
“Bio-Piracy: Legal System and Sustainable Development”

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ABSTRACT: *The Intellectual property rights have been more economically and politically important and controversial in recent times. The issues relating to IPRs are frequently discussed and debated as relating to biodiversity management, use of genetic resources, biotechnology, traditional knowledge, biopiracy, access and benefit sharing of biological resources etc., at international and national levels. So IPRs have a number of socio-economic impacts which require the adoption of a broader perspective rather than purely in terms of economic development.*

The management of biological resources is an important issue at national and international level due to progressive recognition of economic opportunities arising from the use of biodiversity. The current IPRs regime is encouraging the commercialization of Biodiversity and related traditional knowledge. The developed countries are not rich in biological resources but are better equipped in research and development. So the biotechnology industries in capital rich developed countries, strongly favours for

strong IPRs regimes over biological resources and derived products.

There is growing evidence of misappropriation of traditional knowledge and the rights of farmers and local communities by the corporations and private research institutions that have been patenting genetic material and knowledge relating to their use. So the rush of patenting genes, plant varieties and medicines increase (through biopiracy) in which the resources and knowledge of developing countries are parented by institutions of developed countries.

India being a member of the various international conventions and agreements is bound to enact/amend relevant domestic Laws to gear up and face the challenges of globalization. The IPRs related Laws in India is undergoing changes in order to confirm to stipulations in the TRIPS Agreement. This paper analyse the concept of Biopiracy of Biodiversity and traditional Knowledge, current legal mechanism and challenges in this concern.

BIOPIRACY:

Biopiracy is a phenomenon where traditional knowledge of indigenous peoples is exploited for commercial gain without their permission and from and compensation to the indigenous people.¹ IPRs are introduced (mainly patents and PBRs) to have monopolistic control over the biological resources and traditional knowledge for commercial exploitation of communities knowledge without their consent or without any benefit sharing to the original holders of these resources or knowledge.² These practices contribute to inequality between developing countries which are rich in biodiversity and developed countries hosting companies engaging biopiracy. In fact a large number of patents have been granted on biological resources and knowledge without the consent of the possessor of the knowledge. There has been extensive documentation of IPRs being sought over biological resources, developed and used by local communities (e.g. the case of Neem, Turmeric and Basmati rice in India which have been revoked later). It occurs when patents are wrongly granted on innovations that are not novel, since the knowledge has already existed as Traditional Knowledge (TK) in the public domain. It can also occur when patents are rightly granted but are based on pre-existing or with minor modifications in existing TK. The presences of

regressive domestic IPRs laws also contribute to biopiracy.³

IMPLICATIONS OF BIOPIRACY:

The implications of biopiracy are economic as well as ethical as mentioned below-

- The original holders of biological resources and related traditional knowledge do not get any share in the profits made from commercializing their resources or knowledge. They also do not get any recognition for nurturing and developing the resource/knowledge in the first place.
- Once an IPR is acquired by the biopirate, the original holder of a bioresource or related traditional knowledge are barred from making any commercial use of the IPR protected knowledge or resource, for example, a community is not allowed to sell an indigenous product that is covered by an IPR.
- The IPR holder dictates the terms of the use of the IPR protected resource/knowledge which could mean that traditional communities (who are the original holders) could lose access to or control over.

¹ www.thefreedictionary.com/biopiracy.

² IPRs, Biodiversity and TK; Tejaswani Apte, p 35.

³ www.cutsinternational.org,2007

- Traditional communities are especially vulnerable to biopiracy because they do not consider their seed, crop and livestock varieties, forest and related knowledge as private property, but as communal property, God given or passed down by generations who have nurtured and developed the natural resources and related knowledge.
- The phenomenon gives rise to reverse transfer of technology because the developing countries are transferring traditional knowledge to the rich-developed world without getting any reward and getting the protected end products at high price. For most traditional communities, the concept of private ownership of a resource like a seed variety is completely alien, thus hindering a full appreciation of the threats and implications of an IPR regime.⁴
- The patenting and IPRs protection of biological resources by private interest has the potential to restrict the ability of producers to use the processes and products relating to TK. Those who have been keeping and using TK could thus be restricted and discouraged.⁵
- The large scale granting of patents for genes and other biological materials and organisms is leading to an even greater concentration of control over the world's food crops, such as maize, potato, soya bean and wheat, in a few global corporations.⁶

Business corporations want to stop others from commercially exploiting the findings of their bio-prospecting and research activities. Large amount of money is spent on research and development of a new product. The pharmaceutical industry in particular is the most research-intensive industry in the world which invests large amount of time and money on developing new drugs and depends heavily on the patent system to recoup its research and development costs.⁷

CASES OF BIOPIRACY:

(a) Turmeric (*Curcuma longa*) case:

Turmeric is a plant of ginger family which is used as spice for flavoring cooking in India. Along with this it has properties that make it an effective ingredient in medicines cosmetics etc. As a medicine it is used to heal wounds and rashes. In 1995, two expatriate Indians were granted a US Patent⁸ for using turmeric

⁴ Tejaswani Apte, Supra Note.

⁵ Martin Khor, Supra Note.

⁶ Action Aid, 1999, Supra Note.

⁷ CIPR 2002, p. 29.

⁸ US patent (NO 54015041)

to be used as a medicine for wound healing. The Council of Scientific and Industrial Research (CSIR) filed a re-examination case with US patent and Trademark office, challenging the patents on the ground of “prior art”. CSIR pointed out that the said turmeric has been used for thousand years for healing wounds and rashes and therefore its use as a medicine was not a new invention. The patent office upheld the objections filed by the CSIR and revoked the patent stating that there were no novelty and the findings reported by the inventors were known in India for centuries. The turmeric case was a landmark judgment as it was the first time a patent based on TK was successfully challenged.

(b) Case of Neem (Azadirachta Indica)

Neem is a tree found in India and other parts of South and Southeast Asia. It is famous for its properties as a natural medicine, pesticide and fertilizer. Neem extracts can be used against hundreds of pests and fungal diseases that attack crops; oil extracted from its seeds is used to treat colds and flu and is believed to relieve from malaria and several skin diseases. In 1994 European Patent Office granted a patent⁹ to the US Corporation WR Grace Company and US Department of agriculture for a method of controlling fungi on plants

⁹ EPO Patent No 436257

using extracted Neem oil. In 1995 a group of international NGO’s and representatives of Indian farmers filed a petition against the patent. They submitted evidence that the fungicide effect of Neem seeds was known and used for centuries in Indian agriculture to protect crops and thus was lacking inventive step. EPO accepted this claim and revoked the patent¹⁴.

(c) The Basmati Case¹⁰

Basmati is a plant that has been cultivated in India, Nepal and Pakistan for centuries. Nevertheless, in 1997, the U.S. Company "Rice Tec" applied for 16 patents on genetic variations of "Basmati," of which the trademark "Texmati" is the best known. Fortunately, this attempt at biopiracy failed.

The Jeevani drug (Kani tribe, India) and Ayahuasca¹¹(traditional medicine used by native of Amazon) are other cases where the patent granted on TK based products was successfully challenged.

INTERNATIONAL LEGAL MECHANISM :

Traditional Knowledge is a complex multi facet issue. Many countries and Organizations worldwide are considering how to address this

¹⁰ RiceTech Corporation Patent No. 5663484

¹¹ US plant patent (Patent no 5751)

issue at international, regional and national levels. Issue relating to TK and Biopiracy is also discussed in arenas relating to rights of indigenous people and cultural expressions. Of course the role of different organization in framing a policy significantly varies from each other.

(a) Convention on Biological Diversity, 1992

The convention on biological diversity (CBD) provides for recognition of knowledge of local and indigenous communities in genetic materials and sharing of benefit derived from it. Article 8(j) of the convention provides that “each contracting party shall as far as possible and as appropriate, subject to its national legislation respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyle and is relevant for the conservation and sustainable use of biodiversity and promote the wider application with the approval and of the holders of such knowledge.

The obligations imposed by CBD are subordinate to national legislations.¹² i.e. States are free to depart from these obligations by enacting national legislation. Prior to the CBD, biological resources were regarded as the ‘common heritage of mankind’ over which

no State could claim ownership rights.¹³ This led to a situation where innovators based in Innovating States used biological resources located in Origin States to create intellectual property and commercially exploited the same without sharing the benefits with Origin States. This practice was termed ‘bio-piracy’ by Origin States, who sought to curb it through the CBD. This is why the CBD is primarily concerned with the intrinsic value of biological diversity and reaffirms that States have sovereign rights over their own biological resources.¹⁴

(b) Trade Related Aspects of Intellectual property Rights (TRIPS agreement), 1994

TRIPS agreement also has some provision which can be applied in a limited way for protection of traditional knowledge. As per the article 1 of TRIPS Agreement, members are not under any obligation to implement in their domestic laws more extensive protection than required. But it should not contravene the provisions of TRIPs agreement. Many Jurists have suggested using this provision for the protection of TK.¹⁵

¹² *Supra* note

¹³ Tullio Scovazzi, *The Concept of Common Heritage of Mankind and the Resources of the Seabed Beyond the Limits of National Jurisdiction*

¹⁴ Preamble to the CBD.

¹⁵ Dutfield, *Can the TRIPS Agreement Protect Biological and Cultural Diversity?* Available @ www.wipo.int/cgi-bin/koha/opac-detail.

But under TRIPS it is not possible to protect TK under patent law. TRIPS requires member state to grant patent only to that inventions which are new, involving an inventive step and are capable of industrial application. But these attributes cannot be applied in the field of TK, as it is not new and is incapable of industrial application as such. But the same provision can be invoked to prevent biopiracy. Besides this there are authors who argue that obligation to protect geographical indications provided by TRIPS agreement can be used to protect TK. TRIPS agreement by itself does create any measures for protection of traditional knowledge and innovations of indigenous people instead it creates measures for establishing alternative measures for its protection.¹⁶ Article 27.3(b) of the TRIPS states that the members shall provide for protection of plant varieties either by way of patents or by an effective *sui generis* system.

On a whole we can say that conventional intellectual property laws under the TRIPS does not consider TK as intellectual property worth protection though patentability of products or process using traditional knowledge poses a number of questions.

¹⁶ Art 24(3) (b) of TRIPS agreement “Members shall provide for the protection of plant varieties either by patents or by an *sui generis* or by any combinations thereof

(c) The International convention for protection of new varieties of plants (UPOV Convention), 1961

The UPOV convention is an international convention exclusively dealing with protection of new plant varieties and is silent on the subject of traditional knowledge and genetic resources. However it does not forbid granting or creation of rights in respect of TK.¹⁷ Besides this some provisions of the convention can be used to protect the interest of indigenous persons. Convention vests exclusive exploitation rights in the developers of new varieties of plants as an incentive to pursue innovative activity and to enable breeders to recover their investment in breeding. Under the convention, a farmer who produces a protected variety from saved seeds are guilty of infringement unless national law provides so, these provisions tends to weaken the economic position of indigenous communities.

(d) The International Undertaking on Plant Genetic Resources for Food and Agriculture (FAO), 2001

The protection of TK has also been raised in relation to the concept of Farmers’ Rights in International Undertaking on Plant Genetic

¹⁷ Greengrass Barry, *Plant variety protection and protection of traditional knowledge*, available @ www.unctad.org/trade/_envi/docs/unpov.pdf

Resources for Food and Agriculture, which began in 1994. 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 the protection of “traditional knowledge.” 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.

(e) UN Declaration on Rights of Indigenous Persons (UNDRIP), 2007

The declaration emphasizes on the rights of indigenous persons to maintain and strengthen their own institutions, cultures and tradition so as to foster their development. It urges the parties to make mechanism for prevention and redress of any action which has the effect of depriving indigenous people of their integrity or their cultural values or identities.¹⁸ Other rights of indigenous peoples provided for in the UNDRIP include the right to participate in decisions affecting their rights¹⁹, the right to their traditional medicines and the right to maintain, control, protect and develop their traditional knowledge and traditional cultural expressions. Art 31 is an important attempt to protect TK. It asks the states to take all effective measure to recognize and protect the cultural heritage, traditional knowledge, traditional cultural

expression as well as the manifestations of their sciences, technology and cultures.

(f) Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits arising from their Utilization, 2010

The main objective of this protocol is to ensure fair and equitable sharing of benefits arising out of genetic resources and to provide for appropriate access to genetic resources and transfer of technology for protection of biodiversity, it has many provisions which can be useful for the protection of indigenous knowledge. Article 5 of the protocol asks the parties to ensure that the benefits arising from the use of TK are to be shared in a fair and equitable way with indigenous and local communities who conserved these knowledge for these years though mutually agreed terms. In order to protect the interest of the indigenous communities municipal legislations should involve in it the concept of prior consent before granting right to access to resources. The protocol emphasizes on the need for development of a global multilateral benefit sharing mechanism providing for fair and equitable benefit sharing associated with TK related genetic resources.²⁰

¹⁸ Art 8(2) (a) of UN declaration on Rights of Indigenous persons

¹⁹ Article 24(1) of the UNDRIP.

²⁰ Article 10 of Nagoya protocol

The provisions of the UNDRIP indicate that international human rights law has an important role to play in formulating an international regime governing traditional knowledge and the problem of Biopiracy.

INDIAN LEGAL MECHANISM:

To deal with issues pertaining to protection of Traditional Knowledge and Biopiracy, Indian parliament had enacted the following legislations:

(a) Protection of Plant Varieties and Farmers Right Act, 2001(PVPFR Act):

India is the home for many crops; these crops were identified from the wild, selected and cultivated by Indian farmers for years. During this long process of selection of crops farmers had gained lot of knowledge about each variety of crops. This includes knowledge about seeds suitable for specific seasons, soils, and even pests. Patenting of seeds, plant varieties and species are not allowed under TRIPS, but Article 27(3) allows the member countries to make a *sui generis* system for protection of plant varieties. Accordingly India enacted a *sui generis* system in 2001 in the name of The Protection of Plant Varieties and Farmers rights Act.

To protect the knowledge of farmers and enable a share of benefits to be derived from new varieties, there are provisions for a

national gene fund into which breeders will have to pay revenues for using farmer varieties. The legislation requires full disclosure of the source and origin of varieties and complete passport data from breeders. The penalty for non-disclosure is a heavy fine and/or a jail term.²¹ Breeder's rights over the varieties developed by him are protected by this legislation. Under the Act a breeder can register his variety and become a PBR holder. The Act is an exclusive legislation regarding protection of plant varieties; it does not have any specific provision for protection of traditional knowledge. Yet we can invoke the provision of community rights under section 41 and concept of benefit sharing, for protection of knowledge on indigenous communities at least to the extent of plant varieties.²²

(b) Biological Diversity Act, 2002:

As a signatory to CBD India had committed to make a national legislation which provides for access to biological resources and benefit sharing. In order to fulfill this obligation Indian government has enacted the Biological Diversity Act in 2002. It aims at ensuring the conservation of biodiversity, sustainable use of its components and equitable benefit sharing. Access would be granted to citizens only after

²¹ Sahai, 2003, p. 170

²² Bala ravi S, Effectiveness of Indian *Sui generis* law on plant variety and its potential to attract private investment, Journal of intellectual property Rights (9) (2004) 533- 548

prior intimation, while it would be granted to foreigners after prior approval, which would also be required for the transfer of research results abroad, except for “collaborative research”.²³ The Act provides for access to biological resources of the country with the purpose of securing equitable benefit sharing arising out of commercial use of those resources. The Act recognizes the Knowledge of local communities and emphasize on the need to protect them. Measures have been taken in the act to prevent instances of bio piracy by restricting any person from applying for intellectual property rights of any nature within or outside India for any invention based on any research or information on a biological resource obtained from India without previous approval of NBA.²⁴

Another feature of the Act in relation to protection of TK is that it makes biopiracy a cognizable and non-bailable offence with a punishment of imprisonment up to five years and monetary compensation up to five lacks. The Act can be regarded as a defensive strategy for protection of biopiracy; it is indeed an innovative legislation with adequate measures to safeguard the biodiversity and economic interests of indigenous communities.

Although, there are some weaknesses in the Act as under:²⁵

- The provisions regarding community involvement are weak, with ultimate decisions remaining in the hands of the government, rather than in the hands of local communities who are the traditional custodians of the resources and knowledge:
- There is no explicit provision for the participation and decision-making of local communities in the process of outsiders accessing biological resources or in determining benefit-sharing arrangements. It does not necessarily include obtaining the Prior Informed Consent of the local community.
- There is no legal protection given to the information recorded in People’s Biodiversity Registers.

(c) The Patent Act, 1970 and Amendments in 2002 and 2005

The TRIPS agreement signed along with WTO agreement in 1995 provides for making certain changes in domestic patent laws, for reaching a uniform system of legislations relating to patent throughout the world. In order to fulfill

²³ Kaushik, 2003, p. 260

²⁴ Section 5 of Biological Diversity act.

²⁵ Based on Kalpavriksh 2005; Kothari et al 2004.

this obligation under TRIPS patent act was duly amended in 2002 and 2005.

The Patent Amendment Act (adopted in 2002) provides that the applicant must disclose in their patent applications the source of origin of the biological material used in the invention.²⁶

It also allows for opposition to be filed on the ground that the complete specification does not disclose or wrongly mentions the source or geographical origin of biological material used for the invention. The grounds for rejection of the patent application, as well as revocation of the patent, include non-disclosure or wrongful disclosure of the source of origin of biological resource or knowledge in the patent application, and prior disclosure of knowledge, oral or otherwise. The 2005 amendment introduced into Indian IP system certain new measures for protection of TK and Biopiracy

The new amended Act in the area of specification of inventions added that ‘an invention which is mere new use for a known substance’ and an invention which, in effect, is traditional knowledge or which is and aggregation or duplication or known properties of traditionally known substances’ will not be an invention.²⁷ Another provision is inclusion of new provision for opposition of patent, on specific grounds under section 25(1) of the

Act. It provides after publication of patent application any person can in writing make an opposition to the controller of patents on the ground of lack of novelty or inventive step or non disclosure or wrongful disclosure of source or geographical origin used in the invention and anticipation of invention by the knowledge, oral or otherwise available within any local or indigenous groups in the complete specification. Also now we can oppose a complete patent specification which was publicly known or publicly used in India before the date of claim.²⁸

All the above provisions are defensive in nature which can help to oppose any patent granted to an invention which is based on the knowledge available within the indigenous groups of this nation. But these provisions are also not capable of covering the entire area covered by TK, which necessitates the need for a *sui generis* system for protection of TK.

(d) Geographical Indications of Goods (Registration and Protection) Act, 1999

Presently the protection of Geographical Indication (GI) has emerged as one of the most contentious Intellectual Property Rights issues in the TRIPS.

²⁶ Section 10. 4d. d

²⁷ Sec 3(d) and 3(p) of Patent Amendment Act, 2005.

²⁸ Section 25(3) (d)

The protection under the Act is available only to the geographical indication registered under the Act and to the authorized users. The Act permits any association of persons or producers or any organization or authority established by law representing the interest of the producer of goods to register a geographical indication. The provisions of the act enable the protection to symbols other than geographical names, such as 'Basmati'.

HOLES IN INDIAN LAW:

Under the Biological Diversity Act access to biological resources by non-Indian people or requires prior approval of the National Biodiversity Authority. This applies to research and "bio-survey and bio utilization. Intellectual property rights over innovations based on Indian biological resources or traditional knowledge can be established only with the prior approval of the National Biodiversity Authority, which will notify the public of approvals.

A major problem arises from a provision, in the Biological Diversity Act that allows the government to exempt certain items "including biological resources normally traded as commodities" from the remit of the act. In the case of seeds, which are tradable commodity, such an exemption in the absence of other laws

to regulate seed exports opens a legitimised door for biopiracy. The Biological Diversity Act has other deficiencies that undermine its provisions on access and benefit sharing. But the act does not define the use nor utilization, although defines 'commercial utilisation' as any activity that generates economic gain. This definition excludes "conventional breeding or traditional practices in use in any agriculture". Therefore access to Indian genetic resources for use in conventional breeding or other traditional practices followed in agriculture, even by the non-Indian entities does not require prior approval under Biological Diversity Act.

The PVPFR Act does not differentiate the nationalities of people or organisations accessing Indian genetic resources, including varieties protected by plant breeders' rights, for breeding new varieties. The only exception is the need for prior informed consent for repeated use of such a protected variety as a parental line for the commercial production of a new variety. This means that non-Indian entities can freely access plant genetic resources and associated knowledge for use in breeding or for bio-surveys within India. Secondly, having freely accessed the genetic resources of choice to develop breeding lines or new varieties or nothing, seeds of this material can be taken out in different pretexts

as 'exports'. The lack of a legal system regulating seed exports and of an informed customs system with the capacity to verify what is exported, leaves a wide open door for the unchecked outflow of the planting material of virtually any genetic resource - including farmers' varieties.. Once these resources are taken out through the trade route and used in conventional or non-conventional breeding, there is virtually no way left to ensure that benefits are shared equitably to the communities that generated and conserved these resources. The irony is that laws established to protect these resources and promote their conservation are in fact legitimising their piracy and misappropriation from the holder community.

LIMITATIONS IN IP BASED PROTECTION:

Current IP system considers only documented knowledge as prior art. This paves way for Biopiracy by granting erroneous patents for commercial products based on knowledge of indigenous communities as seen the case of “Turmeric and Basmati rice” patents by American companies.

Also current IP system is based on individual private property rights and Traditional knowledge on other hand rests on collective creation and ownership .And the term

“protection” under present IP system indicates the owner of that IPR, has a legal right to exclude others from using or reproducing it. This aspect, is contrary to the concept of TK and thus promote Biopiracy. Indigenous knowledge are not exclusive rights of a particular individual they are often shared between the social group, thus we can say that there is an inherent difference between current IP protection and TK. Current patent system is based on the principles of novelty, non-obviousness and industrial application and hence it cannot be invoked for giving positive protection to TK. TK is something evolved through generations so it lacks the principle of novelty.

One can be observed that that the current patent system provides for economic interests of only those who have slightly altered TK and left out the entire community which developed this knowledge to the present stage. Besides this the current IP system does not provide for community patent which can used to protect collective knowledge of the society. This lacking of provisions for community patent has led to the question of who can be the owner of patents, based on TK and how benefits incurring from such patents can be distributed among the society who are in fact the owners of that knowledge.

SUGGESTIONS:

- The new amendment in Patent Act, 1970, has not categorically excluded seeds developed by novel means. Though India had earlier opted for the *sui generis* system for protection of plant varieties and had subsequently put in place, the Plant Varieties Protection & Farmers' Right Act, lack of clarity in the amended patent law will lead to a situation of patenting of seeds developed by novel means, particularly the transgenic seeds.
- The relationship between the Patents Act and other Legislation like the Biodiversity Act, 2002 is not clear. While the Biodiversity Act gives the National Biodiversity Authority, the power to refuse the patenting of an invention that uses a biological resource, the Patents Act does not explicitly recognise this power.
- A challenge in implementing the law and realising the potential of GIs is that the system needs awareness-raising and an organisational coming together of different producers in order to ensure registration of valuable Geographical Indications such as Basmati or Alphonso mangoes. It is also important to ensure that registered producers do not in any way exercise greater power than genuine, non-registered producers
- Users of traditional knowledge, innovations and practices should respect the relevant local customary rules and regulations when negotiating their acquisition and commercialisation.
- Research should be conducted in close partnership with local communities and grassroots organisations to adapt existing IPRs or develop practical, effective and culturally appropriate *sui generis* alternatives.
- Governments should conduct studies to explore the potential of non-patent IPRs such as geographical indications, petty patents and trademarks for protecting traditional knowledge, and make the results of these studies widely available to local communities.
- The development of registries of traditional knowledge at the national level or international levels, and the sharing of this information with patent offices throughout the world, may contribute to preventing the misappropriation of traditional knowledge. The inclusion of traditional knowledge in such registries is appropriate only with the prior

informed consent of the community in question.

- Governments might consider supporting the development of local knowledge registers (as long as these are bottom-up participatory programmes such as India's Peoples' Biodiversity Registers or SRISTI's innovations databases) that patent examiners could access so as to ensure that traditional knowledge is not pirated. However, they should not claim ownership of these registers, since this would be an infringement of the rights of the knowledge providers.
- Any *sui generis* systems for protecting traditional knowledge should be developed in close collaboration with indigenous peoples and local communities through a broad-based consultative process that reflects a country's cultural diversity.
- Specific principles and objectives might be attached to these *sui generis* alternatives, such as: (i) the promotion of social justice and equity; (ii) the effective protection of traditional knowledge and resources from unauthorised collection, use, documentation and exploitation; and (iii) the recognition and reinforcement of customary laws and practice, and

traditional resource management systems, that are effective in conserving biological diversity.

- International and national mechanisms in IPRs systems are to be introduced to ensure legal access to genetic resources and traditional knowledge.
- Setting up or promoting herbal gardens of traditional medicinal plants.
- Incorporating traditional knowledge as part of the curriculum for schools, colleges, universities and research centers.
- Enhancing traditional medicine and healing arts in state-run hospitals.
- Recognizing leaders, experts and innovations in TK in various fields by providing incentives. Internet can play a key role in the protection and promotion of traditional knowledge of the communities (while bringing in added economic value to these communities)

CONCLUSION:

The issue of biopiracy is a culmination of IPR systems in the style of Western countries. Therefore, TRIPs provisions are largely based on U.S. patent system. There is a paramount need to rethink and review it. As TRIPs assume that the U.S model of IP protection system is strong" and should be followed

worldwide. But in reality, there are lacunas in the U. S model in concern with indigenous knowledge. And the model is very weak to deal the problem of biopiracy

Some jurists have opined that biopiracy happens by reason of non documentation of traditional knowledge. That is not true. Traditional and Indigenous knowledge in India has been systematically documented. And even the folk knowledge orally retained by locals, is recognised as collective and cumulative innovation.

Bio piracy has now emerged as a term to describe the free ride of corporations of developed nations over the genetic resources and traditional knowledge of developing countries. Biopiracy is thus misappropriation of genetic resources or related TK through the patent system. If biopiracy is not stopped, global corporate profits will grow at the cost of the food rights, health rights and knowledge rights of Indians where two thirds of the population is too poor to meet their needs through the global market place. Our survival itself is at stake.