Protection of Traditional Knowledge and Plant Intellectual Property Rights: Emerging Challenges and Issues in India

Sanjit Kumar Chakraborty[1]

Assistant Professor, The WB National University of Juridical Sciences (NUJS)

Abstract

"Commercialization of biotechnological findings became an important vehicle in the knowledge-based global economy, but it is the law that makes them merchantable by securing intellectual property rights. It is upon the law, and especially intellectual property law, to act as the 'Gatekeeper' of 'Morality and Public Order', and 'to tame the genie of science' although not too severely, for the present and future generations." *Shoshana Berman*

Keywords: *Commercialization, global, traditional knowledge, intellectual property law.*

I. Introduction

Traditional knowledge is a central component for the daily life of millions of people throughout the world, of which India is not an exception. Communities everywhere in the world have developed knowledge[2] and skills to derive sustainable livelihoods from biodiversity[3]. The traditional knowledge system follows an intuitive, subjective and holistic method of gathering knowledge which is an integrated whole, based primarily on heuristic method[4] of learning. The knowledge so gained is held sacred and usually imparted by oral traditions.[5] It is the knowledge that helps the community rather than the individual to survive in a sustainable manner in a given environment.[6]

The new technological developments, particularly biotechnology and commercial success chalked up by the pharmaceuticals and cosmetic behemoths, clearly demonstrate the significance and usefulness of traditional knowledge for the development of new product of commercial importance.Traditional knowledge associated with biological resources is the knowledge about a country's biodiversity, an intangible component of the resource itself.[7] The informal knowledge about biodiversity in the traditional knowledge system is very important for sustainable use and conservation of local ecosystem and to enrich biodiversity as a whole.[8] There are ample evidences of traditional knowledge and practices involved in enhancing agricultural biodiversity throughout the world. In India, traditional knowledge has contributed much to the forest conservation, soil conservation, seed conservation and crop biodiversity. The indigenous people and traditional farmers have been important agencies in the conservation of plant genetic resources and the transmission of these resources to seed companies, plant breeders and research institutions.[9]

The protection of traditional knowledge is important for communities in all countries for its spiritual, cultural, and economic values particularly in developing countries like India. However, the protection of traditional knowledge of the local and indigenous communities has seem to be one of the most contentious and complicated issue in the latter half of the 20th century, more specifically after the introduction of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPs)[10] of the World Trade Organization (WTO). On one level,

traditional knowledge plays an important role in the economic and social organization of these countries, and placing value on such knowledge is a viable means of promoting a sense of national cohesion and identity. On another level, developing and least developed countries are engaged in implementing two international agreements the Convention on Biological Diversity (CBD) and the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS)[11] that may affect the manner in which knowledge associated with the use of genetic resources whether traditional or not is protected and disseminated. The potential role of intellectual property rights (IPRs)[12] in protection of traditional knowledge is an emerging field, since intellectual property is not only about property, it is also about recognition of and respect for contributions of identifiable human creators.Intellectual property has a very important role to play in protecting the dignity of holder of traditional knowledge and to give a degree of control of its use by others.From this perspective the present work examines the interrelationship between traditional knowledge and sustainable use of agro-biodiversity. An attempt has been made, to explore, how the use of traditional knowledge has assumed significance in the present IPR regime, and its possible effects upon the realization of social, economic, cultural and human rights of the holder of such traditional knowledge in India. An attempt has also been made to give a brief account of the various legislative measures adopted at the national level, considering the development taking place at international level.

II. Traditional Knowledge and Agricultural Biodiversity

Plant Genetic Resources (PGRs)[13] have always been valuable economic assets and the means of livelihood for many people in many countries including India. For thousands of years, traditional farmers have used the genetic variation in wild and cultivated plants, to develop their crops. It is the foundation of sustainability because it provides raw material for adaptation, evolution, and survival of species and individuals, especially under changed environmental, disease and social conditions,[14] and it will allow them to respond to the challenges of the next century.[15] The traditional farmers throughout the globe depend directly on the harvests of the genetic diversity they sow for food and fodder as well as the next season's seed.[16] It has intrinsic ecological, social, economic, scientific, educational, cultural, recreational and aesthetic values for the human society. This natural wealth includes many varieties of crops and animals that indigenous and local communities have developed over centuries. For example, over the last half century, India has probably grown over 30,000 different indigenous varieties and land races of rice. Traditional farmers in India preserved and enhanced the value of plant genetic recourses by their utilization for planting, seed production and continuous selection of the best adapted farmer's varieties (landraces). Such farmers generally interact among themselves on the basis of barter and exchange across the fence, thus fostering the diffusion of their varieties and there further development.[17] In India, a significant part of the land, forests and habitat of tribal people and local communities is being affected by human activities like deforestation, logging, road construction and dam projects, mining, urbanization and conversion of forests to land for agricultural plantation.[18] The loss of resources and habitat has disrupted the social and ecological context within which the communities have made use of their traditional knowledge.

The impact of modernization on these communities, commercialization of agriculture with the introduction of IPR over biological resources and spread of market economies etc. have made international communities to take the initiatives to protect and conserve biodiversity and traditional knowledge related to the use of biological resources.[19] The TRIPs requirements on agricultural biotechnology[20] sometimes come into conflict with other international norms, namely, the right to food[21] under the Universal Declaration of Human Rights (UDHR) and the goal of

benefit-sharing from biological resources under the Convention on Biological Diversity (CBD).[22] It is argued that the introduction of agricultural biotechnology protected under the new intellectual property regime also results to misappropriation of traditional knowledge, corporatization of agriculture, crop monoculture,[23] and bio-piracy,[24] having direct impact upon the human rights of the common people having, both the economic and environmental importance more specifically upon the farmers' rights. The potential role of IPRs in protection of traditional knowledge is an emerging field, since intellectual property is not only about property, it is also about recognition of and respect for contributions of identifiable human creators.[25] From this perspective, intellectual property has a very important role to play in protecting the dignity of holder of traditional knowledge and to give a degree of control of its use by others. It has been observed empathetically that, towards the end of the 20th century and the beginning of the 21st century however, the richness and greatness of this diversity is most threatened due to the enforcement of IPRs regime in agriculture which does not recognize the contribution of the farmers to world's biodiversity.[26] The heritage of biological resources and traditional knowledge related to these is threatened by loss, lack of recognition, absence of legal protection, extinction, and piracy. Therefore, concerns may naturally arise as to the protection, conservation and sustainable use of traditional knowledge.

III. Protection of Traditional Knowledge and Plant Intellectual Property Rights: Issues and Controversies

Prima facie the idea of protecting age-old traditional knowledge in the hi-technological 21st century appears to be an alien concept[27]; however, the method for its protection is one of the most fundamental aspects of traditional knowledge.[28] Recently, western science has become more interested in traditional knowledge and realized that traditional knowledge may help to find useful solutions to current problems, sometimes in combination with "modern" scientific and technological knowledge. Despite the growing recognition of traditional knowledge as a valuable source of knowledge, it has generally been regarded under western intellectual property laws as information in the "public domain", freely available for use by anybody. Moreover, in some cases, diverse forms of traditional knowledge have been appropriated under IPRs by researchers and commercial enterprises, without any compensation to knowledge's creators or possessors.[29] Both farmers and scientists have relied on the store of genetic diversity present in crop plants that has been accumulated by hundred of generations who have observed, selected, multiplied, traded, and kept variants of crop plants. The result is a legacy of genetic resources that, today, feeds billion of humans.[30] In the words of Executive Secretary of the Biodiversity Convention, "in order to protect and encourage [traditional knowledge], the necessary condition may be in place, namely, security of tenure over traditional terrestrial and marine estates; control over and use of traditional natural resources; and respect for the heritage, languages and cultures of indigenous and local communities, best evidenced by appropriate legislative protection (which includes protection of intellectual property, sacred places, and so on)"[31]

IPRs may be itself not have been a problem as a concept what has become a contentious issue is the nature of the meaning and interpretation it has taken on in recent times, its contemporary application and its extrapolation belong mechanical and literary inventions to the biological science and agriculture. This apparent imposition has tended to marginalize weak developing countries as well as impact negatively on their agriculture and food security.[32] Protecting intellectual property in plant varieties and seed has direct impact on the erosion of prior rights of the traditional communities. The Research and Development (R & D) in biotechnology is principally depended upon the 'raw materials' *i.e.* genes, folk varieties, germplasms which were

traditionally preserved and used applying traditional knowledge by the traditional framers of the third world. In developing new varieties, scientists take plant samples from the field to the laboratory, where the simple act of moving a single gene from one spot to another within a cell creates a "Plant Variety" whether or not it causes an actual variation in the next generation, deemed sufficiently "New" to qualify as patentable invention and became the subject of IPRs.[33]

The way IPRs have been designed in modern commerce, traditional knowledge cannot be protected. For instances, traditional knowledge cannot be patented because such knowledge lacks inventive character, because of the inherent lack of novelty. Traditional knowledge is also often held collectively by communities, rather than by individual owners. The traditional knowledge is information that is transmitted from generation to generation generally within the community or within families within the community in an oral form without any adequate documentation. This has caused traditional knowledge holder to be undervalued and marginalized. In fact, one of the fears in these communities is that if the knowledge were to be documented it would have been lost to the community by expropriation.[34] The patent is the primary IPRs that is sought in the field of agricultural biotechnology because it is meant to be right concerning innovations used in new or improved products or processes. For example, the plant varieties conserved and developed by traditional farmers are latter collected, subject to research and breeding, and enter the commercial channels through seed companies. While the latter can protect the improved varieties under the plant breeders rights (PBRs) and benefited from them the farmers are not compensated for the germplasm they have contributed and the value they have created.[35] An essential characteristic of farmer's varieties is their variation over time. For this reason, such varieties cannot normally meet the stability and uniformity requirements imposed under PBRs.[36] In India majority of the farmers depend on the age-old practice of seed saving and exchange which is a major part of seed distribution mechanism as against merely 38% of seed requirement being met by formal agencies like National Seed Corporations. In absence of traditional right of seed saving the farmer will have to pay royalty for seeds for each sowing as he can neither multiple nor use them in following seasons. There are two problems that patent protection generates. The first concerns the monopolistic feature of the cost analysis of patent protection in this field. The second problem generated when formal, industrial, patentable knowledge builds upon prior art of informal traditional knowledge which is a quasi-commons regime. When it comes to the benefit sharing of the profits arising from the exploitation of this knowledge at the international level these problems are amplified.[37] The systems which govern the use and transmission of traditional knowledge within community may be termed as customary or informal regimes. Since customary law is applicable only within the communities, it can't protect the interest of the holders of traditional knowledge when there is conflict with the economic interests of industries and consumers, in present global economy, e.g. "bio-piracy".[38]

IV. Protection of Traditional Knowledge: An Overview International and National Legal Regime

Traditional knowledge is a blend of knowledge and experience integrated with a coherent world-view and value system. While there appears to be little or no problem with regard to sharing of traditional knowledge with the scientific community, the problems seem to arise at the research and commercialization stage.[39] Traditional communities across the worlds have evidently shared a wealth of their knowledge with scientific communities. But the final product of the use of such knowledge, its commercialization and the wealth generated from it has often had the knowledge partners at logger-heads with each other.[40] Because ownership and property rights under modern legal systems are foreign to most traditional-knowledge based communities, many

concluded that traditional knowledge is *res nullius* – the property of nobody- until it is discovered by explorers, corporate scientists, governments and so on. This legal approach to traditional knowledge does not take into account the fact that customary laws recognizes forms of ownership separate from those designated by IP law.[41] Therefore, the people who are the original holder of the traditional knowledge feel that they have been exploited, whereas the members of the scientific communities claim that the crystallization of that knowledge into a commercial venture was entirely their own contribution and they are not required to share a percentage of the commercial benefits with the holders of such traditional knowledge.[42] The issue of traditional knowledge and its protection under the IPRs regime have been addressed in several international organizations and fora.[43] WIPO developed Model Provisions for National Laws for the Protection of Expressions of Folklore against Illicit Exploitation and other Prejudicial Actions.[44] In 1998, WIPO created a Global Intellectual Property Issues Division, which undertook several studies on traditional knowledge and, in particular, organized fact finding missions in different parts of the world to identify the issues at stake and the concerns of the traditional knowledge holders.[45] Article 9.2(a) of the final text which was adopted as a new treaty by the FAO Conference in Rome in November 2001, requires measures for t he protection of traditional knowledge but, in view of scope and purpose of the Treaty, it only refers to knowledge relating to medicinal or industrial uses of plant genetic resources. Under this approach, the issue of protection of traditional knowledge may circumscribed to knowledge incorporated in farmers' varieties (landraces) and certain associated knowledge (for example specific cultivation practices). The development of a *sui generis* regime for the protection of farmers' varieties becomes in this context, one of the possible components of farmers' rights. The UN Working Group on Indigenous Population has the mandate to develop international standards for the rights of indigenous peoples including in relation to their knowledge and cultural integrity. Protection of traditional knowledge has been dealt with, in this framework, as a component of the broader right to practice and revitalize indigenous cultural traditions and customs.[46] A report by the High Commissioner on Human Rights notes that there are tensions between IP protection and the protection of the knowledge of local and indigenous communities (such as those relating to the use of such knowledge by people outside the community without the knowledge holders' consent and to the equitable compensation) that may "require amendments, adaptations and additions to IP systems".[47]

The United Nations Conference on Trade and Development (UNCTAD) held on 30 October-1 November 2000, an "Expert Meeting on Systems and National Experiences for Protecting Traditional Knowledge, Innovations and Practices". The meeting's outcome, which reflected the diversity of views of experts, was taken up in February 2001 by UNCTAD's Commission on Trade in Goods and Services, and Commodities, which negotiated agreed recommendations to governments, to the international community, and to UNCTAD. Recommendations to governments included: to raise awareness about protection of traditional knowledge, to support the innovation potential of local and indigenous communities, to facilitate the documentation of traditional knowledge and to promote the commercialization of traditional knowledge-based products. The Council of TRIPS is an important forum for the discussion of IPRs, biodiversity and the protection of traditional knowledge in the light of TRIPS Agreement and CBD, particularly in the context of the review of article 27.3 (b). The relationship between the protections of traditional knowledge was examined by the Committee on Trade and Environment (CTE) at the WTO. The CTE considered the provisions of the TRIPS Agreement relevant to its work on the environment. Some developing countries have argued that the TRIPS Agreement must be reviewed in light of the obligations on States under Article 8(j)[48] of the CBD. India has noted that while the TRIPS Agreement obliges Members to provide product patents for micro-organisms and for non-biological and microbiological processes, and to provide for the protection of plant varieties, the CBD:

"Categorically reaffirms that nation states have sovereign rights over their own biological resources, recognizes the desirability of sharing equitably the benefits arising from the use of these resources as well as traditional knowledge, innovations and practices relevant to the conservation of biological diversity and its sustainable use, and acknowledges that special provisions are required to meet the needs of developing countries". In order to reconcile any contradictions, India suggested that the innovators share with holders of traditional knowledge the benefits arising from its exploitation, through "material transfer agreements/transfer of information agreements". In the view of the government of India, however: "the modalities for protecting traditional knowledge are still emerging and evolving. The nature of entitlements and share in benefits is also a gray area. Even at the international level, clarity has as yet not emerged and countries are grappling to understand the issue".[49]

The TRIPs Agreement does not provide any guarantee for protection of traditional knowledge,[50]and the same has been mostly recognized by some national legislations.[51] Considering the importance of traditional knowledge Article 8(j) of the Convention on Biodiversity, 1992 (CBD) requires the protection and preservation of traditional knowledge, though it does not require such knowledge to be 'recognized'.[52] The CBD recognizes the sovereign right of states over their genetic resources and stipulates that access to genetic resources can occur only on mutually agreed terms and with 'prior informed consent' of States. This convention also mandates equitable sharing of benefits arising from commercial use of a country's biological resources and stresses on protection and promotion of rights of communities, farmer and indigenous people.

Thus it requires countries to respect and protect indigenous and local community knowledge, ensures that such communities are asked before using their knowledge for wider societal benefits and encourages the equitable sharing of benefits arising from such use.[53] The formal recognition to the central role that indigenous and local communities play in biodiversity conservation through their traditional knowledge system runs counter to the monopolistic concept of IPRs. This recognition must be translated by way of legislation into three major sets of tools, *viz*: positive rights for local communities; funded programmes to support conservation and sustainable use at the local level; and checks on IPRs in order that they promote and do not run counter to, the objectives of the convention.

Article 10(c) of the CBD requires members to "protect and encourage customary use of biological resources in accordance with traditional culture practices that are compatible with conservation or sustainable use requirements". In the CBD, the obligation to protect traditional culture practices is conditional upon those practices serving the goal of conservation and sustainable use. The words 'traditional cultural practices' are not confined to any group. They could apply to the customary practices of any distinct group whether these are the traditional practices of indigenous groups in the Amazan basin or the practices of traditional farming communities in western state.[54] However, this recognition provided by CBD does not find any place in the IPR regime effectively, so reform is needed in it to make it conductive to CBD.[55]

India is known for its cultural heritage and rich traditional knowledge. With only 2.5% of the land area, India already accounts for 7.8% of the recoded species of the world. India is equally rich in vast ancient pool of traditional knowledge, both coded and informal, which forms its rich agricultural-biodiversity and therefore, is an easy target for accessing valuable traditional knowledge and genetic resources. Unregulated access to these may lead to endangering of genetic resources as well as traditional forms of livelihood practiced by traditional communities

thus impacting the ecosystem and the socio-economic- cultural fabric of the country.[56] One of the major challenges before India lies in adopting an instrument which helps realize the objectives of equitable sharing of benefits enchained in the CBD.After an extensive and intensive consultation process involving stake holder, the parliament has passed two Acts relevant to the issues of protection of traditional knowledge, containing the provisions for "Benefit Sharing", which are the PVP Act 2001, and the Biodiversity Act 2002. These Acts recognize the role of traditional farmers as cultivators and conservers and the contribution of traditional, rural, and tribal communities in the country's agro-biodiversity, by making provisions for benefit sharing and compensation. The new concept of farmers' rights to counter the plant breeder's rights has found a place in the Protection of Plant Varieties and Farmers' Rights Act, 2001 (PVP Act 2001). On the other hand the Biodiversity Act 2002, which was enacted with a view to give effect to the CBD, contains the provisions relating to conserve and sustainable use of biological Diversity, to respect and protect traditional knowledge of local communities related to biodiversity, and secure sharing of benefits with local communities. The proprietary claims to PGRs are articulated in multilateral trade negotiations and institutions most notably through *Article 27.3* of the TRIPs Agreement. Developing countries can weigh the benefits of PBRs in the context of their unique socio-economic issues to accommodate public health or public interest exceptions. Thus, developing countries can establish a *sui generis* PBRs regime that eliminates or reduces adverse welfare effects.[57] At the national level, a significant progress has been made to set up a 'Legal Framework' addressing the human rights issues related to it. The Protection of Plant Varieties and Farmers' Rights Act, 2001 is the Indian *sui generis* legislation, which directly addresses the issues of protection of plant varieties, and rights of farmers and plant breeders in India. Since protection of Plant Varieties has a direct nexus with the sustainable use of biodiversity and food security[58] the country has introduced legislations pertaining to the CBD in the form of the Biological Diversity Act, 2002 and also makes the necessary amendments in the Patent Act 1970. However, it is argued that India's policy change on IPRs resulted from a political bargaining process that attempted to appease a number of different interest groups. In so doing, it may have led to the allocation of ownership rights in a manner that focuses on specific interests but overlooks general welfare.[59]

India uses the *sui generis* option to construct legislation that establishes plant breeder's and articulates a concept of Farmers' Rights as well under the PVP Act, 2001. The Act incorporates the rights of the traditional farmers as breeders, conservators and cultivators, including the rights to save, use, sow, resow, exchange, share or sell their farm produce. Generally speaking, the Act envisages that farmers should be treated like commercial breeders and should receive the same kind of protection for the varieties they develop.[60] The Act also provides for the construction of a National Gene Fund, which shall be applied for meeting any amount to be paid by way of *benefit sharing* and other expenditure. The introduction of IPRs in agricultural biotechnology cannot be disassociated from the conservation of agro-biodiversity, the protection of traditional knowledge and the scope of patent in life forms. The Biological Diversity Act, 2002 was passed to advance the objectives related to conservation of biological diversity, sustainable use of its components and fair and equitable sharing of benefits arising out of the use of biological resources and knowledge. The Act puts limit on the access to biological resources or related knowledge for all foreigners to overcome the problem of *biopiracy* and block the unhindered access to genetic resources.[61] The Act insists upon the sovereign rights over its own biological resources as recognized by the Convention of Biological Diversity (CBD) of 1992. Under this Act, a broader concept of benefit sharing encompassing various alternatives has been incorporated.

Indian Patents Act, 1970 in its original form, dealt with patents in general and was not specifically related to agricultural biodiversity and traditional knowledge resources. It rejected the patentability of all methods of agriculture and was generally much more restrictive than similar laws in other developed countries. However, considering the development of technological capability and the obligations under the TRIPS Agreement, the Act has been amended time to time. In the light of *Article 27* of the TRIPs Agreement the Section 3 of the Patent Act, 1970 has been amended. The definition of "invention", "new invention", and "inventive step" reflects restrictive approach to the legal protection of living materials.[62] While amending the Act, Indian legislature has taken full advantage of the flexibilities, which the TRIPS Agreement provides. After the amendment of the Patent Act in 2002, microorganisms were made patentable. However, plants and animals in whole or any part thereof including seeds, varieties and species and essentially biological processes for production or propagation of plants and animals were excluded from patent protection.[63] The Amendment Act, 2002 includes some of the TRIPS exceptions related to environment and addresses the question of *biopiracy* by imposing the disclosure of the source and geographical origin of biological material used in a patented invention. However, in the absence of definition for "plant", "animal", "micro-organism", "essentially biological process" and "plant variety" its interpretation by the patent office becomes crucial. Since the term micro-organism can have a variety of definition which may not be exhaustive to include genetic material, it is argued that it is safer to place reliance upon the guiding provision in TRIPs agreement.[64] There are strong linkages between these three legislations and cannot be disassociated from one another. An attempt has been made to overcome all the issues and controversies relating to the introduction of IPRs over PGRs and realization of human rights. The current legal frame work however, suffers from lack of effective cooperation and cohesion, due to different origins of the Acts.[65]

Realizing the importance of traditional knowledge and lack of its documentation in international language, a major initiative has been taken by India in early 2001 in terms of developing a Traditional Knowledge Digital Library (TKDL).[66] TKDL is a database that contains 34 million pages of formatted information on some 2,260,000 (0.226 million) medicinal formulations in multiple language. In the year 2014, TKDL has achieved success in preventing the grant of wrong patent in 24 cases without any cost.[67] It intends to give legitimacy to existing Ayurvedic and related traditional knowledge and enable protection of such information from getting patented by the fly-by-nigh in vendors acquiring patents on Indian traditional knowledge. TKDL ensures case of retrieval of traditional knowledge related information by patent examiners and thus ensuring avoidance or misappropriation of Indian traditional knowledge. This will also clearly identify a large number of patents already granted on our traditional knowledge for non original inventions, which may require cancellation. At present this unique library has 250,000 entries specifying the source and the efficacy of each product.[68]

V. Conclusion

The problems associated trade in globalised world, human and economic development is vast and complex which makes the issue of protection of traditional knowledge extremely complicated. The development of any regime for the protection of traditional knowledge should be grounded on a sound definition of the objectives sought, and on the appropriateness of the instrument selected to achieve them.[69] Keeping in mind the importance of protection and preservation of traditional knowledge India has called for a binding treaty to protect traditional knowledge at the WIPO so that action can be taken by countries against infringement of such rights by others. Mr. Ananad Sharma, Union Minister for Commerce, and Industry representing the Country at WIPO, Geneva said "India has been at the forefront for bringing this agenda on the negotiating

table and for the last one decade, we have been trying to build consensus for a binding treaty on traditional knowledge. I hope that WIPO shall be able to bring these negotiations to culmination." He went to say "it is my belief that while all countries are obliged to honour their international commitments, inherent flexibilities must be provided to developing countries to address these pressing social challenges." Expressing his concern about extensive bio-piracy through patents which are being awarded for traditional knowledge he emphasized to strike a balance between the interests of the IP creators and the larger interest of IP users.[70]

The development and dissemination of new technology protected by IPRs is an important factor determining the future of agriculture.[71] A revolution in agricultural technology is the need of the times to meet the various challenges. However, issues of protection of traditional knowledge, bio-safety, especially food safety have to be addressed adequately.[72] In August, 2000 the UN Sub-Commission on the Promotion and Protection of Human Rights adopted Resolution 2000/7 stresses that "actual or potential conflicts exists between the implementation of TRIPs Agreement and the realization of economic, social and cultural rights." To address these conflicts, the Sub-Commission set out an ambitious new agenda for reviewing intellectual property issues within the United Nations, an agenda animated by the principle that human rights must be given "primacy….over economic policies and agreements."[73]

Although IPRs may in some cases, represent a barrier to both public and private sector research and adoption, and utilization of promising agricultural biotechnologies in developing and developed countries, the barriers are not insurmountable.[74] The seemingly insurmountable barriers of IPRs and issues relating to protection of traditional knowledge can be addressed properly by collective efforts by all concerned, particularly developing countries themselves through a regional approach.[75] The Declaration on International Economic Cooperation adopted by the General Assembly in May 1990 clearly recognizes that, *'Economic development must be environmentally sound and sustainable'.* The issues relating to traditional knowledge should be addressed in a holistic manner, including ethical, environmental and socio-economic concerns. There are, in addition, many still unresolved technical issues such as the problem of collective ownership and the modes of enforcement of rights.[76] Adequate and effective steps must be taken to promote the development, towards the protection of traditional knowledge, including the resolution of underlying issues such as land rights and the need to respect and maintain the lifestyles of local and indigenous communities in their suitable environment. There must be continuous cooperation between the various national and international organizations in working to clarify the possible role, scope and content of systems of protection for traditional knowledge. Above all the state must take adequate and effective initiatives to ensure a broad and effective participation of representatives from local and indigenous communities in the definition and implementation of any system for the protection of traditional knowledge. Policies are to be framed materializing the sustainable model, for the protection and preservation of traditional knowledge and agricultural biodiversity to protect environment and human rights. Challenges are to be accepted for mapping out the ways to implement the concept of sustainable development in order to survive on this planet.

Refrences

1 *Assistant Professor of Law*, The WB National University of Juridical Sciences (NUJS), "Dr. Ambedkar Bhavan", 12, LB Block, Sector-III, Salt Lake City, Kolkata, West Bengal, India, PIN- 700 098, E-mail :*skconline@rediffmail.com*

This research article is based on and is part of author's Doctoral Research Work.

Shoshana Berman, "Legal and Moral Reflections on Modern Biotechnology in Use & Misuse" in Wolrad Prinz zu Waldeck und Pyrmont, Martin J. Adelmann, *et.al.* (eds.), *Patents and Technological Progress in a Globalized World*210 (Springer, Verlag Berlin Heidelberg, 2009).

2 Such knowledge is popularly known as *'traditional knowledge'* which is employed to mean knowledge, innovations and practices of indigenous and local communities embodying traditional life-styles; the wisdom developed over many generations of holistic traditional scientific utilization of the lands, natural resources, and environment. It is generally passed down by word of mouth, from generation to generation and is, for the most part, undocumented. Some of the synonymous to the term are 'indigenous knowledge', 'local knowledge', 'folk knowledge' and 'wisdom of the elders'. It does not represent the universal nature; rather it is knowledge relevant to a given population of particular geographic area.

3 *Section 2(b)* of the Biological Diversity Act, 2002 defines the term Biological Diversity as 'the variability among living organism from all sources and the ecological complexes of which they are part, and includes diversity within species or between species and of eco-system'.

4 Learning by doing and experiencing, learning from successes and failures, correcting failures, consolidating successes.

5 Sunita K Sreedharan, "Bridging Time and Tide- Traditional Knowledge in the 21st Century" 147 *JIPR* 15 (2010).

6 Article 8(j) of the Convention on Biological Diversity addresses such knowledge, without using the term 'traditional knowledge'.

7 Dr. Vishwas Kumar Chouhan, "Protecton of Traditional Knowledge in India by Patent: Legal Aspect" 3(1) *JHSS* 35 (2012).

8 The World Bank has stated the following features of indigenous knowledge:
Indigenous knowledge is local knowledge
It is unique to every culture and society
It is the basis for local-level decision making in agriculture, health care, food preparation, education, natural-resource management, and a host of other activities in communities
It provides problem solving strategies for communities
It is commonly held by communities rather than individuals, and It is tacit knowledge and therefore difficult to codify. It is embedded in community practices, institutions, relationships and rituals. *available at:* http://www.worldbank.org/afr/ik/what.htm (Visited on August 27, 2016)

9 ElizabethVerkey, *Law of Plant Varieties Protection,* 149 (EBC, New Delhi, 1st edn. 2007).

10 The Agreement on Trade Related Aspects of Intellectual Property (TRIPs), which entered into force in 1995, requires the members of the WTO to provide patent or some other form of intellectual property protection for biotechnological inventions. The Agreement provides extensions to the same for least-developed countries.

11 The international intellectual property system has become a network of numerous institutions with many new actors, establishing and operating under new structure, and generating a welter of new norms. This is a much less convenient, much messier picture than the narrative of TRIPs as the central framework. But it is fuller picture of the system by which intellectual property norms are generated and implemented internationally. The adoption of TRIPs generated institutional competition with WIPO and gave birth to a useful range of alternative law making devices. The enhanced protection that TRIPs ensured on a broader geographic scale raised the visibility of intellectual property rights and drew a broader range of actors into the public debate and the law making process. *See*, Graeme B. Dinwoodie, "The International Intellectual Property Law System: New Actors, New Institutions, New Sources", 206 *Marquette Intellectual Property Law Review*, 10:2 (2006).

12 Intellectual Property Rights refer to a class of legal rights which typically protect intangible creations of mind. It was only in the twentieth century that the term 'intellectual property' became used generically to refer to a 'group of legal regimes which began their existence independently of each other and at different times in different places'. *See*,Peter Drahos, *A Philosophy of Intellectual Property* 14 (Dartmouth, UK, 1996).

13 *Article 2 of the FAO International Code of Conduct for Plant Germplasm Collecting and Transfer defines plant genetic resources as "the reproductive or vegetative propagating materials of plants".*The revised International Undertaking, 1983 of the FAO, defines plant genetic resources as the entire generative and vegetative reproductive material of species with economical and/ or social value, especially for the agriculture of the present and the future with special emphasis on nutritional plants. For details *see*, K. Hammer and Y. Teklu, "Plant Genetic Resources: Selected Issues from Genetic Erosion to Genetic Engineering" 109 (1) *JARDTS* 17 (2008).

14 K. Hammer, *Resolving the Challenge Posed by Agro-biodiversity and Plant Genetic Resources - An Attempt*, (Kassel University Press GmbH, Germany; 2004), *available at:* http://www.uni-kassel.de/upress/online/frei/978-3-89958-056-3.volltext.frei.pdf (Visited on October 11, 2016).

15 Hammer, K., Diederichsen, A. and Spahillari, M., "Basic studies toward strategies for conservation of plant genetic resources" in Serwinski, J. *et.al* (eds.): *Proceedings of the Technical Meeting on the Methodology of the FAO World Information and Early Warning System on Plant Genetic Resources*, 29–33 (1999).

16 Smale, M., Bellon, M. R., Jarvis, D. and Sthapit, B., "Economic concepts for designing policies to conserve crop genetic resources on farms" 51 *Genet. Resour. Crop Evol.*, 121–135 (2004).

17 Carlos M Correa, *Traditional knowledge and Intellectual Property – Issues and options surrounding the protection of traditional knowledge*, 5, (Discussion Paper, Quaker United Nations Office Geneva, November, 2001).

18 *See generally*, Ashish Kothari, R.V. Anuradha, "Biodiversity, Intellectual Property Rights and GATT Agreement – How to Address the Conflict? XXXII *EPW* 2814-2820 (1997).

19 Hoan T. Le, "The Potential of Biotechnology to Promote Agricultural Development and Food Security" in Joseph Cooper, Leslie Marie Lipper *et. al.*(eds.) *Agricultural Biodiversity and Biotechnology in Economic Development* 275 (Springer, New York, 2005).

20 The term 'agricultural biotechnology' encompasses a wide range of tools and methodologies that are being applied to an increasing extent in crops, livestock, forestry, fisheries and aquaculture, and in agro-industry for a range of different purposes. *See generally,* 'Key Conclusions' in FAO Doc ABDC-10/Report (2010) at para 37(a).

21 Right to food is firmly rooted in international human rights documents such as: the Universal Declaration of Human Rights (Article 25), the International Covenant on Economic, Social and Cultural Rights (Article 11), the Declaration of the Rights of the Child (Principle 4), the Universal Declaration on the Eradication of Hunger and Malnutrition (Article 1) etc. *Article 11(1)* of the International Covenant on Economic, Social and Cultural Rights (1996) provides that the States parties to the present Covenant recognize the right of every one to an adequate food, clothing and housing, and to the continuous improvement of living conditions. Under *Article 11(2)(a)* the States Parties to the covenant also recognized the fundamental right to everyone to be freedom from hunger, and they undertook the liability to improve methods of production, conservation and distribution of food by making full use of technical and scientific knowledge.

22 C.M. Ho, "Agricultural Biotechnology under TRIPs and Beyond: Addressing Social policies in a Pro-patent Environment" in Jay Kesan (ed.), *Agricultural Biotechnology and Intellectual Property: Seeds of Change 305* (CAB International, UK, 2007).

23 'Crop monoculture' is the agricultural practice of producing or growing a single crop or plant species year after year consecutively. It is widely used in modern industrial agriculture which can lead to the quicker spread of diseases, where a uniform crop is susceptible to a pathogen.

24 The term 'bio-piracy' means the illicit collection, smuggling and trade in marketable biological resources. It is the illegal appropriation of life such as microorganisms, plants, and animals-including humans- and the traditional cultural knowledge that accompanies it. *See*, V.K. Gupta, Traditional Knowledge Digital Library, in Conference Proceedings of Sub-Regional Experts Meeting in Asia on Intangible Cultural Heritage, Bangkok, Thailand, 13-16 December, 2005, *available at:* http://www.accu.or.jp/ich/en/pdf/c2005sub_reg_ind/pdf (Visited on October 12, 2016).

25 *See generally*, Dr. B. Pandey, "Biological Diversity Bill – 2000: Traditional Knowledge and Intellectual Property Rights", XV *CLIQ* 226-240 (2002).

26 *See generally*, Lawrence Surendra & N. S. Gopalakrishnan, "Intellectual Property, Seeds, the Future of Farmers and Farming" 5*SCC(J)* 11-20.

27 Sunita K Sreedharan, "Bridging Time and Tide- Traditional Knowledge in the 21st Century" 146 JIPR 15 (2010).

28 Protection here has a more positive role in supporting traditional knowledge -based communities livelihoods and cultures as proposed by the Organisation of African Unity's (OAU's) Model Law and its definition of community right. The main arguments for granting protection of traditional knowledge include:
Equality consideration,
Conservation concerns,
The preservation of traditional practices and culture,
The prevention of appropriation by unauthorized parties of components of traditional knowledge,
Promotion of its use and its importance in development.

29 Martin Gisberger, "Intellectual Property Rights and Traditional Knowledge: Background, Terminology and Issues Arising", (Paper presented to the Workshop Biological Diversity and Biotechnology, Berne, Switzerland, 9-11 Mar 2000).

30 Stephen Brush, *Genes in the Field: On- farm Conservation of Crop Diversity* 3 (Lewis Publishers, Boca Raton, Ottawa and Rome, 2000).

31 In Traditional Knowledge and Biological Diversity, UNCEP/CBD/traditional knowledge BD/1/2, October 18, 1997, para 9.

32 The biggest challenge to the agriculture of developing countries, in the post –WTO period, was posed by unprecedented and unforeseen decline in International agricultural price. Because of this, exports of developing countries were badly hit and several countries were taken aback by import influx of those commodities in which they thought they had strong competitive edge. This caused adverse impact on farmers' income and employment.*See*, Rames Chand, "WTO Agriculture Negotiations and India" in Alokesh Barua and Robert M. Stern (eds.), *The WTO and India: Issues and Negotiating Strategies* 135 (Orient Black Swan, New Delhi, 1st ed., 2010).

33 Alexander Gillespic, "Common Property, Private Property and Equity: Clash of Values and the Quest to Preserve Biodiversity", 12*EAPLJ* 391 (1995).

34 Mohan Dewan "Inside Views: The Realities Of Traditional Knowledge And Patents in India", *available at*:http://www.ip-watch.org/2010/09/27/the-realities-of-traditional-knowledge-and-patents/ (Visited on 2nd September, 2013).

35 *See generally*, J. Chen, "Biodiversity and Biotechnology: A Misunderstood Relationship" in Jay Kesan (ed.), *Agricultural Biotechnology and Intellectual Property- Seeds of Change* 347-372(CAB International, Oxfordshire, UK, 2007).

36 Carlos M Correa, *Traditional knowledge and Intellectual Property – Issues and options surrounding the protection of traditional knowledge,* 5-6, (Discussion Paper Quaker United Nations Office Geneva, November, 2001); *See also,* Jonathan Curci, *The Protection of Biodiversity and Traditional knowledge in International Law of Intellectual Property*, 50-51 (Cambridge University Press, New York, 1st edn. 2010).

37 Jonathan Curci, *The Protection of Biodiversity and Traditional knowledge in International Law of Intellectual Property*, 5-6 (Cambridge University Press, New York, 1st edn. 2010).

38 In May, 1995 the Us Patent office granted to the University of Mississippi Medical Center a patent [5, 401, 504] for "Use of Turmeric in wound Healing." For Indians turmeric is a benevolent goddess, which permeates their life. It is an easy and generous plant [*curcurma longa*] that grows throughout the sub-continent. The patent was promptly challenged by Dr. R.A. Mashelkar, an Indian Scientist, who has done much to awaken India to IPRs issues. After four months submission it was established that the use of turmeric as a healing agent was well known to India. The patent was annulled. Another example of bio piracy is the 'Neem' [*Azadirachta Indica*] which has been used for diverse purposes over centuries in India, particularly in medicine and agriculture. The neem extracts can influence many species of insects, which are resistant to pesticides. In India there has been considerable research upon the properties of neem carried on for more than half century in Institute ranging from the Indian Agricultural Research Institute and the Malaria Research Centre to the TATA Energy Research Institute and the Khadi and Village Industries Commission (KVIC), and a large number of neem based commercial products are also present in the Indian market. In 1971, US timber importer Robert Larsen conducted safety and performance tests upon a pesticide neem extract called *Margosan-O* and in 1985 received clearance for the product from the US Environmental Protection Agency (EPA). Three years later he sold the patent for the product to the multinational chemical corporation WR Grace and Company. Two *Neem* patents as held by the *WR Grace and Company* have been challenged one in US and one in the European Patent Office.

39 *See generally*, Traditional Knowledge and the Convention on Biological Diversity, Convention on Biological Diversity, *available at*: http://www.cbd.int/traditional/intro.shtml ((Visited on September 27, 2016).

40 Sunita K Sreedharan, "Bridging Time and Tide- Traditional Knowledge in the 21st Century" 149*JIPR* 15 (2010).

41 Carlos M Correa, *Traditional knowledge and Intellectual Property – Issues and options surrounding the protection of traditional knowledge,* 3 (Discussion Paper Quaker United Nations Office Geneva, November, 2001)

42 *Supra* note 40 at 149.

43 Issues relating to traditional knowledge and intellectual property have been dealt with by UNEP/CBD, WIPO, UNCTAD and WTO. Though the role of these different organizations and for a significantly different, some of the organizations have cooperated with each other for protection and preservation of traditional knowledge. *Ibid* at 20

44 *See,* the Report of the WIPO-UNESCO Working Group on the Protection of Aboriginal Folklore, 1981.

45 The programme undertaken by WIPO for 2000-2001 covered: 1. Protection of traditional knowledge, innovations and creativity; 2.Biotechnology and biodiversity; 3.Protection of folklore; Intellectual property and development.

46 Article 12 of the Draft UN Declaration of the Rights of Indigenous Peoples as agreed at the 11th Session (1993) of the Working Group on Indigenous Populations.

47 UN Economic and Social Council, "Economic, Social and Cultural Rights- the Impact of the Agreement on Trade Related Aspects of Intellectual Property Rights on Human Rights"*Report of the High Commissioner*, E/CN.4/Sub.2/2001/13, Jun 2001.

48 Article 8(j) of CBD calls upon the States to "respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application with the approval and involvement of the holders of such knowledge, innovations and

practices and encourage the equitable sharing of the benefits arising from the utilization of such knowledge, innovations and practices."

49 *Supra* note 47 at23

50 Hans Morten Haugen, *The Right to Food and the TRIPS Agreement – With a Particular Emphasis on Developing Countries' Measures for Food Production and Distribution* 400 (Martinus Nijhoff Publishers, Leiden, 2007).

51 *See*, The Overview of National Legislation and Traditional Knowledge, WIPO, (2002a).

52 *Supra* note50at 187.

53 S.K. Verma, Access to Biological and Genetic Resources and their Protection", 43(1) *JILI* 5-7 (2001).

54 "Study on the Relationship Between the Agreement on TRIPS and Biodiversity Related Issues, Final Report", 83 , Submitted by CEAS Consultants (Wye) Ltd., Centre for European Agricultural Studies in association with Geoff Tansey and Queen Mary Intellectual Property Research Institute (2000).

55 *See generally*, Md. Zafar Mahfooz Nomani, Environment Agriculture and Challenges of Bio-piracy: A Blue Print of Indian *Sui generis* Legal Order" 1(2) *IJEL* 3-22 (2000).

56 Sunita K Sreedharan, "Bridging Time and Tide- Traditional Knowledge in the 21st Century" 146 *JIPR* 15 (2010).

57 S. Ragavan, "To Sow or Not to Sow: Dilemas in Creating New Rights in Food" in Jay Kesan (ed.), *Agricultural Biotechnology and Intellectual Property: Seeds of Change 327* (CAB International, UK, 2007).

58 Food security refers to a situation of availability of food and one's access to it. The obligation to fulfill or facilitate right to food requires that the State must property-actively engage in activities intended to strengthen people's access to and utilization of resources and means to ensure their livelihood, including food security. For details *see*, Dr. Nafees Ahmad, "Right to Food: Towards an Existential Atrophy", *available at*: https://www.academia.edu/4050548/Right_To_Food_Towards_An_Existential_Atrophy (Visited on September 27, 2015).

59 Saksham Chaturvedi and Chanchal Agrawal, "Analysis of farmer rights: in the light of Protection of Plant Varieties and Farmers' Rights Act of India" 708-714*European Intellectual Property Review*33(2011).

60 Dr. Philippe Cullet & Radhika Kolluru, "Plant Variety Protection And Farmers Rights-Towards A Broader Understanding" 24 *Delhi Law Review* 48, 2002 (2003).

61 *Section 3* of the Biological Diversity Act, 2002.

62 Dr. Mike Adcock & Dr. Margegret Llewellyn, *Law and Ethics* (University of Sheffield, UK).

63 *Section 3(j)* of the Patents Act, 1970.

64 Basheer Shamnad, "India's Tryst with TRIPs: The Patent (Amendment) Act, 2005" *The Journal of Law and Technology*, quoted in *JIPR* (January, 2008).

65 Since, in practice, Patents are dealt within the Ministry of Industry and Commerce, Plant Variety in the Ministry of Agriculture and Biodiversity in the Ministry of Environment and Forests,there, seems to be lack of effective cooperation in the drafting and hence over lapping of the bodies and their functions under these legislations. *See generally*, Philippe Cullet, *Intellectual Property Protection and Sustainable Development,* 270-284 (LexisNexis, New Delhi, 2005).

66 For a detail discussion on Protection of Traditional Knowledge through Documentation and the Role of TKDL *see*, Shahid Alikhan and Raghunath Mashelkar, *Intellectual Property and Competitive Strategies in the 21st Century* 83-85 (Aditya Books Pvt. Ltd., New Delhi, First Indian Reprint, 2006).

67 Dr. V.K. Gupta, "Protecting India's Traditional Knowledge" 3 *WIPO Magazine* 12 (2011).

68 Information given by Mr. Ananad Sharma, Union Minister for Commerce, and Industry while addressing a high level policy dialogue at WIPO, Geneva on 08.03.2013.

69 Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional knowledge and Folklore Report, WIPO, WIPO/GRTKF/IC/1/3, (Geneva, 2013).

70 Amit Sen, "India Calls for Binding Treaty on Traditional Knowledge" Business Line, 8 April, 2013.

71 Mr. G. Chandrashekhar, "Role of technology in agriculture" 5 *The Hindu Survey of Indian Agriculture* (2006).

72 *See generally*, Lesser W, "The Effects of TRIPs-mandated Intellectual Property Rights on Economic Activities in Developing Countries", *available at*: http://www.wipo.int/about-ip/en/studies/pdf/ssa_lesser_TRIPS.pdf (Visited on August 26, 2015).

73 *See generally*, Helfer, L. R. "Human Rights and Intellectual Property: Conflict or Coexistence?" 5 (I) *MINNESOTA Intellectual Property Review*, 47-61 (2003).

74 Sara Boettiger and Karel Schubert, "Agricultural Biotechnology and Developing Countries: The Intellectual Property Resource for Agriculture (PIPRA)" in Charles Mc Manis (ed.), *Biodiversity & The Law- Intellectual Property, Biootechnology & Traditional Knowledge* 200 (earthscan, London, 1st ed. 2007).

75 Hoan T. Le, "The Potential of Biotechnology to Promote Agricultural Development and Food Security" in Joseph Cooper, Leslie Marie Lipper *et. al.*(eds.) *Agricultural Biodiversity and Biotechnology in Economic Development* 275 (Springer, New York, 2005).

76 Carlos M. Correa, *Traditional knowledge and Intellectual Property – Issues and options surrounding the protection of traditional knowledge,* 27 (Discussion Paper Quaker United Nations Office Geneva, November, 2001).