



**INDIAN INSTITUTE OF MANAGEMENT CALCUTTA**

**WORKING PAPER SERIES**

**WPS No. 629/ September 2008**

**Biopiracy and Protection of Traditional Knowledge: Intellectual  
Property Rights and Beyond**

**by**

**Shamama Afreen**

Fellow, IIM Calcutta, Diamond Harbour Road, Joka P.O., Kolkata 700 104, India

**&**

**Biju Paul Abraham**

Professor, Public Policy & Management Group, IIM Calcutta, Diamond Harbour Road,  
Joka P.O., Kolkata 700104 India

**BIOPIRACY AND PROTECTION OF TRADITIONAL KNOWLEDGE:  
INTELLECTUAL PROPERTY RIGHTS AND BEYOND**

**By**

**Shamama Afreen\* and Biju Paul Abraham\*\***

**ABSTRACT**

The increasing importance of traditional knowledge (TK) of indigenous communities, both in the economy as well as in biodiversity conservation, has attracted the uncompensated use of such knowledge by multinational companies and research organisations for commercial purposes. Numerous cases of biopiracy have highlighted this issue and have increased demands for protection of TK from such misappropriation, causing many biodiversity rich countries to design and adopt different protective regimes.

This paper seeks to highlight the need for protecting TK by taking a look at some global biopiracy cases. It discusses various approaches for establishing a protective regime and argues that this cannot be done solely through conventional intellectual property rights (IPRs). It suggests a comprehensive approach that is a bundle of complementary legal, non-legal and voluntary mechanisms, containing not only IPRs but moving beyond to include *sui generis* systems that can be integrated into the national legal framework and also conform well to specific needs of indigenous communities.

\* **Fellow, Indian Institute of Management Calcutta.**

\*\* **Professor, Public Policy & Management Group, IIM Calcutta**

## **1. INTRODUCTION**

In recent years issues related to the importance of traditional knowledge (TK) held by indigenous communities, its role in the economy as well as in biodiversity conservation and sustainable use, and the need for its protection from misappropriation by commercial interests have been the subject of debate in international fora like the Convention on Biological Diversity, the World Trade Organization and the World Intellectual Property Organization. Recognition of the remarkable economic potential of such knowledge has led many multinational corporations of the industrialized nations to “free ride on the genetic resources and traditional knowledge and technologies of the developing countries” (Dutfield, 2006), leading the latter to resent such “biopiracy” or uncompensated exploitation of their natural resources.

With an increasing number of patents being extended to products based on genetic resources, developing countries, which harbor much of this biological diversity, are concerned not just about the misappropriation of resource based inventions but also the intangible knowledge associated with the resource. Much of this knowledge belongs to local and indigenous communities who through generations of observation, practice and usage have not only maintained and conserved biodiversity, but also developed and preserved an associated TK base. However, in most cases, benefits arising from commercial utilization of such resources are not shared with the communities that provide the knowledge. Though there is recognition of the need to protect the rights of such indigenous communities, there is also the realization that this cannot be done through conventional intellectual property rights (IPR) systems which are based on concepts of individual ownership. More and more biodiversity rich nations and indigenous groups are realizing the significance of this fact and taking measures to put in place legal and non-legally binding mechanisms to protect their TK base.

This paper looks at some cases of biopiracy from around the world which highlights the need to protect TK. It then discusses ways in which such knowledge can be protected from misappropriation – both through conventional IPRs as well as through other means.

## **2. BIOPIRACY**

Bioprospectors, in order to find commercially valuable genetic resources depend on the knowledge of indigenous and local communities that have managed these resources for ages

and understand them best. This process of “*appropriating biodiversity and the knowledge*” involved is termed biopiracy (Delgado, 2002, original italics). It refers specifically to “...the use of intellectual property (IP) systems to legitimize the exclusive ownership and control of *biological resources and knowledge*, without recognition, compensation or protection for contributions from indigenous and rural communities...thus bioprospecting cannot be considered anything but biopiracy” (Mooney, 1993; quoted in Delgado, 2002). The term can also be used for breach of contract related to access and use of TK (GRAIN & Kalpavriksh, 2002).

Methods by which patents can be used to appropriate TK are discussed later in Section 3.1.1. At this point, it is important to note that patents can be granted on innovations that use TK in three ways. The first kind could be based directly on TK in which case benefit sharing becomes much simpler with compensation being provided to the source indigenous community. The second type could be directly based on the same bioresource/TK employed by indigenous communities but not for the same purpose for which it was used by them traditionally. The third kind of innovation may not be directly based on TK but could derive from some bioresource which has been traditionally used by indigenous communities for various purposes. An example is the the Indian patent 187750 granted to Kottayam Kadangode Arun Krishnan for preparing high azadirachtin *neem* oil through a process of cold pressing that preserves the inherent natural levels of azadirachtin, nimbin and salanin (Plasmaneem, undated). In the second and third cases it becomes unclear whether benefits need to be shared at all and if yes, then with whom.

Biopiracy, the process through which the rights of indigenous communities to their biological resources and TK are “erased and replaced for those who have exploited indigenous knowledge and biodiversity” (Shiva et al, 1997, p. 31), takes everything with no return gains for the provider community. The only value it adds to TK is the Western scientist’s corroboration of the properties of the bioresource, a fact that was anyway already community knowledge for many years (GRAIN & Kalpavriksh, 2002). Thus, such misappropriation of TK results in grant of patent for the invention to the “first-to-file” (the pharmaceutical or agro-chemical company) rather than to the “first-to-invent” (the indigenous community) (GRAIN & Kalpavriksh, 2002).

Protests relating to biopiracy revolve around the central point that businesses in developed nations are reaping the wealth garnered from poor people’s knowledge and at the expense of the developing countries (Schuler, 2004). Biopiracy is considered illegal because it violates international conventions and corresponding domestic regulations through its failure to recognise, respect and equitably compensate the rightful owners of appropriated bioresources and related TK (Global Exchange, 2001). What becomes unacceptable is that researchers take a bioresource for its traditional medicinal or other commercially viable properties, put it through limited laboratory testing or selective breeding, produce a marketable product and receive a patent on what is only a slight variant of the traditional product. US patent No. 5,304,718 on quinoa granted to researchers from Colorado State University and US Plant patent No. 5,751 on *ayahuasca* are examples of patents granted to resources in their original form. In many cases, the invention for which patent was granted was “nothing but the imitation of indigenous knowledge” (Gene Campaign, Undated) and had applications similar to the traditional use (Table 1).

*Table 1: Similarity between Plant’s Indigenous and Patented Use*

<b>Plant name</b>	<b>Indigenous use</b>	<b>Use for which patent is granted</b>
Aegle marmelos ( <i>Bel</i> )	<ul style="list-style-type: none"> <li>• Treating diabetes</li> </ul>	<ul style="list-style-type: none"> <li>• Treating diabetes</li> </ul>
Aloe vera ( <i>Ghritakumari</i> )	<ul style="list-style-type: none"> <li>• Skin disorders</li> <li>• Hair tonic</li> <li>• General weakness</li> </ul>	<ul style="list-style-type: none"> <li>• Skin care formulations</li> <li>• Cleansing articles for hair</li> <li>• Nutritional composition</li> </ul>
Commifora mukul ( <i>Guggul</i> )	<ul style="list-style-type: none"> <li>• Lowering body fat</li> <li>• Skin diseases</li> </ul>	<ul style="list-style-type: none"> <li>• Method for treating hyperlipidemia (excess fat)</li> </ul>
Curcuma longa ( <i>Haldi</i> )	<ul style="list-style-type: none"> <li>• Wound healing</li> <li>• Skin diseases, discolouration of skin, allergic conditions</li> <li>• Jaundice</li> </ul>	<ul style="list-style-type: none"> <li>• Cosmetics and Skin lightening compositions</li> <li>• Wound healing</li> <li>• Skin conditioning, antiirritant, anti-inflammatory agents</li> </ul>
Nigella sativa ( <i>Kalajira</i> )	<ul style="list-style-type: none"> <li>• Oral hygiene</li> <li>• Jaundice</li> <li>• Skin disorders</li> </ul>	<ul style="list-style-type: none"> <li>• Dental healing</li> <li>• Treatment of hepatitis</li> <li>• Chapped skin</li> </ul>
Emblica officinalis ( <i>Amla</i> )	<ul style="list-style-type: none"> <li>• Skin diseases</li> <li>• Grey hair dyeing composition</li> <li>• Health tonic</li> </ul>	<ul style="list-style-type: none"> <li>• Cosmetic formulations</li> <li>• Grey hair composition</li> <li>• Nutritional formulations</li> </ul>
Piper nigrum ( <i>Kalimirch</i> )	<ul style="list-style-type: none"> <li>• Treatment of skin diseases</li> <li>• Arthritic diseases</li> <li>• As a condiment</li> </ul>	<ul style="list-style-type: none"> <li>• Treatment of skin diseases</li> <li>• For healthy joints</li> <li>• Flavouring agent</li> </ul>
Rauwolfia serpentina ( <i>Chandrabhaga</i> )	<ul style="list-style-type: none"> <li>• Epilepsy, schizophrenia</li> <li>• High blood pressure</li> </ul>	<ul style="list-style-type: none"> <li>• Treatment of skin diseases</li> <li>• Treatment of heart diseases</li> </ul>

Rubia Cordifolia ( <i>Manjistha</i> )	<ul style="list-style-type: none"> <li>• Skin diseases</li> <li>• Paralysis</li> </ul>	<ul style="list-style-type: none"> <li>• Skin care compositions</li> <li>• Neurovascularization</li> </ul>
Tamarindus indica ( <i>Imli</i> )	<ul style="list-style-type: none"> <li>• Fruit drink</li> <li>• Boiled seeds used for dressing boils</li> <li>• Cooling food, antiinflammatory action</li> </ul>	<ul style="list-style-type: none"> <li>• Beverages</li> <li>• Wound-covering materials</li> <li>• Food, pharmaceutical, cosmetics and industrial application</li> </ul>
Withania somnifera ( <i>Ashwagandha</i> )	<ul style="list-style-type: none"> <li>• General tonic, heart diseases</li> <li>• Rheumatism</li> </ul>	<ul style="list-style-type: none"> <li>• Anti-fatigue/stress</li> <li>• Arthritis</li> </ul>
Terminalia arjuna ( <i>Arjuna</i> )	<ul style="list-style-type: none"> <li>• Cardiac tonic, heart diseases</li> <li>• Treating high blood pressure</li> </ul>	<ul style="list-style-type: none"> <li>• Enhancing cardiovascular performance</li> <li>• Control of high blood pressure and high levels of cholesterol</li> </ul>
Terminalia chebula ( <i>Harra</i> )	<ul style="list-style-type: none"> <li>• For dysentery and diarrhea, stomach complaints, ulcers, vomiting and worms</li> <li>• Flatulence</li> </ul>	<ul style="list-style-type: none"> <li>• Treating and preventing Helicobacterpylori associated stomach gastritis, ulcers</li> </ul>
Terminalia bellerica ( <i>Behera</i> )	<ul style="list-style-type: none"> <li>• Germicidal For treating stomach disorders and improving digestion</li> <li>• Enlargement of the spleen</li> </ul>	<ul style="list-style-type: none"> <li>• Tooth powder</li> <li>• Treating and preventing Helicobacterpylori associated stomach gastritis, ulcers</li> <li>• Hepatoprotective compositions</li> </ul>

Source: Gene Campaign, undated

From the 1990s onwards there has been an increase in cases related to biopiracy with patents and trademarks being used to acquire monopoly rights over indigenous resources without concomitant benefit sharing (Ismail et al, 2004). As with other biodiversity-rich countries, the number of biopiracy cases affecting Asia is also steadily increasing. Table 2 gives examples of some such cases, which is considered a mere “tip of the iceberg” (GRAIN & Kalpavriksh, 2002; p. 8)

Table2: Bioprospecting in Asia-Pacific

Country	Biological Resource	Biopirate country	Notes
China	Bitter Melon <i>Momordica charantia</i>	US	US Patent No. 5484889
China	Xi Shu /Happytrees ( <i>Camptotheca lowreyana</i> )	US	US Patent No. PP11,959
Malaysia	<i>Bintangor tree</i> ( <i>Calophyllum lanigerum</i> )	Singapore , US	US Patents including No.s 6420571, 6369241, 6160131 and 6277879
Pacific	<i>Kava</i> ( <i>Piper mythesticum</i> )	US	US Patents including No.s 6405948, 6277396, 6080410, 6025363, 5977120, 5976550 and 5770207

Pacific	<i>Nonu [Indian Mulberry(Morinda citrifolia)]</i>	Europe, US	In 1995 Nonu Samoa Enterprises began export of nonu, a tree with medicinal properties, to the US with US collaboration.
Pakistan	<i>Basmati Rice</i>	US	US Patent No.s 6274183 and 5663484
PNG	<i>Coral reef sponges</i>	US	US Patent No.s 6281196, 6153590, 5646138 and 5494893
Philippines	<i>Soil microbes</i>	US	The multinational company Eli Lilly has earned billions of dollars from erythromycin developed from a bacterium isolated from a soil sample that Filipino scientist Abelardo Aguilar collected in his home province of Iloilo. Neither Aguilar nor the Philippines received any royalties.
Philippines	<i>Llang-llang (Cananga odorata)</i>	France	The use of the extracts from llang llang in the cosmetic industry is perhaps as old as perfume in France. Several perfumeries in France that have used and continue to use it in their products.
Philippines	<i>Banaba (Lagerstroemia sp)</i>	Japan, US	US Patent No. 5980904
Philippines	<i>Nata de coco</i>	Japan, US	US Patent No.s 6280767, 6140105, 5962277 and 5,795,979
Philippines	<i>Snails (Conus)</i>	US	US Patent No.s 6369193, 6344551, 6197535, 6153738, 6077934, 5633347, 5595972, 5589340 and 5514774
India	<i>Basmati Rice</i>	US	US Patent No.s 5663484 and 4522838
India	<i>Turmeric (Curcuma longa)</i>	US	US Patent No. 5401504, 5135796 and 5047100
India	<i>Neem (Azadirachta Indica)</i>	US	Several US Patents including No.s 5420318, 5391779 and 5371254; the US multinational company W.R.Grace's EPO Patent No. 0426257
India	<i>Guggul (Commiphora mukul)</i>	US	US Patent No. 6,113,949 and US Patent Application 20020018757
Thailand	<i>Jasmine Rice</i>	US	A US plant geneticist has developed a strain of Jasmine Rice to grow in the US; he received the original seeds of the Thai Khao Dok Mali 105 jasmine rice variety from the IRR in 1995.
Thailand	<i>Plao-noi (Croton sublyratus)</i>	Japan	In 1975 Sankyo of Japan extracted the active ingredient of the Thai local plant to produce the patented product Kelnac.
Samoa	<i>Mamala tree (Homalanthus nutans)</i>	US	US Patent No. 5,599,839
Sri Lanka	<i>Kothala himbutu (Salacia Reticulate)</i>	Japan, US	Takama System, Ltd. (Yamaguchi, JP)'s US Patent No. 6,376,682

Source: GRAIN & Kalpavriksh, 2002

Some controversial biopiracy cases are discussed below:

i. *Quinoa*

Quinoa (*Chenopodium quinoa*), cultivated since pre-Incan times in the Andean countries of Latin America, forms an integral part of the diet of millions of people in this region. Due to its high nutritional value, the market for quinoa is fast expanding with the Bolivian annual

export market being estimated at US \$ 1 million (GRAIN, 2000). In 1994, two researchers of Colorado University claiming to be the first to identify and use a reliable method of cytoplasmic male sterility in quinoa for producing hybrids were granted US patent no. 5,304,718. This allowed them monopoly control over male sterile plants of the traditional Bolivian “Apelawa” variety of quinoa and plants derived from its cytoplasm. This method of hybridising quinoa also subsumed 43 other traditional varieties grown in Bolivia, Peru, Ecuador and Chile (RAFI, 1998).

Implications: The implications of the quinoa patent were serious for Bolivian farmers. Developing of hybrid quinoa was aimed at increasing the yield of the crop so that it could be cultivated on commercial scale in North America. Although the scientists agreed to transfer technology to researchers in Bolivia and Chile, this would not have been of much benefit as corporate owners of the patent could have prevented Bolivian exports of quinoa to the US. Such a loss of export markets could have adversely affected the livelihood of thousands of Bolivian small farmers who depended on their quinoa harvests. However, protests by the Bolivian National Association of Quinoa Producers (ANAPQUI) and a number of non-governmental organisations (NGOs) to oppose the patent caused the University of Colorado to abandon the patent by May 1998 (GRAIN, 2000).

## ii. *Ayahuasca*

*Ayahuasca* (*Banisteriopsis caapi*) is endemic to the Amazonian rainforest and has been used by natives of this region for religious and healing ceremonies. Central to the culture of many indigenous groups, this plant is considered sacred and forms an integral part of their traditional religions (ENS, 1999). In 1986, in response to US citizen Loren Miller’s claim that he had discovered a new variety of *Banisteriopsis*, US patent PP 05751 was granted to the Plant Medicine Corporation. The company was allowed exclusive rights to develop and sell new varieties of *Ayahuasca* and went ahead to develop psychiatric and cardio-vascular drugs derived from the plant. The patent was however challenged by the Coordinating Body of Indigenous Organisations of the Amazon Basin (COICA) as the patented variety had been cultivated by the Amazonian people since ages and hence did not fulfil the criteria of Novelty. This protest led to cancellation of the patent in November 1999 (GRAIN, 2000).



Implications: The USPTO did not pay heed to the claims of indigenous groups that sacred plants should not be brought under patent protection. This went against perceptions that IPR laws could be used to defend against cultural misappropriation (Schuler, 2004). The fact that *ayahuasca* is a sacred plant used in religious ceremonies, the attempt to patent it was perceived by the indigenous community as an intense attack on their cultural rights (GRAIN, 2000).

### *iii. Turmeric*

Turmeric (*Curcuma longa*) is a magic cure-all for many Indians and has been used for thousands of years in traditional ayurvedic medicine for its anti-inflammatory and wound healing properties. In 1995, the University of Mississippi secured US patent 5,401,504 on the use of turmeric for wound healing. The claim held that though turmeric had traditionally been used in India for treatment of sprains and inflammatory conditions, there was no record of its use for external treatment of wounds (GRAIN, 2000). Challenging the patent the Indian Council for Scientific and Industrial Research produced ancient Sanskrit texts and a paper published in 1953 in the Journal of Indian Medical Association as proof of prior art (Ismail et al, 2004). On the basis of this evidence the United States Patent and Trademark Office (USPTO) rejected the patent in 1997.

Implications: Even though it has been a longstanding traditional practice, this patent could have prevented the free use of turmeric for wound healing. It would have also prevented Indian companies from marketing turmeric for this purpose in the US. Had the US been successful in securing a patent in other countries including India, then commercialisation of turmeric in India would have become illegal.

### *iv. Neem*

The neem tree (*Azadirachta indica*), indigenous to the Indian subcontinent, has been known for its versatility and been put to many uses ranging from medicinal to agricultural (Shiva, undated). In 1994, a multinational company, W. R. Grace and the U.S. Government were granted a joint patent No. 0436257 B1 on "A method for controlling fungi on plants with a neem oil formulation containing 0.1 to 10% of a hydrophobic extracted neem oil which is substantially free of azadirachtin, 0.005 to 5.0% of emulsifying surfactant, and 0 to 99% water." (quoted in GENET, 2000).

The patent was opposed on grounds that the fungicidal effect of hydrophobic extracts of neem seeds was part of Indian indigenous knowledge and had been used for centuries both as Ayurvedic cure for dermatological ailments and in traditional Indian agricultural for protecting crops from fungal infections. As such the patented innovation did not fulfil two basic statutory requirements for the grant of a European patent – novelty and inventive step. The opposition also put forth the charge that the fungicidal method claimed in the patent was based on one single plant variety (*Azadirachta indica*) which, in contradiction to the European Patent Convention's prohibition on patenting of plant varieties, would lead to at least partial monopoly over it (GENET, 2000). Inciting protests from Indian farmers, scientists and political activists, the patent was revoked in May, 2000 (Shiva, 2000).

Implications: The patent could have led to the commoditisation of neem and affected the livelihood of local farming communities who would not have been able to afford seeds made expensive by the patent. An indirect effect of patenting of neem has been the increase in price of seeds from Rs. 300 per ton to Rs 3000 – 4000 per ton, with local users now competing with industry supplying Northern consumers for what was often considered a free resource (Shiva, Undated).

v. *Hoodia*

*Hoodia*, a succulent indigenous to southern Africa has traditionally been used by the San and Khoi shepherds of this harsh dry land to suppress hunger and thirst. Africa's CSIR and UK based company Phytopharm have developed an appetite suppressant P57 derived from *Hoodia* and been granted international patent WO 9846243 for monopoly use of extracts of *Hoodia* for this purpose. With obesity being one of the major public health problems in developed countries, the market potential for such a drug is enormous (GRAIN, 2000).

Implications: Although the stakeholders in this arrangement are reaping large benefits from commercialisation of the drug, there was no benefit sharing with the original holders of the TK about the plant. While CSIR earns huge royalties for the lifetime of the patent, Phytopharm had already received US\$35 million from Pfizer, which in turn was expected to earn US \$3000 million annually from sale of the drug (GRAIN, 2000). However, following widespread criticism, in the year 2000 CSIR agreed to share future profits with the San community (Dutfield, 2002) in the form of 8% of all milestone payments it received in the following three years and 6% of all royalties it receives during the life of the patent

(Chennells, 2003). Ironically, cultivation of *Hoodia* is being done by commercial farmers and not by indigenous communities who traditionally developed and conserved the resource or even by small farmers. This goes against the grain of the South African policy, which requires that bioprospecting should lead to economic development of the most disadvantaged sections of the population.

*vi. Enola Bean*

Mexican beans (*Phaseolus vulgaris*) have been developed and grown through centuries by generations of farmers and more recently plant breeders in Mexico. In 1994 Larry Proctor, the owner of a small seed company and President of POD-NERS, L.L.C purchased a bag of “Azufrado” or “Mayocoba” bean seeds in Sonora, and when back in the US planted yellow coloured beans and allowed them to self-pollinate. He selected yellow seeds for several generations and applied for a US patent on the resulting “uniform and stable population” of yellow bean seeds (quoted in RAFI, 2000). Proctor was granted US patent no. 5,894,079 on the “Enola” bean variety which allows exclusive monopoly on any *Phaseolus vulgaris* having a particular yellow colour. POD-NERS then claimed that was illegal for anyone to buy, sell, offer for sale, make use for any purpose including dry edible or propagation, or import beans of that description and has sued Mexican bean exporters for selling such bean seeds in the US (RAFI, 2000). On 20 December 2000 the International Center for Tropical Agriculture (CIAT) challenged the patent requesting for its re-examination (RAFI, 2001).

Implications: This patent allows POD-NERS to exclude importation or sale of any bean exhibiting the yellow colour of the Enola beans. The company is demanding six cents per pound in the form of royalties on yellow beans entering the US from Mexico (RAFI, 2000). Thus many poor farmers are being forced to pay a licence fee to grow and sell a crop that has been native to their regions and which they had been cultivating for centuries (Rattray, 2002). In addition to this US custom officials inspect beans entering into the country and collect samples from each shipment at additional costs to the exporter (Gilliland, 2000 quoted in RAFI, 2000). Because of this patented bean export sales have dropped over 90%, also affecting the market for other bean varieties (RAFI, 2001).

The problems and loopholes associated with such controversial patents are reflected in the US government’s justification for granting them:

Informal systems of knowledge often depend upon face-to-face communication, thereby limiting access to the information to persons in direct contact with one another. The public at large does not benefit from the knowledge nor can the knowledge be built upon. In addition, if information is not written down, that information is completely inaccessible to patent examiners everywhere as prior art when they are examining patent applications. It is possible, therefore, for a patent to be issued claiming as an invention technology that is known to a particular indigenous community. The fault lies not with the patent system, however, but with the inaccessibility of the knowledge involved beyond the indigenous community” (US General Declaration to First Meeting of the WIPO Committee, 2001; quoted in Correa, 2001).

It has been alleged that governments of industrialized nations are too quick in granting IPR protection on plants, products and processes that already are in use in developing countries (Schuler, 2004). According to the same author this is the result of the fact that oral prior art is denied recognition and also that patent applications are not extensively examined by the patent offices of the developed countries. Many of the controversial patents have been contested by public interest advocacy groups and been revoked but the deterrent to this initiative is the exorbitant cost of the process. For instance, challenging the Enola bean patent was estimated to cost at least US \$200,000 by way of legal fees (RAFI, 2000).

### **3. PROTECTION OF TK**

The above section illustrates the validity of indigenous communities’ apprehensions regarding misuse of their TK and bioresources and their repeated demands to protect their knowledge and set up a mechanism to ensure compensation for commercial use of the same.

This section discusses how their knowledge, innovations and practices can be protected through the following legal mechanisms (CBD, 2000):

- Conventional IPR regimes
- *Sui generis* systems
- National Access and Benefit Sharing (ABS) legislation mandating PIC
- Contractual agreements

- Customary and common – law regimes

The non-legally binding forms of protection include voluntary guidelines and codes of conduct and traditional resource rights (TRRs). The following discussion takes up the above options in detail:

### **3.1 Legally – binding forms of TK protection**

#### **3.1.1 Conventional IPR regimes**

Conventional IPR systems, based on concepts of individual ownership and private property rights legal rights are aimed at encouraging innovation and for facilitating technology transfer and access (Downes, 1997; CBD, 2000). However, these systems, which originated long before the CBD, were not created to address matters related to ABS and protection of TK. The forms of IPR relevant for this purpose include patents, PBRs, copyrights, trade secrets, trademarks and geographic indications/appellations of origin of which the last two claim economic rights while the rest encourage invention and “may be considered as granting “true” intellectual property rights to holders”(CBD, 2000; p 5, original emphasis).

Conventional IPR regimes have been deemed to be inadequate for protecting bio-diversity and communally based knowledge of the indigenous and local communities (CUTS, 1995; Montecinos, 1996; Dutfield, 2001; Ragavan, 2001) though at the same time they are thought to present “windows of opportunity” in this direction (CBD, 2000; p5, original emphasis). The existing modes of IPRs protection and their significance in protecting biodiversity and TK are as follows:

##### *(i) Patents*

To be patentable an invention must meet the criteria of novelty, utility, involve an inventive step and be non-obvious and have industrial applicability. Such criteria with respect to TK raise some problematic issues. Since TK is not a contemporary form of knowledge and has been used and passed down the generations, it cannot fulfil the novelty and/or inventive step requirements of patent protection. Importantly, although it is widely accepted that traditional medicines are useful in healing many ailments, they often do not meet the requirements of novelty and non-obviousness (Raghavan, 2001). Axt et al (1993) point out that determining

non-obviousness with respect to TK would be problematic as it would be difficult to pinpoint the relevant prior art. Patent applicants through documentary evidence must show that their innovation is the result of a single act of discovery. Indigenous communities cannot protect information relating to TK or protection of biodiversity if it is not the result of specific historic act of “discovery”. Axt et al (1993) hold that although it can be presumed that prior art would be knowledge held by the indigenous people before the invention was made, it would be difficult due to the trans-generational nature of such knowledge to ascertain when exactly the indigenous people had acquired or developed the relevant knowledge.

Another issue of importance in this respect is whether prior art, as a proof of non-obviousness, should include only the knowledge of the potential indigenous patent applicant or also the knowledge held by other indigenous groups that have been neighbours of or have been in contact with the applicant. Axt et al (1993) suggest

*The fact that other indigenous peoples do not use a plant in a particular way known to one group, although the others also have access to the same plant and use it in other ways common to many groups, might be evidence of the inventiveness of one group's particular, unique use.*

The same authors also point out that if non-indigenous groups of people like scientists from developed countries are not aware of certain TK, then it could be taken as evidence of non-obviousness.

TK is held and generated collectively while patent law attributes inventiveness to a person's (natural or legal) accomplishment. In other words, patents require an inventor to have legal entity – a criteria that does not apply to indigenous peoples that hold and develop knowledge communally. Moreover, since TK generally is shared among all the members of an indigenous society, it has been in the public domain and cannot be considered prior art. As such, any invention based on such knowledge would be obvious to anyone skilled in that art, making such knowledge unprotectable through patents (Raghavan, 2001).

Patents can however, protect some elements of traditional medicine as illustrated by patents that have been granted on natural components (EP 0519777 on formulations made from a variety of fresh plants) and on combinations of plants used for therapeutic purposes (WO

93/11780 on a skin therapeutic mixture with cold processed aloe vera extract with yellow sap and aloin removed) (Correa, 2001).

An important aspect of patents that has long disturbed indigenous peoples is that this form of protection motivates commercialisation and distribution. Indigenous communities may however, be largely concerned with prohibiting commercialisation and restricting use and distribution. According to the 1994 COICA Statement:

*For members of Indigenous peoples, knowledge and determination of the use of resources are collective and inter-generational. No Indigenous population, whether of individuals or communities, nor the government, can sell or transfer ownership of resources which are the property of the people and which each generation has an obligation to safeguard for the next.*

(<http://users.ox.ac.uk/~wgtrr/coica.htm>)

Patents recognise only market economic values and ignore spiritual, aesthetic, or cultural - or even local economic - values. Indigenous peoples may value such information as they are linked to their cultural identity and symbolic unity (Posey, 1999).

## *(ii) Copyrights*

Original artistic manifestations of TK holders such as literary, theatrical, pictorial, musical works and artefacts can be protected through copyrights (Grulac, 2000; cited in Correa, 2001). However, only the specific expression is protected and not the underlying ideas (Gollin, 1993). As such, anyone extracting the associated knowledge by reading the literary work or watching the theatrical presentation can use it without violating the copyright (Axt et al, 1993).

Copyrights are meant to benefit society through the granting of exclusive rights to “natural” and “juridical” persons or “creative individuals”. As such it necessitates the identification of an author, which is a problematic concept in many traditional societies where knowledge and innovations are communally owned. As the Bellagio Declaration (<http://users.ox.ac.uk/~wgtrr/bellagio.htm>) puts it:

*Contemporary intellectual property law is constructed around the notion of the author as an individual, solitary and original creator, and it is for this figure that*

*its protections are reserved. Those who do not fit this model - custodians of tribal culture and medical knowledge, collectives practicing traditional artistic and musical forms, or peasant cultivators of valuable seed varieties, for example - are denied intellectual property protection.*

As the system does not recognise community ownership, creative expressions and collective innovations of indigenous communities are not eligible for protection through copyrights (Dutfield, 2001). Copyright normally requires works to be documented. However, this is not so with folkloric expressions as they are usually passed on orally from one generation to the next. Moreover, the entity asserting its copyright - or indeed to claim any other IPR - must have legal personality. Collective groups like traditional communities however, usually lack juristic personality according to a national legal system. Copyrights provide protection for a limited time period. This again is unsuitable for folkloric expressions because being an integral part of the traditional people's identity, they should be protected in perpetuity (Dutfield, 2001).

### *(iii) Trade Secrets*

In case an invention of great utility and commercial value does not satisfy the requirement of patentability thus not qualifying for a patent, it can be protected through trade secret law. Even if an invention is patentable, the inventor may want to treat it as a trade secret so as to retain sole control over it and prevent it from disclosure to others (Axt et al, 1993). While many traditional societies commonly share knowledge, many healers and other specialist knowledge-holders do not reveal such information gathered through the ages to the outside world. Such TK holders can resort to legal action to force a company to pay compensation if it obtains their specialised knowledge without their PIC. In other words, trade secrets allow secrecy to be maintained "by imposing penalties (the recovery of costs) when information held as secret is improperly acquired or used" (CBD, 1995; p.6).

According to Dutfield (2001) trade secret law could lend protection to a significant amount of TK. Protection in this form is quicker, cheaper and easier and can be maintained in perpetuity in contrast to most other form of IP (Raghavan, 2001).

However, it may not always be feasible for indigenous communities to maintain TK as a trade secret as researchers may have already interviewed indigenous shamans and other members of the community and may have published that knowledge somewhere. If a



particular piece of TK has not been disclosed to outsiders, the indigenous community could keep it as a trade secret with respect to the rest of the world. The community could also explore the option of disclosing it only to a specific outside organisation in exchange for suitable compensation and/or confidentiality (Axt et al, 1993). For instance, the NCI letter of collection includes a provision for confidentiality, according to which information given by local population or traditional healers regarding medicinal use of any plants will be kept confidential by NCI and will not be published without the permission of its original holders and proper acknowledgement of their contribution to the research (Posey et al, 1996).

Knowledge that is known to all the members of the indigenous community may not be eligible to be a trade secret. If a shaman or other individual, by dint of his status in the group, has exclusive access to information that is valuable to others and could give one business/organisation an edge over another in developing a new product, then that individual or the indigenous group together probably has a trade secret (Axt et al, 1993). The same authors emphasise that unless an indigenous group designates information as a trade secret and takes the initiative to protect it, any acquisition by outsiders would not amount to misappropriation.

The problem associated with this form of protection is that growth of ideas could be checked if the inventor commercialises his innovation as a trade secret (Afreen et al, 2003). Additionally, it would be to the detriment of the holder of a trade secret if similar innovations are developed by someone else and granted protection. Opponents of patenting often overlook the fact that in the absence of patents useful information would become trade secrets. It is important to appreciate that patenting pushes an invention into the public domain thereby allowing other researchers to investigate knowledge offered by it (Macer et al, 2001).

#### *(iv) Trademarks*

Trademarks can be effective in helping indigenous and local communities gain economically from their TK and also protect it from undesirable commercial use by outsiders. All manufactured goods and services offered by craftsmen, manufacturers, traders of local and indigenous communities or by their representative bodies can be differentiated from another through use of trademarks (Correa, 2001). They provide reliable information and assurances of authenticity to the consumers (Heald, 1996; cited in Downes, 1997) and are an essential

element in the commercial promotion of goods. Trademarks take care of indigenous concerns better than other forms of IPR as they can be maintained in perpetuity and only limit the use of a symbol to a specified class of people instead of granting monopoly rights over the use of the information (Downs, 1997). Such a form of protection has been used by the Cowichan knitters of Vancouver Island, British Columbia to protect their products which were being threatened by fakes in the market (Brascoupé et al, 2001). However, this requires considerable effort in trademark promotion and protection.

*(v) Geographical indications*

Geographical indications, especially appellations of origin are effective in augmenting the commercial value of natural, traditional and craft products if their attributes can be traced to their particular geographical origin (Correa, 2001). Like trademarks, geographical indications also lend themselves effectively to the protection of TK as they can be held as long as the collective tradition is maintained and do not confer monopoly rights over the information. They can be used by a producer on the basis of location and method of production irrespective of whether the producer is an individual, family, partnership or some other concern. This suits the communal nature of TK, unlike requirements specified by other forms of IPR.

Geographical indications also respond to indigenous people's concerns regarding the inalienability of their knowledge that makes them resent the free buying and selling of the same. Such a concern is reflected in the initiative taken by the traditional silk weavers of the Indian state of Tamil Nadu to register their Kancheepuram *sarees* under the Geographical Indications Act. Not only would it prevent duplicates from flooding the market, it would also ensure that weavers conform to traditional weight, quality and *zari* norms (<http://tamilibrary.org/teli/silk1.html>). In this respect, a geographical indication is not private property and the good-place link underlying GI protection automatically ensures that it cannot be transferred to non-locale producers or be used for similar products originating from any area outside the one represented by the GI (Rangnekar, 2002).

In addition to this geographical indications are in concurrence with the importance given by indigenous communities to their traditional ways of life and their relationship with their local habitats and ecosystem. They are rooted in collective traditions and collective decision-making process and protect and reward traditions, at the same time allowing evolution (Downes 1997).

Although GIs are a better option for protecting certain products based on TK, the drawback is that they do not protect the underlying knowledge *per se* (Dutfield, 2000). This leaves the TK in the public domain with no protection against its misappropriation. To overcome this problem Kumar (undated) suggests the use of “complementary, though overlapping, IPRs covering similar subject matter”. By way of illustration, the same author presents a multipronged approach for protecting handicrafts: protection of its technical content as a technical idea, its cultural value as a form of expression and the distinctive characteristics through trademarks or GIs.

### ***3.1.2 Sui generis System of Protection of TK***

Several countries have realised that IPRs on their own are not adequate to protect TK. A number of such countries like India and Philippines have enacted or are in the process of enacting alternative systems of protection. Such a system would involve the establishment of a *sui generis* regime of IPRs which is a legal framework of its own kind with special adaptations to take care of the unique nature and characteristics of TK. Any model for *sui generis* national legislation aimed at protecting biodiversity related TK would have to uphold indigenous and local community cosmovisions and customary laws, and call for respect, maintenance and preservation of their knowledge, innovations and practices (Indigenous Peoples’ Biodiversity Network, 1996; cited in CBD, 2000). To ensure that a *sui generis* system does not conflict with other existing legislations, it might also be necessary to amend related national laws that govern land tenure, natural resources, protected areas, environment protection and IP.

Some Latin American countries have proposed the establishment of a *sui generis* system for TK in the context of the Free Trade Agreement for the Americas which allows Parties to “refuse to grant patents on plants and animals other than micro-organisms, and essentially biological processes for the production of plants or animals other than non-biological and microbiological processes”. However, it specifies “Parties shall provide for the protection of plant varieties either by patents or by an effective *sui generis* system or by any combination thereof” (FTAA, 2001). Some models that could prove useful in the protection of biodiversity related TK include:

- The Model Provisions for National Laws on the Protection of Expressions of Folklore Against Illicit Exploitation and Other Prejudicial Actions, developed by the United Nations Education, Scientific and Cultural Organisation (UNESCO) and the WIPO
- The Principles and Guidelines for the Protection of the Heritage of Indigenous People, elaborated by the Sub-Commission on Prevention of Discrimination and Protection of Minorities (E/CN.4/Sub.2/1995/26)
- The Third World Network's Proposal for a Rights Regime for the Protection of Indigenous Rights and Biodiversity
- The Intellectual Integrity Framework of the RAFI
- The Model Biodiversity Related Community Intellectual Rights Act of the Research Foundation for Science, Technology and Ecology
- The Draft Legislation on Community Rights and Access to Biological Resources developed by the OAU

### ***3.1.3 National Access and Benefit Sharing (ABS) Legislation Mandating PIC***

The principle of PIC is embedded in the CBD whereby, subject to national legislation, access to and use of knowledge, innovations and practices of indigenous and local communities should take place only “with the approval and involvement of the holders” of the same (Art 8[j]). Many of the countries that have ratified the CBD have already put in place (or are in the process of doing so) legislations and policies dealing with protection of biodiversity related TK and PIC. Decision 486 of the Andean Community relating to the protection of TK is a case in point, establishing legal recourse that provide for “*nulidad absoluta*” of a patent if PIC had not been granted with respect to the patented product or process (CBD, 2001).

### ***3.1.4 Contractual Agreements***

Contractual agreements, encompassing both legally binding as well as non-binding agreements, can be used in absence of or in addition to IPRs for protection of TK. These are based on mutual respect cultivated through long and close relationship between the indigenous communities and the researchers. This is an attractive approach as most societies are familiar with it and involves minimal government intervention. However, the non-binding nature of contracts, high transaction costs, lack of legal expertise, disparity in bargaining power, and unfamiliarity of indigenous communities with formal national legal systems could be major deterrents (CBD, 2000).

### *3.1.5 Customary and common law regimes*

In addition to using existing forms of IPR regimes for regulating access to and control over TK, CBD (2000) suggests that such knowledge should be acquired and used in a manner that does not violate the customary laws of the indigenous and local communities. This would entail including customary law systems or those elements relevant to CBD, into the mainstream national statutory and common law structure. In addition to honouring commitments to indigenous and local community self-determination in the recognition and administration of customary law, this would also help in the protection of such traditional legal systems.

The Biodiversity and Community Knowledge Protection Act of Bangladesh is one such piece of legislation that works in this direction and “prohibits violation of Common Property Regimes that include various rights, relations, arrangements and cultural practices whether or not they have legal expressions or recognition through legal precedence by which Communities own, use and have access to biological and genetic resources”. Another example is the Philippines Executive Order No. 274, which mandates that “Prospecting of biological and genetic resources shall be allowed within the ancestral lands and domains of indigenous cultural communities only with the prior informed consent of such communities; obtained in accordance with the customary laws of the concerned community” (Section 2.1).

The common law, in some countries, could also be a means for protecting biodiversity related TK. Some elements of such knowledge like herbal remedies prescribed by traditional healers, which cannot be protected under standard patent law, can be protected as confidential information. Common law principles like those governing unconscionable behaviour and unjust enrichment can also serve the purpose. Local communities seeking to control imitation or unauthorised commercialisation of their products could also take refuge in provisions of Article 10 bis of the Paris Convention for the Protection of Industrial Property that calls for protection from unjust competition (CBD, 2000).

### **3.1.6 National non-IPR legislations**

Most countries have a wide variety of legislation governing conservation and sustainable use of natural resources pertaining to different sectors, which can also be used to protect traditional biodiversity related knowledge. If resources being accessed are present in territories occupied or traditionally used by indigenous communities, then the law could incorporate provisions mandating permission of the affected community for access and use of the resource. Laws governing forests, fisheries, agriculture and those specific to nature conservation and protected areas could provide opportunities in this direction.

Some countries having jurisdiction over indigenous and local communities, through appropriate legislation, have granted or secured tenure of such communities over whole or part of their traditional territories. Such laws may also provide for some level of self-governance and enable communities to control access to their territories and natural resources. Moreover, national and subnational legislation could also include protection of cultural heritage through which sacred site or areas of particular significance to indigenous and local communities (like sacred groves and breeding sites of important species) could be safeguarded (CBD, 2000).

The above mechanisms of legal protection open up for TK holders the option of both 'positive' and 'defensive' protection of their knowledge (Srinivas, 2008). Positive protection allows them to acquire IPRs or any other right provided by a legal mechanism established to protect TK and interests of such knowledge holders. The rights of TK holders are recognised under such protection and can be enforced through IPRs or *sui generis* systems. Defensive Protection allows them to gain protection through legal or other means to prevent unauthorised use and claims to cultural expressions, knowledge contained in specific practices, products based on or enclosing TK that is already in the public domain.

## **3.2 Non-legally binding mechanisms**

### **3.2.1 Traditional resource rights**

Traditional resource rights (TRRs) can be defined as “a rights concept that seeks to integrate an array of existing universally recognized human rights [...] with implied environmental rights [...] and the emerging rights of indigenous peoples as expressed in the draft United

Nations Declaration on the Rights of Indigenous Peoples” (CBD, 2000; p 14) into “overlapping and mutually supporting bundle of rights” (Posey et al, 1996). It is a system of integrated rights that acknowledges that cultural and biological diversity are integrally inseparable and is guided by human rights principles of indigenous and local communities including the right to self-determination, collective right, land and territorial rights, religious freedom, the right to development, the right to privacy and PIC, environmental integrity, IPRs, neighbouring rights, the right to enter into legal agreements, rights to protection of cultural property, folklore and cultural heritage, the recognition of cultural landscapes, recognition of customary law and practice and farmers' rights (Posey, 1996).

TRRs are compatible with the requirements of the CBD, IUPGR and the TRIPS Agreement and allow States to fulfill their international obligations with respect to trade, environment and development as well as honour their commitments on human rights. Though these rights can be implemented at the local, national and international levels, they are not self-executing rights; rather they have to be implemented by national law making bodies (CBD, 2000). Thus, in addition to guiding international law and practices and national legislation, TRRs can also help give direction to dialogue between local and indigenous communities and other parties like governmental and nongovernmental organizations (Posey et al, 1996).

### **3.2.2 *Voluntary guidelines and codes of conduct***

Responding to continued misappropriation of their bioresources and related TK for commercial use, indigenous and local community groups started establishing codes of conduct, ethical guidelines and principles of cultural ownership since the early 1980s. Such documents assert ownership over cultural heritage and associated knowledge and lay down principles related to rights to privacy, ground rules for consultation and obtaining permission for carrying out research and publication/disclosure of information. Mirroring such efforts, many institutions and NGOs have also developed codes for guiding researchers towards right conduct while working with indigenous communities, respecting their rights to privacy, protection of their TK and fair dealings (CBD, 2000).

Codes of ethics and guidelines thus encourage researchers to reflect on and make efforts to improve current practices in addition to increasing sensitivity and regulating behaviour within the researcher community (Cassell et al, 1987; cited in Laird et al, 2002). Generally

codes/guidelines deal with matters relating to the role and procedures of national licensing authorities, application for and granting of licences, collecting responsibilities and procedures to be followed during and after collection, responsibilities of sponsoring organisations, respecting and assigning IPRs, reporting requirements for collectors and sponsoring organisations and national and international monitoring of the codes of practice (CBD, 2000)

A VCC must include the following key features (Balakrishna, 2003):

- Commitment to follow international, national and local research policies and codes of conduct
- Collaboration with local communities on product development and technology transfer
- Respect for the rights to information of the community
- Promotion of sustainable development and conservation
- Description of negotiation for patent rights
- Benefit sharing and fair compensation with short, medium and long-term reciprocity

One voluntary code of conduct (VCC) has been developed by the MS Swaminathan Research Foundation, Madras for activities related to agrobiodiversity conservation and development of community biodiversity registers (CBRs). According to Balakrishna (1999), a VCC for CBRs must try to answer the following questions:

- Who owns the genetic resource?
- How can PIC be obtained?
- What are MTAs?
- Who is authorised to give PIC and sign MTAs?
- Who will manage the CBR?
- Who will have access to the register?
- Will the register be used as an official document to settle disputes?

Other examples include:

- Manila Declaration Concerning the Ethical Utilization of Asian Biological Resources (includes a Code of Ethics for Collectors),
- Covenant on Intellectual, Cultural and Scientific Resources – a basic code of ethics and conduct for equitable partnerships between responsible corporations, scientist or institutions and indigenous groups



- “Professional Ethics in Economic Botany: Preliminary Draft Guidelines” of the Society for Economic Botany
- “Biodiversity Research Protocol” developed by the Pew Conservation Fellows
- “Guidelines for Equitable Partnerships in New Natural Product Development: Recommendations for a Code of Practice”
- “Code of Conduct and Standards of Practice” developed by the International Society of Ethnobiology.

#### **4. THE WAY FORWARD: LOOKING BEYOND IPRS**

From the above discussion it is evident that the limitations of IPRs in protecting TK are manifold, rendering them inadequate for the purpose and making them incompatible with the customs, beliefs and knowledge systems of many traditional societies. However, the role of GIs and trademarks in protecting TK cannot be overlooked. As in the case of the Kancheepuram *sarees*, a well developed system of GIs has been used successfully in France to guarantee authenticity of certain food products like wines, cheeses and spirits whose value is based on environmental and cultural factors, especially the traditional, collectively developed techniques for production (Downes, 1997).

It is important to understand however, that no matter what the form of IPR protection, impediments like high costs and difficulty in enforcement of relevant rights would render them “of little or no real value to those who may claim rights in traditional knowledge” (Correa, 2001; p.13). As such, rather than opting for protection solely through IPRs, it would be more effective to “set any use of private property rights in a broader legal context, respecting this choice as one option within a spectrum of options” (WIPO, 2004; p.9). This approach has been adopted by many countries that have incorporated such rights into their national *sui generis* measures - Brazil has combined the grant of exclusive rights with access regulation; the United States of America has combined the use of existing exclusive rights with defensive protection of native insignia and repression of unfair competition in native Indian products; and Costa Rica and Portugal have combined exclusive property rights, access regulation and unfair competition law (WIPO, 2004).

CBD (1996) points out that two important issues have to be closely examined and taken into consideration while adapting existing IPRs and/or developing new ones – the existing legal, economic and social conditions prevalent in the country or region and the beneficiaries and

markets being affected by the rights. Owing to these factors, CBD highlights the impossibility of developing a universally applicable rights that would satisfy the requirements and needs of all local and indigenous communities.

Keeping these issues in view, the option of *sui generis* protection is being explored by many countries and their indigenous communities. According to the CBD (2007) TK encompasses three dimensions: a *cultural aspect* (reflecting the culture and values of a community), a *temporal aspect* (it is passed down from one generations to another with gradual adaptations taking place in response to changing realities) and a *spatial aspect* (relating to the territory or a community's relationship with its lands and waters traditionally occupied or used). The Convention specifies that an effective *sui generis* system must acknowledge and protect each of these dimensions at various levels. Srinivas (2008) however, expresses doubts about whether any single regime can protect all three dimensions as "different components of TK deserve or are entitled to different types of protection" (p. 85).

The advantage of a *sui generis* system is that besides allowing for a wide range of legal and non-legal approaches, it grants national authorities the flexibility to choose appropriate legal mechanisms that would best conform to the specific needs of indigenous and local communities at the domestic level and also fit into the national legal framework in which protection would be valid. CBD (2007) suggest that since *sui generis* systems recognize collective ownership over knowledge and related resources, they could safeguard against third parties claiming IPRs over TK.

#### *Recognizing Customary Rights*

*Sui generis* systems have to be designed in continued collaboration and discussion with indigenous peoples and must accommodate the holistic nature of their knowledge and respect its cultural context. Importantly, such a system of protection must support existing local systems of protection that are governed by indigenous customary laws. The importance of this is reflected in the view held by a North American indigenous organization, the Four Directions Council, that (quoted in Dutfield, 1999; p.508):

*Indigenous peoples possess their own locally-specific system of jurisprudence with respect to the classification of different types of knowledge, proper procedures for acquiring and sharing knowledge, and the rights and responsibilities which attach to possessing knowledge, all of which are embedded uniquely in each culture and*

*its language. Rather than attempting to devise uniform IPR guidelines for protection of traditional knowledge, the Four Directions Council urges governments to agree that traditional knowledge must be acquired and used in conformity with the customary laws of the people concerned*

Significantly, concepts presented by many customary law systems may also exist in other bodies of similar laws around the world and can be considered ‘common principles’ or “norms” of customary law. A case in point is the Nunavut Wildlife Act that lists important Inuit customary law principles with respect to biodiversity (CBD, 2007). Such principles that are common to those followed by other communities can be put together to develop a system of protection that can be applied across communities, resources and regions.

### *Recognition of Land Rights*

Indigenous communities would not be able to protect their TK and bioresources unless they have ownership rights over their ancestral lands and resources. CBD (2007) emphasizes the need for *sui generis* systems to “recognize the important link between protecting traditional knowledge and securing tenure and/or access over lands and waters traditionally occupied or used by indigenous and local communities” (p.3). Several biodiversity rich countries like Brazil<sup>1</sup> and Peru that also have a considerable indigenous population have understood the importance of this and made efforts to include relevant provisions in their national laws that grant indigenous communities sovereign control over their bioresources. Such community intellectual rights and collective rights (Seiler, 1998) have been granted by the Costa Rica Biodiversity Law<sup>2</sup> that establishes an entitlement called “The Community Intellectual Rights, *Sui generis*” in which the State recognises and protects the local and indigenous community’s biodiversity related

---

<sup>1</sup> Constitution of the Federative Republic of Brazil of 1998 - Article 231: The Indians shall be accorded recognition of their social organization, customs, languages and traditions and the original rights in the lands that they occupy by tradition, it being the responsibility of the Union to demarcate them, protect them and ensure respect for all their property.

<sup>2</sup> Article 82 - *Sui generis* community intellectual rights: The State expressly recognises and protects, under the common denomination of *sui generis* community intellectual rights, the knowledge, practices and innovations of indigenous peoples and local communities related to the use of components of biodiversity and associated knowledge.

knowledge, practices and innovations (Aguilar, 2001). Philippines<sup>3</sup> has a similar agenda built into its Community Intellectual Rights Protection Act (2001). Valuable lessons can also be learnt from Venezuela<sup>4</sup> and signatories of the Andean Pact<sup>5</sup> that recognise the rights of indigenous peoples over their IP and have taken steps to arm them with IPRs for their biodiversity related innovations that conventional IPR systems do not recognise.

An effective property regime must thus, as part of positive protection vest in TK holders the rights to allow access, determine terms of access, refuse access and the means to enforce such rights (Srinivas, 2008). However, this can be difficult in cases where the rightful holders of TK cannot be clearly identified.

#### *Complementary national and international legislation*

*Sui generis* systems, however well designed, would not be effective on their own; rather they would need to be supported by appropriate national and international measures that would provide best-practice guidelines and recognize and endorse existing local protection systems (CBD, 2007). At the national level *sui generis* systems would have to be harmonized with other national laws which according to WIPO (CBD, 2007) could be done by determining the extent to which the law of IP can meet national objectives and help address policy issues related to TK. If such law is found to be deficient for the purpose of protecting TK, the WIPO suggests (CBD, 2007) that IP laws be adapted and *sui generis* measures, laws and systems developed to complement IP and non-IP tools. Legal protection of TK makes it necessary that the following issues be addressed (CBD, 2000):

---

<sup>3</sup> The objective of this bill is to provide for a system of community intellectual rights protection of local and indigenous cultural communities with regards to development of genetic resources and conservation of the country's biological diversity. The bill explicitly acknowledges that biodiversity has been and should continue to be the commons of local communities. It also recognizes that both resources and knowledge should be freely exchanged among different communities who are also users of the innovation.

<sup>4</sup> Constitution of the Republic of Venezuela of 1999 – Article 124: The collective intellectual property of indigenous knowledge, technology and innovations is guaranteed and protected. Any work on genetic resources and the knowledge associated therewith shall be for the collective good. The registration of patents in those resources and ancestral knowledge is prohibited.

<sup>5</sup> Article 7.- The Member Countries, in keeping with this Decision and their complementary national legislation, recognize and value the rights and the authority of the native, Afro-American and local communities to decide about their know-how, innovations and traditional practices associated with genetic resources and their by-products.

- Area and nature of respective national and indigenous and local community jurisdictions related to IP
- Policing
- Rules of evidence and procedure
- Locus standi
- Nature and composition of the judicial authority assigned to deal with customary IP
- Role of local community justice mechanisms
- Appropriateness, nature and enforcement of any penalties imposed for infringements against customary laws governing access to and use of biodiversity related TK.

CBD (2007) cautions that it could be beneficial to integrate the *sui generis* system into the general framework of national legislations.

Implementation of effective *sui generis* systems with proper institutional and legal support would require that local institutions governing land-use and management of biodiversity and related TK would have to be strengthened. At the national level this could call for legal and policy reform that aim at securing rights of indigenous communities to resource ownership and use and building their capacity to exercise such rights (CBD, 2007). Such steps have been taken by various countries through constitutional amendments that aim at incorporating biodiversity-related rights of indigenous communities in the national legislative framework which could lend more power to community rights legislation and has been followed by various countries in different parts of the world – India’s amendment 73 which aims at devolution of power to the grassroot level through the *Panchayati Raj* institution and Thailand’s Art. 79<sup>6</sup> of a new Constitution. Colombia, Brazil and other Latin American countries have also articulated such rights in their constitutions and this could strengthen *sui generis* community rights systems.

*Sui generis* systems for protecting TK have till now been developed on a national or regional level. The former becomes ineffective in the case of cross border knowledge systems and when TK is taken beyond the sphere of national jurisdiction. Regional initiatives like those

---

<sup>6</sup> Article 79: The state must promote and accept public participation in planning and implementing environmental and natural resource conservation and management, as well as controlling and eradicating pollution that threatens people's lives, welfare and quality of life.

developed by the signatories of the Andean Pact and the Organization of African Unity are again limited in a similar way. There is thus the need for a protection regime at the international level that not only protects the rights of local and indigenous communities but also respects and complies with a wide variety of diverse systems of customary laws and practices (Tobin, 2004). In this regard, Dutfield (2004) cautions that a common international regime would have to incorporate a certain degree of harmonization in order to be effective in foreign jurisdictions – a fact that could prevent it from accommodating diversity and possibly result in a regime that would be useless by not conforming to any culture.

Besides designing and implementing *sui generis* systems, national and international initiatives for protecting TK could include formulating legislation to govern access to access to genetic resources and TK and make PIC of relevant indigenous communities compulsory. Lessons can be taken in this regard from countries like India<sup>7</sup> and Ethiopia<sup>8</sup> that have adopted all-inclusive legislations concerning biodiversity-related rights of communities, encompassing mechanisms of access, biosafety, intellectual property, communal rights and national initiative for conservation and sustainable use of biodiversity.

The importance of PIC cannot be over-emphasized. Its significance is evident from the fact that it has been mandated at the national level through many different legal instruments like the Constitution (Venezuela<sup>9</sup>), national indigenous rights law (Philippines<sup>10</sup>), laws for protection of rights over TK (Peru<sup>11</sup>) and folklore (Panama) (Tobin, 2004). Such instruments

---

<sup>7</sup> Plant Variety Protection and Farmers Rights Act: Breeders who wish to use farmers' varieties for creating Essentially Derived Varieties cannot do so "except with the consent of the farmers or group of farmers or community of farmers who have made contribution in the preservation or development of such variety" (Sec. 43).

<sup>8</sup> Access to Genetic Resources and Community Knowledge, and Community Rights Proclamation – Article 3: The objective of this Proclamation is to ensure that the country and its communities obtain fair and equitable share from the benefits arising out of the use of genetic resources so as to promote the conservation and sustainable utilization of the country's biodiversity resources

<sup>9</sup> Constitution of Venezuela – Article 120: Exploitation by the State of the natural resources in native habitats shall be carried out without harming the cultural, social and economic integrity of such habitats, and likewise subject to prior information and consultation with the native communities concerned.

<sup>10</sup> The Philippines Indigenous Peoples Act – Sec. 35: Access to biological and genetic resources and to indigenous knowledge related to the conservation, utilization and enhancement of these resources, shall be allowed within ancestral lands and domains of the ICCs/IPs only with a free and prior informed consent of such communities, obtained in accordance with customary laws of the concerned community.

<sup>11</sup> One of the Objectives of the Law Introducing A Protection Regime For The Collective Knowledge Of Indigenous Peoples Derived From Biological Resources is "To ensure that the use of the knowledge [of indigenous communities] takes place with the prior informed consent of the indigenous peoples (Article 5 (d)). Article 6: Those interested in having access to collective knowledge for the purposes of scientific, commercial and industrial application shall apply for the prior informed consent of the representative organizations of the

can be important guides for countries that are in the process of formulating protective regimes for different components of the knowledge of their indigenous communities.

Besides implementing a legislative framework that directly deals with ABS, biodiversity and protection of TK, other national laws can be used to establish a sectoral community rights regime (Seiler, 1998). This can be done by formulating community rights legislation to take care of the specific needs and realities of different groups like small scale fisherfolk living in coastal areas, farmers dealing with crops and livestock and communities living in the forest and depending solely on forest resources. For instance Thailand and Laos have developed Community Forestry Acts paying specific attention to needs of communities who survive on forest resources and who have lost management rights due to logging operations and nature conservation schemes.

Similar rights have been provided by India which, through its Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, accepts the necessity “to address the long standing insecurity of tenurial and access rights of forest dwelling Scheduled Tribes and other traditional forest dwellers including those who were forced to relocate their dwelling due to State development interventions” and has enacted the law to “recognise and vest the forest rights and occupation in forest land” in such communities (Preamble). Philippines has included similar provisions in its laws that deal with wildlife conservation<sup>12</sup> and traditional medicine<sup>13</sup>.

### *Compliance and Enforcement*

In addition to the above legislative measures a comprehensive protection regime would also have to establish non-legal mechanisms like TRRs that can help guide international law and

---

indigenous peoples possessing collective knowledge. The organization of the indigenous peoples whose prior informed consent has been applied for shall inform the greatest possible number of indigenous peoples possessing the knowledge that it is engaging in negotiations and shall take due account of their interests and concerns, in particular those connected with their spiritual values or religious beliefs.

<sup>12</sup> Wildlife Resources Conservation and Protection Act – Sec.7 of this Act allows collection of wildlife with one of the conditions being: “That collection of wildlife by indigenous people may be allowed for traditional use and not primarily for trade”. The Act defines ‘Traditional use’ as “utilization of wildlife by indigenous people in accordance with written and unwritten rules, usage, customs and customs and practices traditionally observed, accepted and recognized by them” (Sec.5 (u)).

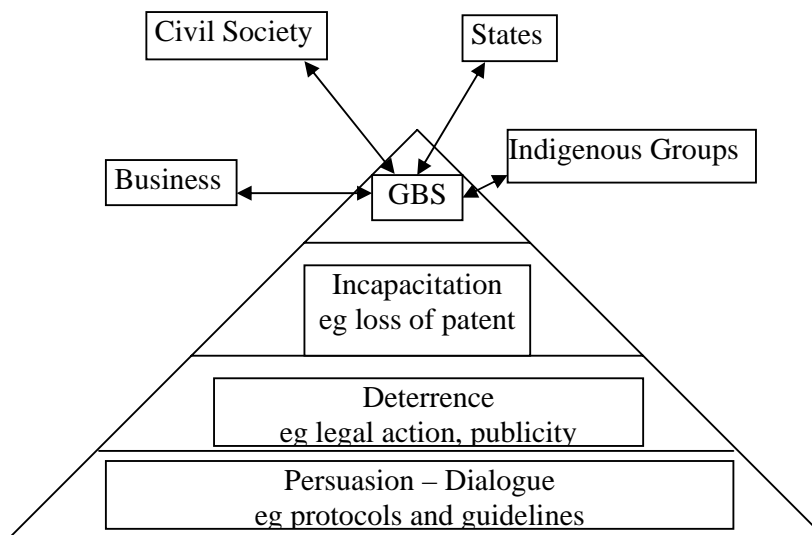
<sup>13</sup> Traditional and Alternative Medicine Act defines intellectual property rights as “the legal basis by which the indigenous communities exercise their rights to have access to, protect, control over their cultural knowledge and product, including but not limited to, traditional medicines, and includes the right to receive compensation for it” (Article II, Sec.4(i)).

practices and national legislation as well as give direction to dialogue between local and indigenous communities and other parties like governmental and non-governmental organisations (NGOs) (Posey et al, 1996).

Some amount of protection can also be achieved by the use of protocols which though not legally enforceable, establish industry standards and could provide guidance to at least some of those stakeholders who wish to be access bioresources and TK in a responsible manner. It cannot however be overlooked that since protocols are not laws, enforcement would not only depend what powers indigenous and local communities can exercise under national and sub-national laws but also on the willingness to adhere to them voluntarily (CBD, 2000).

Drahos (2004) suggests that compliance with protocols can be increased by integrating them into a regulatory enforcement pyramid. Such a pyramid (Figure 1) has soft tools of regulation at the base – tools like guidelines, protocols and educational strategies that are based on the assumption that actors want to do the “right thing”. The tools of regulation become more stringent towards the top of the pyramid with the topmost offering strict forms of punishment like imprisonment, cancellation of license etc.

*Figure 1: International Enforcement Pyramid for TGKP*



*Source: Pyramid draws upon Braithwaite, J. (2002); cited in Drahos, 2004*

As the enforcement pyramid allows commencement of negotiations at the base through dialogues and information-based strategies, Drahos (2004) holds it especially appropriate for regulating use of TK and practices “because, for indigenous groups, respectful engagement



with others over the use of their knowledge and resources is the fundamental starting point of any process of regulation” (p.35).

An important component of a protective system, in addition to the above strategies, is the documentation of TK in a participatory way. Such registers and databases would prevent patents on indigenous resources and related TK by establishing prior art and also prompt sharing of benefits resulting from commercial use of such materials. India has already made inroads in this area in the form of the Traditional Knowledge Digital Library – a computerised database of documented TK related to medicinal and other plants. People’s Biodiversity Registers being developed in Kerala and Karnataka also are commendable efforts at protecting TK through documentation.

Similar initiatives taken by national institutions in other parts of the world offer important lessons in this respect. The Australian Institute of Aboriginal and Torres Straits Islanders Studies and the Vanuatu Cultural Centre help indigenous peoples collect and protect their knowledge, holding it in trust and conforming to conditions of confidentiality imposed by the communities (Alexander et al, 2004). NGOs are also an important group that can help in this effort as has been proved by the database developed by Honey Bee and the Farmers Rights Information System database developed by the MS Swaminathan Research Foundation.

The option of documentation is not without its limitations. With the amount of TK being owned by innumerable indigenous communities being very vast, it is not possible to develop a completely comprehensive and extensive register of such knowledge (India’s intervention, in WTO, 2002d; para. 253; cited in Dhar et al, 2004). This would be especially true in the case where TK used in an innovation was not documented, was derived from oral traditions or was documented in the local language (India’s intervention, in WTO, 2002d, para. 253; and in WTO, 2003, para. 123; cited in Dhar et al, 2004). Relying on the documented source itself would be insufficient in such a case (Dhar et al, 2004). Moreover, if institutionalised as part of the formal legal system without putting in place a system of protection, documentation of TK could lead to misappropriation of local knowledge and resources.

Countries can also establish registers for protection of TK through national laws as has been done by the Indian Biodiversity Act, 2002, Brazil’s interim regime (medida provisoria No. 2.126-8) on ABS, Kenya’s register of traditional healers, Panama’s law on folklore, Peru’s

collective regime on traditional knowledge, Portugal's TK law, and Thailand's register of traditional medicine, as well as measures within the Andean Community, the Organization of African Unity and the South Pacific Forum (Alexander et al, 2004).

In addition to the above measures, appropriate incentive schemes formulated in consonance with the opinion of indigenous and local communities could lead to effective protection of biodiversity related TK. Core incentives could include security of tenure over land and natural resources and co-management of natural resources, with monetary and non-monetary benefits being added to suit specific situations. Private research and collecting institutions could also aid in this process through contractual obligations based on MATs and fair and equitable benefit-sharing arrangements. (CBD, 2000).

With regard to providing incentives, it is important to understand that no one incentive will suffice for all situations within or across communities. Incentives would thus have to be tailored to suit different kinds of knowledge, skills, practices, innovations and holders of TK as well as the needs of particular communities and of particular members of the community. Above all, incentive measures should be designed and implemented in a manner that maintains the community and ecological balance (CBD, 1997). Capacity building measures could also be undertaken to supplement the above protective measures. This could include strengthening capacities for making proper use of biological resources, expertise in relevant scientific and technological fields, ability to draft legislation and develop *sui generis* systems of protection of TK and expertise and skill required for bargaining and negotiating ABS and other agreements (CDB, 2000).

Inspiration can be drawn from a "more responsive and constructive approach" (Swiderska et al, 2006; p.10) that is being explored by some indigenous communities and organizations to make up for gaps in policy initiatives of UN agencies like the CBD and WIPO that "address traditional knowledge separately from traditional resources and territories and customary laws, deal with TK issues within a paradigm of property, and marginalize the ancestral rights-holders from decision-making" (Swiderska et al, 2006; p.10). The concept of Collective Bio-Cultural Heritage is defined as the "Knowledge, innovations and practices of indigenous and local communities which are collectively held and inextricably linked to traditional resources and territories, local economies, the diversity of genes, varieties, species and ecosystems,

cultural and spiritual values, and customary laws shaped within the socio-ecological context of communities” (defined in Swiderska et al, 2006; p.11).

The concept provides a framework for designing mechanisms for protecting TK that are holistic and based on human rights, including rights to land and natural resources as well as the right to self-determination. This model allows for protection of TK through (Swiderska et al, 2006):

- recognition of collective land rights, which itself provide a positive *sui generis* mechanism;
- strengthening of community based management of natural resources, biodiversity and knowledge;
- strengthening of cultural and spiritual values;
- strengthening of customary laws and institutions;
- strengthening local economies
- poverty reduction.

Swiderska et al (2006) emphasize that this model “could provide the basis for a common international policy, while allowing flexibility for approaches to be adapted to diverse local needs and contexts” (Sweiderska et al, 2006; p11)

## **5. CONCLUSION**

The concern of indigenous communities regarding unfair exploitation of their bioresources and TK with disregard to their customary laws and practices has been gaining ground and there is growing recognition of the need to respect and protect their rights over such resources. Policy initiatives are being taken at national and international levels to design a protection regime that does not contract indigenous values of cultural heritage, customs, free sharing of knowledge, resources and innovations and communal control over such resources that have been passed down the generations. The great diversity in cultures, lifestyles, laws and practices of indigenous peoples the world over makes it impossible to design a one-size-fits-all protective regime. As experiences of different countries have shown, there is no one protection system that is universally applicable; rather each country has to come up with its own options that can only be guided by international frameworks.

Protection of TK raises many policy issues related to the rationale for protection, the measures through which it is to be achieved, the mode of enforcement and the implications for indigenous communities and other right holders. Countries designing a protection system must approach it in a holistic manner, addressing issues related to equity, ethics, environment, sustainable resource use, the socio-economic set up and empowerment of indigenous peoples.

Importantly, no new form of protection of TK will be effective or have practical meaning if it is separated from the cultural context in which the knowledge exists and denies indigenous communities their rights or reduces their ability to manage and enforce them. What system of protection a country designs and implements will depend on its diverse legal, conceptual, infrastructural and operational capacities as also on its obligation to international treaties. Countries would need to analyze the existence of and further need for framing complementary policies like recognition of customary laws and practices, terms of land tenure, recognition of rights of indigenous communities and preserving and promoting use of their knowledge.

Any system of protection would have to draw on a wide variety of legal and non-legal mechanisms. It is evident from experience (WIPO, 2004) that any country desirous of establishing an effective protective regime would be more likely to do so through a bundle of complementary legal, non-legal and voluntary mechanisms that take up new measures along with adaptations of existing IPRs and have been decided upon in consultation with relevant indigenous communities. Significantly, the Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore, WIPO, has repeatedly endorsed this as a 'comprehensive approach' to TK protection (WIPO, 2004).

## REFERENCES

1. Afreen, Shamama & Biju Paul Abraham (2003), "Evolving A National System For Conservation of Biodiversity And Protection Of Traditional Knowledge: Some Alternatives For India" presented in the Third Biennial Conference on Biodiversity and Quality of Life, organized by The Indian Society for Ecological Economics, during 18-20 December.
2. Aguilar, G. (2001), "Access to Genetic Resources and Protection of Traditional Knowledge in the Territories of Indigenous Peoples", *Environmental Science and Policy*, 4, pp. 241 – 256.
3. Alexander, M., Chamundeeswari, K., Kambu, A., Ruiz, M. & Tobin, B. (2004), *The Role of Registers & Databases in the Protection of Traditional Knowledge: A Comparative Analysis*, UNU-IAS Report.
4. Axt et al, (1993), *Biotechnology, Indigenous Peoples and Intellectual Property Rights*, Congressional Research Service Report for Congress, Washington D.C., April 16<sup>th</sup>.
5. Balakrishna, P. (1999), "Why Share Benefits?", *The Hindu*, 23<sup>rd</sup> May, India.
6. Balakrishna, P. (2003), "Convention on Biological Diversity, Intellectual Property Rights and Voluntary Codes of Conduct: Facilitating Access and Benefit Sharing", in Moore, P. & Yang, W. (eds), *Trade, Biodiversity and Sustainable Development*, Proceedings of the Training Workshop, Beijing, China, October 29-31.
7. Brascoupé, S. & Mann, H. (2001), *A Community Guide to Protecting Indigenous Knowledge*, Department of Indian Affairs and Northern Development, Research and Analysis Directorate, Canada, June.
8. CBD (1995), *Intellectual Property Rights and Transfer of Technologies which Make Use of Genetic Resources*, Document No. UNEP/CBD/COP/2/17, 6<sup>th</sup> October.
9. CBD (1996), *Knowledge, Innovations and Practices of Indigenous and Local Communities: Implementation of Article 8(j)*, Document No. UNEP/CBD/COP/3/19, 18<sup>th</sup> September.
10. CBD (1997), *Traditional Knowledge and Biological Diversity*, Document No. UNEP/CBD/TKBD/1/2, 18<sup>th</sup> October.
11. CBD (2000), *Legal and Other Appropriate forms of Protection for the Knowledge, Innovations and Practices of Indigenous and Local Communities Embodying Traditional*

*Lifestyles Relevant for the Conservation and Sustainable Use of Biological Diversity*, Document No. UNEP/CBD/WG8J/1/2, 10<sup>th</sup> January.

12. CBD (2001), *Report on the Role of Intellectual Property Rights in the Implementation of Access and Benefit-Sharing Arrangements*, Document No. UNEP/CBD/WG-ABS/1/4, 10<sup>th</sup> August.
13. CBD (2007), *Development of Elements of Sui generis Systems for the Protection of Traditional Knowledge, Innovations and Practices to Identify Priority Elements*, Document No. UNEP/CBD/WG8J/5/6, 20<sup>th</sup> September.
14. Chennells, R. (2003), *Ethics and Practice in Ethnobiology and Prior Informed Consent with Indigenous Peoples Regarding Genetic Resources*, Paper presented at the Conference on Biodiversity, Biotechnology and the Protection of Traditional Knowledge, Washington University, St. Louis, April 4 – 6.
15. Correa, C. M. (2001), *Traditional Knowledge and Intellectual Property: Issues and Options Surrounding the Protection of Traditional Knowledge*, Discussion Paper, Quaker United Nations Office Geneva, November.
16. CUTS (1995), “No Patents on Life Forms”, Briefing Paper, No.8, November
17. Delgado, G. C. (2002), “Biopi@acy and Intellectual Property as the Basis for Biotechnological Development: The Case of Mexico”, *International Journal of Politics, Culture and Society*, Vol. 16, No. 2, Winter.
18. Dhar, B. & Anuradha, R.V. (2004), “Access, Benefit-Sharing and Intellectual Property Rights”, *The Journal of World Intellectual Property*, Vol.7, Issue 5, pp 597-639, September.
19. Downes, D. (1997), *Using Intellectual Property as a Tool to Protect Traditional Knowledge: Recommendations for the Next Steps*, Discussion Paper prepared for the Convention on Biological Diversity Workshop on Traditional Knowledge, Centre for International Environmental Law (CIEL), Madrid, November.
20. Drahos, P. (2004), *Towards an International Framework for the Protection of Traditional Group Knowledge and Practice*, UNCTAD-Commonwealth Secretariat Workshop on Elements of National *Sui generis* Systems for the Preservation, Protection and Promotion of Traditional Knowledge, Innovations and Practices and Options for an International Framework, Geneva, 4-6 February

21. Dutfield, G. (1999), "Rights, Resources and Responses" in Posey, D. A. (ed) *Cultural and Spiritual Values of Biodiversity*, UNEP, Intermediate Technology Publications, London.
22. Dutfield, G. (2000), *Intellectual Property Rights, Trade and Biodiversity: Seeds and Plant Varieties*, Earthscan Publications Ltd., London.
23. Dutfield, G. (2001), "TRIPS Related Aspects of Traditional Knowledge", *Case W. Res. J. Int'l L*, Vol. 33: 233 – 275.
24. Dutfield, G. (2002), *Protecting Traditional Knowledge and Folklore: A Review of Progress in Diplomacy and Policy Formulation*, UNCTAD/ICTSD Capacity Building Project on Intellectual Property Rights and Sustainable Development.
25. Dutfield, G. (2004), *New Forms of Sui generis Protection*, Paper presented at the International Expert Workshop on Access to Genetic Resources and Benefit Sharing, Mexico, 24<sup>th</sup> – 27<sup>th</sup> October.
26. ENS (1999), "U.S. Cancels Patent on Sacred Ayahuasca Plant", Washington D.C, 5<sup>th</sup> November.
27. FTAA (2001), FTAA Draft Agreement, Document No. FTAA.TNC/w/133/Rev 1.
28. Gene Campaign (Undated), *Biopiracy: Imitations Not Innovations*, available at <http://www.genecampaign.org/Publications/biopiracy.pdf>, accessed on 10<sup>th</sup> September 2005.
29. GENET (2000), *Patents: Background paper on the Neem Patent Challenge*, available at website <http://www.gene.ch/genet/2000/May/msg00009.html> - accessed on 26<sup>th</sup> December, 2005.
30. Global Exchange (2001), *Biopiracy: A New Threat to Indigenous Rights and Culture in Mexico*, April, available at website <http://www.globalexchange.org/countries/americas/mexico/biopiracy.pdf>, accessed on 14<sup>th</sup> December, 2005.
31. Gollin, M. A. (1993), "An Intellectual Property Rights Framework for Biodiversity Prospecting" in *Biodiversity Prospecting: Using Genetic Resources for Sustainable Development*, Reid, W.V. et al (eds.), WRI, INBio, Rainforest Alliance, ACTS, Washington DC.
32. GRAIN & Kalpavriksh (2002), *Traditional Knowledge of Biodiversity in Asia-Pacific: Problems of Piracy and Protection*, November.

33. GRAIN (2000), "Of Patents and Pi@ates – Patents on Life: The Final Assault on the Commons", GRAIN Briefing, July, available at website [www.grain.org/briefings/?id=141#](http://www.grain.org/briefings/?id=141#), accessed on 23.08.03.
34. Ismail, Z. & Fakir, T. (2004), "Trademarks or Trade Barriers? Indigenous Knowledge and the Flaws in the Global IPR System", *International Journal of Social Economics*, Vol. 31. Iss. 1/2.
35. Kumar, K. S. (Undated), "Protection of Geographical Indications", *Technoligence*, Issue 2, Volume 2.
36. Laird, S. A. & Posey, D. A. (2002), "Professional Society Standards for Biodiversity Research: Codes of Ethics and Research Guidelines" in *Biodiversity and Traditional Knowledge: Equitable Partnerships in Practice*, Laird, S. A. ed, Earthscan Publications Limited, London, Sterling, VA.
37. Macer, Darryl R. J. & Kato, Makina (2001), *Biotechnology, Patents and Bioethics*, UNU/IAS Environment & Multilateral Diplomacy Series, 11.
38. Montecinos, C. (1996), "Sui generis: A Dead End Valley", *Seedling*, December.
39. Plasmaneem (undated), *Plasma Neem<sup>TM</sup> Oil*, available at website <http://www.plamsneem.com/neem.htm> - accessed on 17<sup>th</sup> November, 2006.
40. Posey, D. A. & Dutfield, G. (1996), *Beyond Intellectual Property: Towards Traditional Resource Rights for Indigenous Peoples and Local Communities*, IDRC, Ottawa.
41. Posey, D. A. (1999), "Introduction: Culture and Nature – The Inextricable Link" in Posey, D. A. ed. *Cultural and Spiritual Values of Biodiversity*, UNEP, Intermediate Technology Publications, London.
42. RAFI (1998), *Quinoa Patent Dropped*, Genotype, 22<sup>nd</sup> May.
43. RAFI (2000), *Mexican Bean Biopiracy*, available at website [http://www.etcgroup.org/documents/geno\\_mexicanbean.pdf](http://www.etcgroup.org/documents/geno_mexicanbean.pdf), accessed on 4<sup>th</sup> December 2005.
44. RAFI (2001), *Enola Bean Patent Challenged*, RAFI Press Release, 5<sup>th</sup> January, available at website [http://www.biotech-info.net/enola\\_bean.html](http://www.biotech-info.net/enola_bean.html) - accessed on 27<sup>th</sup> April, 2002.
45. Raghavan, S. (2001), "Protection of Traditional Knowledge", *Minnesota Intellectual Property Review*, Vol. 2: 1.



46. Rangnekar, D. (2002), *Geographical Indications: A Review of Proposals at the TRIPS Council*, UNCTAD/ICTSD Capacity Building Project on Intellectual Property Rights and Sustainable Development, available at website <http://www.iprsonline.org/unctadictsd/docs/GI%20paper.pdf>, last accessed on 23<sup>rd</sup> September, 2007.
47. Rattray, G. R. (2002), “The Enola Bean Patent Controversy: Biopiracy, Novelty and Fish-and-Chips”, *Duke Law and Technology Review*, 0008.
48. Schuler, P (2004), “Biopiracy and Commercialization of Ethnobotanical Knowledge” in *Poor People’s Knowledge: Promoting Intellectual Property in Developing Countries*, Finger, J. M. & Schuler, P. eds, World Bank and Oxford University Press.
49. Shiva, V. (2000), “North-South Conflicts in Intellectual Property Rights”, *Peace Review*, 12:4, pp.501 – 508.
50. Shiva, V. (Undated), “The Neem Tree – A Case History of Biopiracy” available at <http://www.twinside.org.sg/title/pir-ch.htm> - accessed on 17<sup>th</sup> March 2002.
51. Shiva, V., Jafri, A., Bedi, G., & Holla-Bhar, R. (1997), *The Enclosure and Recovery of the Commons*, Research Foundation for Science, Technology and Ecology, New Delhi.
52. Srinivas, K. R. (2008), “Traditional Knowledge and Intellectual Property Rights: A Note on Issues, Some Solutions and Some Suggestions”, *Asian Journal of WTO & International Health Law and Policy*, Vol 3, No. 1, pp. 81-120.
53. Swiderska, K. & Argumedo, A. (2006), *Towards a Holistic Approach to Indigenous Knowledge Protection: UN Activities, ‘Collective Bio-Cultural Heritage’ and the UNPFII*, Fifth Session of the UN Permanent Forum on Indigenous Issues, 15-26 May, New York, IIED, Andes (Peru) and Call of the Earth.
54. Tobin, B. (2004), *Customary Law as the Basis for Prior Informed Consent of Local and Indigenous Communities*, Paper presented at the International Expert Workshop on Access to Genetic Resources and Benefit Sharing, Mexico, 24<sup>th</sup> – 27<sup>th</sup> October.
55. WIPO (2004), *Protection Of Traditional Knowledge: Overview Of Policy Objectives And Core Principles*, Document No. WIPO/GRTK/IC/7/5, 20<sup>th</sup> August.