CHAPTER 8

Traditional Knowledge, Indigenous Knowledge and Intellectual Property Rights

Introduction

During the last decade or so, there has been a virtual explosion in writings on indigenous knowledge and IPRs as evident in the number of books, articles and studies on this.[1] In this chapter, these debates are considered in a selective manner and some other aspects, related to cultural property, indigenous medicine and folklore in detail, are not analyzed, except where such a discussion is relevant to the objectives of this thesis. Similarly, the issues relating to human rights and indigenous people or various declarations about the rights of the indigenous people or issues relating to self-determination and sovereignty are not discussed in detail. Cultural property and indigenous people or on native cultural rights and misappropriation of indigenous symbols and artifacts are not examined in detail. These are interesting issues to discuss but for reasons of space, and to focus on IPR issues the discussion has to be confined to specific questions and issues.

Indigenous Knowledge, Traditional Knowledge and Local Knowledge

Indigenous Knowledge, traditional knowledge, local knowledge, traditional ecological knowledge these are some of the terms that are used to describe knowledge and knowledge systems that are not recognized as part of the western scientific knowledge but whose utility and value have been recognized. Although these terms may sound similar, it is necessary to differentiate between them. Indigenous Knowledge refers to the knowledge developed and put to use by indigenous people, while traditional knowledge is a broader term that covers non-western knowledge. Local knowledge refers to knowledge that is specific to a location or geographic area or region.[2] Traditional Ecological Knowledge refers to the

traditional knowledge that is particularly relevant to ecology and environment and includes, but not limited to traditional practices of natural resources management.[3] Traditional knowledge itself is often composed of different knowledge systems and practices. For instance, traditional Indian medical knowledge is found is different systems like Ayurveda, Siddha, and Unani. Each of these has its own texts, practices and they are not the same. Thus within the traditional knowledge itself there is a wide variance in terms of organization of knowledge, practices. Some like Ayurveda have standard texts and there are institutions, which impart training in Ayurveda, and medicines are prepared based on these texts and in many instances, there are standardized procedures and manufacturing processes.[4] Thus, traditional knowledge is not a fixed phenomenon frozen in time. At the same time a portion of the traditional knowledge is not yet codified or recorded in texts and it is passed on from one generation to another orally coupled with training. Thus, any discussion, which is not sensitive to the varieties of knowledge and their components, will be misleading beyond a point. Although it is often, tempting to reduce Indigenous Knowledge as a single entity and argue on that basis, the fact is the sheer variety of knowledge systems and the cultural diversity that is associated, with them makes such a claim irrelevant and meaningless. However, one way to overcome this problem is to identify some key elements of Indigenous Knowledge and compare that with scientific knowledge. The various definitions of Indigenous Knowledge also indicate the range and scope of Indigenous Knowledge. However, as Indigenous Knowledge studied from different perspectives and by scholars with different disciplinary backgrounds there has been a proliferation of discussions on the definitions and components of Indigenous Knowledge. According to one definition it is a cumulative body of knowledge.[5] The definition given by WIPO is in a very broad sense.[6] The 'definitional dilemmas' over traditional knowledge are too many, and, these are not without consequences.[7] What is traditional in traditional knowledge or what is indigenous in

Indigenous Knowledge? - This is not an easy question to answer for one has to know what is meant by tradition and non tradition/modern in the first place and whether such a clear cut definition can be drawn is doubtful.[8] One can conceptualize TK as a process oriented phenomenon as the WIPO Report does. One definition of TK is based on the view that such knowledge built across generations[9]. Another interesting definition of Indigenous Knowledge can be adopted from the definition of Traditional Knowledge as comprised of embedded knowledge and embodied knowledge.[10] The definitions given by scholars/institutions/ organizations reflect their views as much as they try to define Indigenous Knowledge/ Traditional Knowledge. In this chapter, both the terms Indigenous Knowledge, Traditional Knowledge are used interchangeably, unless indicated otherwise. The intention is to avoid hair splitting arguments on the differences between them when these terms are used and a contextual discussion is given at the appropriate places.

In the context of CBD despite Article 8(j), CBD itself did not create any new intellectual property rights for indigenous or traditional peoples. Nor does it stipulate that governments are under an obligation to do so. This means that with no model being mentioned in CBD the IPR models and regimes under WTO and WIPO will be the guiding one for development of IPR models for IK/TK. It has been argued that IPR regimes in vogue are not adequate to promote conservation and sustainable use of genetic resources as envisaged by CBD.[11] . The mixed response of the indigenous communities to CBD and Article 8(j) indicates that not all communities are comfortable with CBD or with the objectives of Article 8(j).[12] This of course should be seen as a part of the larger politics relating to indigenous interests and conservation and use of biodiversity.

The (Re) Discovery of Indigenous Knowledge

Traditional knowledge is not an inferior form of knowledge nor is a competitor with western scientific knowledge. It has its own dynamics, cosmologies and knowledge claims

and epistemologies. More over traditional knowledge too evolves and is dynamic in nature. It is easy to view that as a stagnant knowledge system that is out of tune with the times and irrelevant in the context of scientific advancement. Some may view that as a knowledge that has some limited utility but unscientific. However, such views ignore the fact that traditional knowledge is often an integrated system of knowledge. That the western scientific knowledge itself has used traditional knowledge to further its growth is not widely known. For instance, Balick and Cox had pointed out that Galileo used the traditional knowledge of ballistics developed by craftsmen in Venice and Linnaeus developed the classification system based on the Sámi classification systems.[13]

The role of traditional knowledge has been significant in developing classification and codification systems and according to Ellen and Harris western scientific taxonomy "ironically depended upon a set of diagnostic and classificatory practices, which though represented as science, had been derived from earlier codifications of Indigenous Knowledge."[14]

Anthropologists had studied traditional knowledge as a part of social anthropology and cultural anthropology and had documented the role of spirituality and rituals in traditional knowledge. However, the study of traditional knowledge became a critical issue as even after few decades of development assistance many projects failed or resulted in unanticipated problems. Anthropologists who studied these questioned the application of western knowledge without taking in to account the local contexts and the rejection of traditional knowledge as irrelevant or backward. Studies in ethno-sciences confirmed the uniqueness of indigenous knowledge and the specificity of the knowledge and the cultural practices associated with rituals, ceremonies etc, which were called as 'science of the concrete' by Levi-Strauss. [15]

Many scholars wrote critically about science, technology and development, the discourse of development and the western claims about the superiority of the modern science and society[16]. Besides these, there were also evidences that traditional knowledge relating to environment and ecology could play a key role in forest conservation and sustainable development. In the late eighties and early nineties, thus there was a renewed interest in Indigenous Knowledge and its role in development. By then it became evident that traditional knowledge has many positive aspects even from a utilitarian perspective and it could be effective where developmental projects have failed because of adoption of inappropriate technologies.[17] Thus, the cultural dimension of the development and the relevance of traditional knowledge were acceptable even to funding agencies[18]. The signing off the Convention on Biological Diversity in 1992 and its recognition of Indigenous Knowledge gave an impetus to the issue of rewarding Indigenous Knowledge and protecting it from exploitation by others[19]. Thus in the mid nineties traditional knowledge became the subject matter for many publications, conferences, monographs which time and again discussed the issue of intellectual property rights and traditional knowledge. With the formation of WTO in 1994 and the signing of TRIPS, the issue became a major issue. Throughout the nineties and later the issue of protecting traditional knowledge assumed importance due to many instances of 'bio piracy'

Bio-cultural Diversity

Traditional knowledge is inseparable from cultural diversity. Cultural diversity and linguistic diversity are closely related. Thus, when a language dies or faces extinction the related traditional knowledge also dies or becomes unavailable. Unfortunately, many languages and indigenous groups are facing extinction. According to one estimate, indigenous groups or cultures that face extinction speak many languages that face extinction. But the bio-linguistic diversity and bio-cultural diversity are important for conserving

biodiversity. Indigenous communities are repositories of both.[20]. The biodiversity loss and ethno-linguistic loss are interlocking processes.[21]

The nexus between cultural diversity and biodiversity is thus very important. Often this bio-linguistic diversity faces danger when the cultures that nourish the diversity face threats to their survival. Most of this knowledge is not in any written form and often is learnt from elders or handed down by one generation to generation it is true that with the death of the cultures this knowledge also vanishes from the earth. However, languages do not remain static, nor do cultures. Cultures face the onslaught from outside; assimilate some aspects external to their native mores and values and in the process, language also changes. Thus, a static view of culture and language fails to capture this dynamics and often tends to view Indigenous Knowledge similar to a display in a museum, preserved for future. If at all indigenous cultures and language need recognition, it is not because they have some utility value but because the cultural diversity is valuable in itself. [22] The biodiversity itself could be understood as a historical and process phenomenon.[23]

Thus when bio-cultural diversity is recognized as the outcome of cultural as well as natural processes the importance of indigenous knowledge becomes obvious irrespective of its utility for development purposes. The bio-cultural diversity thus is valuable on its own sake and only when it is understood that culture and nature are inextricably linked the significance of indigenous knowledge in the context of bio-cultural diversity will be better appreciated.

Of course, humanity can still make use of the documented knowledge, although cultural context and the multiple meanings with that are lost. One reason why traditional or Indigenous Knowledge is attracting so much attention is that knowledge is valuable not because of the cultural factors but because of its utility particularly in drug discovery and development. So it is possible to talk of the importance of Indigenous Knowledge or

traditional knowledge in terms of its importance for the survival of indigenous groups, their empowerment and their rights to development.[24]

Commodification : Culture, Property and Rights

Thanks to the developments in biotechnology and information technology commodification of such knowledge is possible. Thus, whether it is Indigenous Knowledge or the genetic material of indigenous people it is possible to turn them in to commodities and claim intellectual property rights.[25]

However, commodification has been extended to products of culture also. In addition, for indigenous people who hold knowledge sacred, the commodifcation of knowledge in all forms, from designs, music, medicine, oral narratives, and traditional patterns is a form of sacrilege and hence they have to seek the intervention of courts or seek separate laws to protect their knowledge and culture from such exploitation.[26] In the context of Indigenous Knowledge commodifiction is associated with western scientific knowledge and development and the usurpation of Indigenous Knowledge and resources is seen as a part of the commodifiction process. Here the emphasis is more on the communal nature of knowledge and resources, than on alienation in a Marxian sense.[27] Indigenous worldview often perceives knowledge as a matter of collective ownership.[28] The incompatibility between indigenous approach to sharing knowledge and commodification is another point raised by scholars who caution about commodification.[29] The IPRs have been part of the strategy to commodify indigenous knowledge and resources.[30] Of course commodification and IPRs, particularly the patenting of genes is a much discussed topic and as a discussion on this beyond the scope of this chapter it is not elaborated further. However many such perspectives are also critiques of the current IP regimes.[31]

Thus commodification is a major concern with indigenous people and this arises from the experience with colonization, which continues in one form or another. Commodification

is the opposite of sharing and gift culture. This issue of commodification extends not only to Indigenous Knowledge but also the genetic material of the indigenous people and this is contrary to the deeply held beliefs of indigenous people.[32]

Thus the critique that IPRs only further the commodification process, reveal the fear about the IPRs and the dangers of commodifcation facilitated by IPRs. Commodification and the IPR interface itself has been debated at length in discussions on ownership of body's parts, rights of patients and other who donate material for research, property rights and intellectual property etc. A discussion on this is beyond the scope of this chapter.[33]

Traditional Knowledge/Indigenous Knowledge: Anthropology and, the Politics of Knowledge

Traditional knowledge itself cannot be viewed in isolation or something that is opposite of western scientific knowledge. Anthropologists have debated the tendency to essentialise traditional knowledge or pose that as an opposite of western knowledge[34]. Such a hard division of traditional and western knowledge is not possible for there has been centuries of interaction between the two, although it has not been on equal terms. Tradition itself is a controversial term and so is culture. Within traditional knowledge, there is a hierarchy and Indigenous Knowledge and culture are often the knowledge and culture of the marginalized. For example within India there are many indigenous medicinal systems and there are many traditional healers who do not follow codified systems like Ayurveda or Unnai or Siddha although they may be using same herbs and may be giving similar medicines. Many such healers are healers by tradition or who practice medicine apart from engaging in other activities like farming. Indigenous communities in India have their own traditional medical systems and the communities are often exploited by the mainstream society which itself has many traditional knowledge systems. Thus while traditional knowledge is not necessarily opposite to Indigenous Knowledge, due to the power relationships and hierarchy in the

society and due to other factors Indigenous Knowledge is often treated with contempt or exploited with utter disregard to the customs and practices of the communities. Thus, a North vs. South or Western vs. Non Western view on traditional knowledge is misleading. Anthropologists have cautioned against the uncritical use of the culture and tradition and against romanticizing traditional knowledge[35]. Therefore, there is no use in pitting traditional knowledge against modern knowledge and trying to argue that both are totally opposite of each other and hence are incomparable at any level or are not at all compatible. The view that traditional knowledge is always ecologically sound or indigenous people always act in ways that are sensitive to nature and ecology is popular, is questioned by anthropologists who have cautioned against such perspectives.[36] Part of this understanding comes from the view that indigenous people are noble savages and lead a simple, nature friendly lifestyle. This is far from true as indigenous people are neither noble savages nor their lifestyle could be labeled as such. Since indigenous communities depend heavily on their surroundings, particularly forests and ecosystems for survival they cannot afford to ignore the impacts of their activities and hence their attitude towards nature is shaped by this to some extent. But it is not correct to assume that each and every traditional practice is always eco friendly or is shaped by their concern towards nature. The sacred groves can be given as an example. There is much literature, which cites this as a practice to save trees and ecosystems, and hence it is argued that sacred groves embody traditional wisdom and hence traditional practices like sacred groves are examples of biodiversity conservation. This can be applied to debates on Traditional Environmental Knowledge, with the increasing call for incorporating TEK in conservation. Is all TEK environment friendly or are they imagined so because of the assumptions being held about TEK.[37]

Most of the romanticization about the traditional knowledge stems from this desire to view the traditional/indigenous practices as environment friendly or benign, always.[38]Is

traditional or Indigenous Knowledge is always compatible with science or modern worldview. Those who look at traditional knowledge from a utilitarian perspective do not look in detail at such questions. For them it is effective, and is relevant and can be used as a complementary factor in development[39], while some caution against this. For example, Nadasdy argues against clubbing, traditional environmental knowledge with modern science as such attempts may be "be reinforcing, rather than breaking down, a number of Western cultural biases that in the end work against full community involvement in managing local land and wildlife."[40]

A detailed discussion on the issues raised by this article or, on Traditional Environmental Knowledge (TEK) is beyond the scope of this article. However, Nadasdy highlights the differences between the modern or scientific worldview and the indigenous worldview and the consequences of such differences.

The reinvention of Nature and traditional knowledge and the discourses about bio-cultural diversity underscore the point that multiple interests are at work in this. The indigenous communities are asserting their rights and are using this to their advantage. The need to involve indigenous communities in conservation programs has been highlighted by a section of the conservation movement, particularly by NGOs. So the current interest in the Indigenous Knowledge is due to many factors and inevitably, the role of intellectual property rights in this is an important issue. The tensions between these diverging perspectives are, reflected in the debates on IPRs and indigenous knowledge. While some view that IPRs are compatible with the interests of indigenous communities and, can be, used to protect both the knowledge and the interests of communities, others disagree. If indigenous knowledge is viewed as something useful and hence need to be taken into account or integrated into the development process, the merits of the first view are obvious. When the very motive of the development process is questioned, the role of IPRs not beyond doubt. [41]

Thus as the debates on IK/TK/TEK and development process, IK/TK/TEK and IPRs indicate that the indigenous issues have been taken to the international arena and the dictum "Act Locally, Think Globally' has been put to use. This has resulted in many unanticipated developments on both sides of the debate. Thus while the advocates of IK/TK for development purposes have found favorable response from national governments and international donors and funding agencies, the articulation of indigenous interests by civil society groups, academics, NGOs and transnational advocacy networks has resulted in claims and counter-claims particularly in the context of bioprospecting, benefit sharing and intellectual property rights. While a detailed examination of this issue is beyond the scope of this dissertation it can be pointed out that both in theory and practice this has resulted in many interesting debates and the politics of representation is an important aspect in these debates. [42]

Perspectives On Intellectual Property Rights and Traditional Knowledge /Indigenous Knowledge:

The discussions and debates on intellectual property rights and Indigenous Knowledge have been wide ranging, from cultural property to oral stories, from designs to knowledge about medicinal plants. In the debates on Indigenous Knowledge and intellectual property extreme viewpoints have been put forth- from total negation of intellectual property as not suitable to Indigenous Knowledge to using intellectual property as a means to protect Indigenous Knowledge. Many solutions and suggestions have bee given and for the convenience of discussion, they are categorized as below:

Common Heritage Approach;

Traditional Resource Rights and Soft Laws;

Databases and Digital Libraries;

Traditional Knowledge Registers, Community Intellectual Property Rights;

Collective Rights and Community Rights

IP Rights (e.g. Patent, Copyright, Geographical Indicators, Trade Secrets) to protect Indigenous Knowledge/TK

Laws and Legal Regimes for protecting TK/Indigenous Knowledge at the national/regional level

Using Contracts, Licensing Agreements etc

Proof of Origin and Certificate of Origin

Global Bio-collecting Society and

Global Treaty on Indigenous Knowledge/TK

Common Heritage Approach:

The Common Heritage Approach is, based on the idea of Common Heritage of Mankind idea. Stephen Brush is an important advocate for this perspective. He favors a common heritage approach and favors using Indigenous Knowledge as a means to promote conservation and crop improvement. For Bush the issue is more than that of using Indigenous Knowledge. He points out simple solutions do not solve complex issues like poverty and environmental degradation nor will they promote conservation. Instead, he prefers a solution based on equity and ethics, which will, recognize indigenous communities and farmers for their contributions and would encourage conservation and contribute to poverty alleviation and development.[43]

The common heritage approach has been discarded and so is the concept of free exchange or unregulated access. Although the common heritage is based on, the idea that genetic resources are public goods and hence they should not be privatized the reality is otherwise. Further, the historic experience has been otherwise and the developing nations have realized that sovereignty over natural resources is essential and the indigenous communities have realized the need to have control over Indigenous Knowledge to prevent

exploitation and privatization of that knowledge. Thus, a return to a common heritage regime is not possible. However, Bush raises some important questions, which need careful consideration. His caution against privatization is worth noting. Further as he points out economic poverty and environmental degradation call for solutions based on ethics and equity and intellectual property rights will not be a solution to these problems. The indigenous communities are well aware of it and their claim over Indigenous Knowledge is to ensure that Indigenous Knowledge, nature and culture are not exploited by outside forces.

John Trotti has suggested that elements of Common Heritage of Humankind could be applied to Indigenous Knowledge management regime that could compensate the indigenous communities. He has suggested that a structure similar to International Seabed Authority could be formed and that body could charge finders fee and royalties from companies engaged in drug discovery and development based on Indigenous Knowledge.[44] However as the CHM idea has been discarded by both North and South such suggestions however well intended they may be may not be acceptable to most states. The CHM perspective however is useful as an idea to advocate ethically sound and equitable solutions.

Traditional Resource Rights and Soft Laws

Traditional Resource Rights approach was, advocated by Posey and Duttfield in 'Beyond Intellectual Property'. According to Posey Intellectual Property Rights are inadequate and inappropriate to protect Indigenous Knowledge due to many reasons.[45] Traditional Resource Rights has been defined as 'bundles of rights" that can be used for protection, compensation, and conservation.'[46] Traditional Resource Rights is thus a broad concept that includes various categories like human rights, collective rights, cultural property rights, intellectual property rights etc and it is an integrated concept.[47] TRR approach does not reject intellectual property rights per se but only indicates that intellectual property rights

may be necessary but not sufficient to protect Indigenous Knowledge and culture. As a concept, this is an interesting one as it tries to provide a holistic perspective.

The major shortcoming is that not all these rights need be mutually supportive or complementary. Nor are they of the same category backed by laws/conventions with equal power and authority Thus the bundle contains too many rights most of which are enshrined in conventions and treaties that form part of soft law and hence may not be fully enforceable. Further coupling intellectual property rights, as a part of traditional resource rights is problematic for the very idea of traditional resource rights is to overcome the inadequacies of intellectual property rights to protect Indigenous Knowledge. Moreover, it could be argued that human rights and intellectual property are not fully compatible and hence putting them in the same bundle is not a good solution. The right to development and intellectual property rights need not be complimentary if the implementation of intellectual property rights threatens or undermines the former. The relationship between human rights and intellectual property rights is complex.[48]

The concept of traditional resource rights can be used to frame guidelines for access and benefit sharing, to enact laws but it has limited utility otherwise, as it is too vague, broad and lacks a coherent perspective. Soft laws like declarations, codes of conduct, non-binding agreements and treaties have been used by indigenous groups and NGOs effectively but that alone will not be sufficient to protect Indigenous Knowledge, nor can they be used in all circumstances. Moreover, in the absence of effective legislation at the national level most of the rights covered under soft laws are in paper only. The traditional resource rights approach has lost much of its appeal for indigenous groups and others have realized that it is not a strong one both in theory and in practice.

Sui Generis system, Databases and Digital Libraries

Development of a sui generis intellectual property law to protect Indigenous Knowledge is an idea that has been put forth by many organizations and individuals. The idea is to overcome the limitations of the existing intellectual property rights regimes and to ensure that unauthorized and undesirable use of Indigenous Knowledge is prevented and the communities are adequately compensated for use of their knowledge. It should be noted that neither CBD nor TRIPS have any provision envisioning creating of sui genereis systems for this purpose. TRIPS mentions about sui generis system in case of plant varieties. However, what exactly is a sui generis system is not defined and TRIPS does not give an idea about it as it has not been defined anywhere in TRIPS. But various authors have tried to formulate what could be a sui generis system or what can be the components of such a system.[49]

TK Databases is a concept promoted by WIPO and it has found favor with UNCTAD, World Bank and governments. The idea is to make available, particularly to the patent offices and patent examiners databases with links and search facilities.[50]One major advantage of standardized searchable databases is that they contain information which patent examiners can rely on and can ascertain whether the patent covers any information available under prior art as a matter for protection. Further local or indigenous communities can use this to prove their claims and to challenge any such patent, which tries to privatize their knowledge. These databases can be developed by indigenous communities, or by the governments, or by both. A systematic collection of information will also bring clarity to the nature of knowledge and the available information in public domain. For example, a database can have information on indigenous medicine with links to the corresponding scientific literature and the literature available in indigenous languages and can indicate in which form it is available.

For example such a database on Neem will have references not only to the knowledge in public domain, i.e. uses of neem, literature in ayurveda with links to relevant literature and

the scientific literature on the properties and uses of neem. The database would thus clearly indicate what is available in public domain and what is the prior art. This would enable the patent examiner to verify the claims made by the applicant and its relevance for granting or denying a patent. Had such a database been there much of the controversy on the patent on products derived from neem would not have arisen as the patent office would have been able to identify the prior art easily.

The WIPO Standing Committee on Information Technology had suggested that TK Digital Libraries should be established. It had given some ideas about how such libraries should be developed. By recognizing TK as prior art a lot of confusion could be avoided and this would help in curtailing or reducing unauthorized use of TK. But international recognition of TK as prior art could be facilitated by standardizing the structure of the digital libraries and by providing online searches with facility to check for cross references and to cull out relevant information.

Let us illustrate this by the above cited example of neem. Since in India there are many indigenous systems of medicine a cross reference to them is essential to determine the complete prior art and to compare the different processes. For example, a text in Ayurveda could describe a process to use neem as a cure or medicine for some disease and a text in Siddha system of medicine could describe another process to use neem as a cure for the same disease. A database which has links to cross verify this would be essential for the patent examiner to know the prior art and how different processes in different systems are described in literature and hence how it is possible to derive many products using different processes from a plat. However, building such a digital library is possible only if the governments are willing to build such libraries.[51]

The Government of India has undertaken a project to document and create a database on the indigenous/traditional medicinal knowledge in India. This involves collation of

relevant literature from Sanskrit and other languages and creates a digital database on TK related to health, medicinal plants, treatments, production of drugs etc.

The contents of the digital library or database should be materials/knowledge already available in public domain and the digital databases. Indigenous people and traditional healers should not be expected to pass on what all they know into the database. In other words, database should not be an attempt to inventory and survey Indigenous Knowledge but should be an attempt to collate and digitize what is available in literature, scientific journals, dissertations etc that could be used to cite the relevant prior knowledge. However what constitutes as prior art is not uniform all over the world. So harmonizing definitions of prior art will be essential if the developing nations are to benefit from exercises relating to digital libraries on TK. A detailed discussion the issues related to prior art can be found elsewhere in this dissertation.

The task force formed by the Government of India to create a classification system for documenting traditional Indian medicine has come out with a draft, TK Resource Classification (TKRC). TKRC is based largely, on International Patent Classification (IPC) system, which is used to search the databases to identify and retrieve patent documents. Now the Committee of Experts of the Special Union for the International Patent Classification has formed a task force on TKRC, and the IPC union has opined that TKRC could be linked or partially integrated into IPC. If other developing nations also take similar initiatives it would be possible to build a global digital library on TK which could be used to verify the knowledge claims of the Indigenous Knowledge and revoke patents obtained by false claims. Such initiatives are likely to succeed now because they have the support of other agencies like World Bank, UNCTAD, WHO and governments like Indian government.

The CBD Work Program on implementing Article 8(j) and Related Provisions of the Convention envisages forming an ad hoc group for developing standards and guidelines for

the reporting and prevention of unlawful appropriation of TK and related genetic resources and, it is envisaged that this would be done in collaboration with organizations like WIPO. Since this has the backing of WIPO and as it also forms part of WIPO Program on TK this initiative could be a pioneer in designing a digital library on TK. Indian government has gone ahead with implementing this idea and has released digital database.[52] . Similarly China has built up a digital database on Traditional Chinese Medicine related patents and formulations with search facilities and the same is made available through WIPO.[53]

However, such an initiative also raises some questions. The database initiative may work against the interests of TK holders, as they would not be able to assert any rights over them, if it is in public domain and hence the whole knowledge base is up for grabs by outsiders. When there is no consensus on prior art whether building up databases and making the information available to anyone who can access the database will not in the interests of TK holders. On the other hand, it is possible for others to build upon this knowledge and make claims. Thus, the possibility of the database used to exploit TK without compensating the TK holders and / or without their consent, is not ruled out. Only when the Intellectual Property Rights regime permits the use with due compensation and consent it makes sense to build such massive databases and digital libraries.

Nevertheless, even with all these databases or digital libraries, there is no guarantee that they would stop patents, which misappropriate traditional or Indigenous Knowledge. Most of the Indigenous Knowledge is unrecorded so it would not be possible to record or register that. The relevant knowledge may be known to few individuals in the community, but they may not be able to give the information as needed for recording or to meet the norms of a publication or database entry. Further, there are problems of translation, comparing folk knowledge with scientific knowledge etc. In case of turmeric, the relevant literature was available but this need not be the case in every case relating to misappropriation. Graham

Duttfield has pointed out that there is wide variance in treatment of information in public domain, prior art and disclosure. He points out that European Patent Convention even though accepts oral description that does not mean that biopiracy could be successfully challenged. [54]

This is part of the wider problem with patent laws and how patent laws prefer some sources of knowledge over others and what are the limitations of prior art in the laws. Thus, the databases may not be very useful if there are no fundamental changes in the patent laws. On the other hand, the databases could facilitate further biopiracy, as much knowledge is now available for exploitation.

For example, an inventor can use this knowledge and produce a product based on this knowledge with minor modifications or could use genetic engineering techniques to produce a new variety and claim rights over that.[55] Even with the digital database, which has recorded this knowledge of using aloe vera it, would be difficult to deny patent to a product, which has other components. This example illustrates the nature of Indigenous Knowledge and the requirements for obtaining a patent. Another problem is most of the TK is couched in terms which need to be translated into scientific terms to make sense of that. Common remedies based on an understanding that needs only common sense are in vogue in every culture.

The remedy would be something like taking few leaves, using clean water without giving technical details which are needed in case of a patent. Although a register may contain such remedies, that itself will not be sufficient to prevent misappropriation of Indigenous Knowledge. It is quite likely that based on the information that leaves of aloe vera, could be used Indigenous Knowledge this somebody might come out with a process, which uses aloe vera and few other compounds to make a cream or lotion or solution for dry eyes. So the question is, is that a novel product or not.

The option of recording their knowledge should be left to the indigenous communities and they should have the right about the access policies for the database. For example, a

community may provide the information solely for the purpose of use by patent examiners and deny access to others. At the same time, not all knowledge can be recorded so, as much knowledge is tacit knowledge, which may not be amenable to recording in databases. Similarly, a good portion of the Indigenous Knowledge is contextual and hence it cannot be divorced from the context to be meaningful.

Traditional societies may not be aware of all the relevant knowledge regarding a plant or a variety or an ecosystem. Even though they may be using it for thousands of years, they may not be aware of all the possible uses or components of a plant. Therefore, the limits to TK are obvious. Science and knowledge progress in many unexpected ways. Science can improve upon the TK or use that as a starting point to make discoveries. The TK may also be incomplete in many respects. So recording Indigenous Knowledge has many limitations and the very process of recording and classifying raises many questions, which are beyond the purview of this dissertation.[56]

Another practical issue is how much of the TK/IK should be recorded and for what purpose. If it is the purpose of transfer of technology, the quantum of information needed to disclose will be different from that of seeking paten. For the former it is enough to disclose information that relates to the technical aspects but for, using the IK as a basis for seeking patenting more detailed information is needed. Thus the information to be entered in the database will differ according to the purpose. One solution is to tag the information [57]. Relevant linkages between subjects/disciplines are necessary and extracting data or information without the understanding of the linkages is difficult. But this is easier said, than done[58]. Another issue is the incommensurability between western scientific classification and the terms used in traditional knowledge practices and texts. It is more than a question of finding equivalent terms. If these problems are not taken in to account the databases may not serve the purpose but may aid biopiracy.[59]

This sort of differentiation seems to be lacking in the initiatives to build digital databases. Basically what sort of information should be provided and what not should be left to the discretion of the community. But a community will need external help to assess the pros and cons of revealing the quantity and quality of information. One option is to protect some information/know-how through trade secrets and to reveal some in the databases. But for making information available to patent offices a comprehensive database may be needed so that the complete information may be available to decide on the questions of novelty and prior art. Thus, there is a dilemma in disclosing which information for what purpose.

Thus, the idea of digital libraries and databases could be a starting point. This is necessary but not sufficient to solve the larger issues relating to biopiracy or misappropriation of Indigenous Knowledge.

Community Registers / Traditional Knowledge Registers/Peoples' Biodiversity Register

TK Registers or Community Register is an idea suggested by some NGOs (e.g. FRLTH, SRISTI) and scholars like Madhav Gadgil.[60] The idea is to register the knowledge of a particular community or a locality in registers and thereby assert their claims and prevent misuse by others. However whether such registers are acceptable in challenging the claims by outsiders is open to question and unless they are recognized by law, such registers may not be of much use. In India thanks to the efforts of NGOs and concerned individuals steps have been taken to give them recognition by law. The idea is to collect and document indigenous/traditional knowledge as a collective effort and use that as a basis in access and benefit sharing and in checking misappropriations. The registers contain information relating to biodiversity, peoples knowledge, customs of usage and the various details about the flora and fauna. So there are different types of registers focusing on different aspects of biodiversity and indigenous knowledge. At a later stage these could be integrated with other databases and digital libraries. In India such an initiative to build registers is being

undertaken as a part of a larger project on biodiversity policy formulation. The process is yet to be completed and only after few years one can assess their impact. What is interesting is that the registers can serve more than one purpose. In case of Access and Benefit Sharing contracts these will be useful to identify the beneficiaries, however as ABS is yet to take off in a big way, in India, it is too early to assess its usefulness in practice. The issues raised regarding what to disclose and for what purpose are also relevant here. Hence this idea may not be an ideal solution but can be a starting exercise or part of a larger initiative on databases to be effective.

The Community Registers idea has been analyzed by scholars who have opined that this is an interesting idea with benefits and shortcomings.[61] However the dilemma of what to disclose and for what purpose still remains. While sanction for such registers through laws (e.g. as in India) and policies will help in making them more credible many important questions remain unanswered.

Community Intellectual Property Rights (CIPR)

This has been proposed as an antidote to what is called as biopiracy. A community could assert its rights under CIPR when its knowledge or resources are misappropriated. The Crucible Group had suggested that CIPR could be effective if it were enshrined in national laws with reciprocal legislation in other countries. It also suggested that a database could be created for tracing the flow of germplasm and an internationally recognized mediator or ombudsman could be appointed to function as a public defender. This idea sounds interesting, but as argued elsewhere, citing particularly the works of Fowler there are too many conceptual and practical problems associated with them to realize them in practice.

The CIPR as a concept is vague because what constitutes a community is often difficult to ascertain. The collective interest in knowledge need not necessarily mean that all

members of a community are equally interested in that or can claim equal benefits. In addition, what sort of IPR does CIPR represent and how does one recognize that in the context of two or more communities in the locality or area claiming rights over the knowledge. The idea is to protect exploitation of Indigenous Knowledge but with a vague concept like CIPR, not much could be achieved unless it is developed further and is used in combination with other measures. Hence, attempts like Model Community Rights Act have been useful in clarifying some aspects relating to CIPR but the conceptual problem that plagues such attempts is yet to be over come. One problem with all such attempts is the uncritical use of the notion of community and assumptions about community knowledge. Using the term innovations instead of knowledge does not make things better.

Collective Rights and Community Rights and Intellectual Property Rights

It has been argued by Gray and Stenson that that communities are entitled for intellectual property rights because they are cultural communities (as argued by Kymlicka) and as they are endangered they are entitled for special rights including rights over 'traditional varieties and botanical knowledge'.[62] The argument for autonomy based rights is coupled with an instrumental perspective on intellectual property to support the view that an international sui generis system should be set up to promote community intellectual property rights. Stenson and Gray are not averse to patenting life forms. In their view, the problem is with the propertitarian perspective on intellectual property rights, which should be replaced with an instrumentalist perspective on intellectual property. They are not advocating any changes in laws relating to intellectual property but only a change in perspective. They also argue that common heritage approach is compatible with communal intellectual property rights.

The basic problem with their argument is they have a narrow perspective on intellectual property rights. Irrespective of the perspectives, what is not acceptable to many

indigenous communities is the fact that the intellectual property rights are granted to what they consider as sacred or significant to their culture. In fact the instrumental perspective could support commodification of Indigenous Knowledge. Since they have not outlined any sui generis system or the basis of that and what changes are needed in attitudes it is not possible to extend this critique beyond a point. A communitarian perspective is necessary but there are limits to that. For example, a community or culture may not be endangered but its knowledge could be misused to claim intellectual property rights. The patents on neem based pesticides and turmeric based products are good examples for this. More over the idea of cultural communities is often difficult to sustain as groups or communities are often spread in different areas and they may have many things in common but not always, a cultural homogeneity could be found. As communities face the onslaught of modernization and development, they respond to that in many ways. Therefore, to define a cultural community is often difficult if not impossible. But communities are spread over different geographical regions, people migrate elsewhere and settle and hence even when a community is taken into account it is difficult to identify its members. The only option is to declare that only members who live in a region be considered so, but people migrate seasonally and return or work elsewhere but, may still consider themselves to be a member of the community. For example in case of Kanis , an indigenous community in Kerala, India it was found that members of the community are dispersed within Kerala and outside, and there is another community with the same name in Tamil Nadu, and they live on the other side of the Western ghats. So which is the community that should have the rights, when both are using and aware of properties of Arokya Patcha?

The politics of identity and classification of groups, as indigenous/non indigenous, cannot be ignored. Often, proving/disproving the indigenous identity as claimed by groups is problematic. Not all indigenous people live within a fixed area and due to urbanization and,

migration indigenous people cannot be identified, solely, on the basis of domicile/ residence. Similarly, non indigenous population is also found in areas where indigenous population is majority. Above all even the classification of indigenous population is problematic. [63]

This takes us to question of using indigenous as a political and legal strategy to achieve some objectives. The use of essentialism as a strategic resource in legal and political area, for mobilization and advocacy is too well known. But unfortunately neither the collective rights discourse with reference to Indigenous Knowledge and IP, nor, most writings on Indigenous Knowledge & IP do not question the politics of identity and assume that it is possible to identify/classify the population as indigenous- non-indigenous easily. This issue arises in the context of cultural property also. For reasons of space a detailed discussion on the politics of identity and the indigenous issues is avoided, and, such a discussion is also beyond the scope of this dissertation.

Another important issue is that of rights and obligations in the context of protection of biodiversity. The tension between the goals of the conservationists and indigenous people on one hand and between goals of the nation states and indigenous people on the other hand can be resolved only if the rights and obligations are discussed acknowledging the rights (including cultural rights, human rights) of indigenous people. But often the assertion of the sovereign rights of the state over natural resources and the rights of the indigenous people are at odds, as indigenous people stake their claim to the rights to livelihood in forests and areas, where the state has interest. So it cannot always be assumed that the politics of identity and rights will not be contradictory to conservation of biodiversity or sovereign rights.[64]

Communal Patent Regime

Ikechi Mgbeoji has suggested this as solution to misappropriation of indigenous knowledge.[65] He has suggested that community patents under CIPR legislation could be provided based on registries of Indigenous Knowledge. A public defender of community

patents would not only defend the interests of the communities but also would track globally the cases of misappropriation of Indigenous Knowledge. His idea suffers from one major weakness.

It is not easy to have two different criteria for award of patents and hence the suggestion that 'Community patents could be issued without examination' would not stand judicial scrutiny. Moreover, it is just impossible to document all the Indigenous Knowledge in registries and there will always be overlapping claims about the knowledge. In many cases, the indigenous community may be aware of few aspects about a plant or genetic resource. Nevertheless, subsequent research by an outsider could result in different claims, other than those claimed by the indigenous community. Moreover, a redefinition of patent and norms for grant of patent should result in stricter norms and guidelines and not in the vague guidelines. (For reasons of space a detailed critique is avoided).

It is needless to say that most of the criticisms put forth in the previous section, are relevant here. Of course, the larger question of identity and politics looms large.

Laws and Collective Rights and Claims

Some nations have passed laws that specifically recognize the indigenous rights over knowledge and institute a mechanism to ensure such rights are, protected. [66] The Philippines law thus recognizes not only the rights over knowledge but also their right to decide on that knowledge. This law which provides self government (to a great extent) within the territories occupied by indigenous communities also recognizes their rights over land, cultural lands, also mandates that indigenous communities should be consulted on matters relating to national plans and policies.

Thus, the right over Indigenous Knowledge is a part of the wider framework that recognizes the fact that indigenous communities have the right to exist as cultural communities and their consent is required for using their knowledge. This law exemplifies

the letter and spirit of Article 8(j) of the CBD. Since a patent cannot be obtained without Prior Informed Consent (PIC) is illegal in Philippines such a patent could be revoked it is proved that PIC was not obtained or obtained by fraudulent means. Even if such a patent is awarded in another country, it need not be accepted in Philippines. The sui generis system developed in Panama has attracted wide attention and according to WIPO it is the first comprehensive system.[67]

The law passed in 2000 aims at protection of tangible knowledge as well as the intangible cultural expressions of the indigenous people. Thus, it aims to protect the collective rights and TK of the indigenous people. The law states that collective rights extend to creations of indigenous people and cultural knowledge and practices also. The law defines creations in a broad sense including "inventions, models, patterns and designs, innovations contained in images, figures, symbols, diagrams and petroglyphs".

The Executive Degree no. 12 of 2001 has extended the regime envisaged under this law to biodiversity related Indigenous Knowledge also. Under this law, indigenous groups through their general congresses or other similar traditional authorities can apply for protection to an agency called Department of Collective Rights and Folkloric Expressions or to the National Office of Author's Rights. Third Parties who wish to use and commercialize the traditional art and other cultural creations and manifestations should abide by the regulations of the indigenous group. Similarly, the third parties cannot use the intellectual property rights to protect their claims based on Indigenous Knowledge unless such a use has been authorized by the indigenous group concerned.

Prima facie, it appears that this law is a comprehensive exercise in protecting Indigenous Knowledge and preventing unauthorized use or misappropriation. However unless one studies this law with the relevant legislation in Panama relating to intellectual property rights it is difficult to assess it. Moreover, not much information is available about

its implementation and functioning of the regime envisaged under this law. Hence, it is too early to comment on this.

Peru is another country, which has passed a law, The Law of Protection of Collective Knowledge of Indigenous People to protect the collective knowledge of the indigenous people.[68] Under this law, Prior Informed Consent of the communities is mandatory for accessing the knowledge of the indigenous communities. The law envisages three types of registers, The Local Register, The National Confidential Register, and The National Public Register. Although communities are obligated to include their knowledge in these registers, it will be helpful if they record their knowledge. One of the objectives of Public Register is to prevent, patenting of TK already disclosed in public.

Since more details about this law are not available, it is too early to assess its impact. Moreover, whether this law will be compatible with other laws relating to intellectual property is yet to be tested. The national laws on sui generis systems are evolving.[69] However, what is important is that they recognize indigenous claims over knowledge and communities are, granted rights in exercising claims over knowledge. However, the ground reality is too complex to, be governed by well meaning objectives and intentions alone. The law is based on some assumptions about communities and collective rights but as the cases on access and benefit sharing point out communities are often in disagreement on sharing knowledge or benefits and when they deal with third parties the role of other actors in civil society becomes important. As the communities are subject to influence from outside ultimately the claims over knowledge are, not based on the laws alone. In addition, a term like Prior Informed Consent (PIC) is too vague as, it means different things in different context. Hence, the mere rule that PIC is necessary need not necessarily result in deals that honor PIC in both letter and spirit.

IP Pessimism or Skeptical Attitude towards IP for protecting Indigenous Knowledge

Pessimism over using intellectual property to protect the interests of indigenous people been expressed, by some anthropologists who view that this will create more problem than it solves.[70] Such a view has been echoed in a document from CBD Secretariat, (UNEP/CBD/COP/3/19). "Knowledge, Innovations and Practices of Indigenous and Local Communities: Implementation of Article 8(j)". It was concluded that there were "no international legal instruments or standards which adequately recognize indigenous and local communities' rights over their knowledge, innovations or practices "It went on to observe that "...current systems of intellectual property rights alone are not sufficient to ensure that benefits flow back to indigenous and local communities."

According to Posey Intellectual Property Rights are inadequate and inappropriate for protection of traditional ecological knowledge and community resources for various reasons.[71] Two prominent NGOs, ETC Group, and GRAIN, active in Indigenous Knowledge/TK issues have expressed pessimism over using current IP regime as a means of protecting Indigenous Knowledge/TK and the interests of communities. Many statements and declarations issued by indigenous peoples organizations or collectives have expressed their doubts about the suitability of the existing IP regime for protecting Indigenous Knowledge. Some statements and declarations stressed on self-determination, the relevance of cultural and intellectual property rights of the indigenous people. Thus statements and declarations made by indigenous groups and by others, particularly by NGOs on this issue reveal that all groups are not optimistic about the current IP regimes relevance for protecting Indigenous Knowledge. [72]

Global Bio-Collection Society

Peter Drahos has suggested that a Global Bio-Collection Society (GBS), can be established to ensure that the interests of indigenous people are served better.[73] He has

suggested that it could play many roles including that of a monitoring service. The GBS will be an entity that could collect and distribute royalties and lump sum payments. The GBS an international institution will facilitate access to Indigenous Knowledge in exchange for some benefits. The GBS will have a repository of community knowledge registers provided by communities and groups. The membership of GBS is open to both communities and others who want to make use of this knowledge. The GBS is not a broker but a facilitator who could help the indigenous communities in dealing with outsiders and ensure that they get a fair deal. The GBS can also monitor patents based on Indigenous Knowledge and defend the rights and claims of Indigenous Knowledge holders. However, how such an organization can function at the international level is not clear. If GBS is just a society in which both TK holders and others are members then those who control it will have a better say in its functioning irrespective of the mandate. Its relationship with WIPO and WTO are not clear and whether it can represent indigenous communities before patent offices is doubtful. So unless the legal status is clear one cannot assume that it could do many things as envisaged. It is easy to identify the holders of copyright and performing rights and hence a collecting society can function efficiently and can defend their interests. But in case of CBS what exactly it is trying to defend is not clear and the community registers are not yet standardized in to some acceptable format which could be used all over the world. In addition, vetting that knowledge is not easy. Apart from the difficulty of translating Indigenous Knowledge which is available in many hundreds of languages into a standard format in major languages like English, French there are other practical problems like assessing their value in monetary terms and arriving at a method to compensate the knowledge holders. The basic problem is this institution runs counter to the national sovereignty over natural resources as provided in the CBD and national governments will not be in favor of another international body in this issue. The GBS could function as a repository of Indigenous Knowledge registers and help in

negotiations between an indigenous group and an outside entity. Only if the national laws on biodiversity conservation and, access to genetic resources, allow any role for such a GBS it would be possible for GBS to perform any meaningful role. The national laws are, based on different principles and national governments are not willing to give the indigenous people all the rights needed to determine scope and conditions for access. The relevant laws do recognize the relevance of Indigenous Knowledge and then acknowledge the rights of indigenous communities but they deal with issues relating to access and benefit sharing in many different ways. Moreover, as discussed earlier the community registers concept is yet to be tested.

Hence, while the spirit behind the GBS idea is laudable this does not seem to be a practical idea as of now. Perhaps at a later stage when the digital library of TK becomes a reality the scope for a GBS may widen.

Indigenous Knowledge & Compensatory Liability Regime

Indigenous Knowledge can be regarded as know-how that has practical applications but may not stand the scrutiny for granting patents. Prof. Jerome Reichman has proposed a liability regime based on this view. In this regime for a limited period, users will compensate the know-how holders and this will be routed through a collecting society. His suggestion is based on the presumption that indigenous/TK is just a know-how that needs protection from misappropriation, and hence a liability regime is suited for this purpose. [74]

The problem is indigenous knowledge or traditional knowledge is much more than mere know how. So considering it as know-how will result in it being under valued and less protected. But if there can be patents on processes for isolation and purification for substances occurring in nature or on business processes, to consider indigenous knowledge as know-how and offer less protection is unreasonable. If at all, anything there is too strong a protection for products derived from indigenous knowledge or traditional knowledge.

As argued elsewhere the scope of intellectual property protection for seeds and plant varieties had expanded but, the basic resource, exotic germplasm, was, considered as a free resource. A liability regime may be useful but that should not result in indigenous knowledge and communities, rewarded, less than those who use Indigenous Knowledge to get stronger IP protection. Issues relating to equity and unjust enrichment using others knowledge are too important to be given up in the name of a liability regime.

Misappropriation Regime

Misappropriation regime is an idea proposed by Charles Correa. He suggests that such a regime initially built with three features (documentation of TK, proof of origin of materials and prior informed consent)[75]. Such a regime would help the developing nations in dealing with misappropriation of Indigenous Knowledge. Duttfield has argued that such a regime could incorporate moral rights also.[76] The moral rights of the author are enshrined in Berne Convention and in national laws. However collective moral rights are difficult to define and implement although there have been cases where indigenous people have won against others using their traditional designs, patterns, artworks etc.

Moreover extending the concept of moral rights to all types of knowledge is difficult. For, example what sort of moral right one can claim on Indigenous Knowledge about biological diversity. It is true that indigenous communities hold most knowledge as sacred and hence are protective about it. The proposal for a misappropriation regime was supported by the Africa Group in 2003. [77]

Proof of Origin and Patent Claims on Indigenous Knowledge

Indicating the proof of origin with patent application is an idea proposed as a solution to biopiracy. The rationale is that the requirement to grant patent should take into account the provisions of CBD on access and benefit sharing and, the Bonn guidelines as well.[78] It has been suggested that this condition should be made mandatory not for granting patent but for

enforcing it and that Article 8 of TRIPS, may be used for this and the fraudulent procurement doctrine can be applied as a supporting measure. However, there are some problems with this idea. Prior Informed Consent is a term, which is difficult to define or prove. This requirement suffers from a practical problem as a patent application may include materials from many regions or in situ seed banks and to require PIC in each case is an impossible condition. The applicant may be using materials in public domain also and it is difficult to ensure that PIC, is obtained in case of each genetic resource. In many cases, there may not be an intention to obtain patent fraudulently and the applicant could have obtained the resource in a market, or from a university or from a research center after paying for it. In case of many genetic resources spread over many countries or available in many countries from whom one should obtain PIC. Is there a way to prove the country of origin? Can one argue that since China is the origin of soybeans any patent application that specifies, soybean should be accompanied by an indication of origin from China. Seeds and germplasm have traveled all over the world and many 'non native' species, been used in many different regions and have been 'domesticated' over the centuries.

The question is how to stipulate this condition – i.e. disclosure of origin, should this be mandatory, or, should this be an optional feature or, this supplemented, by other measures. As indicated elsewhere, Belgium has tried to incorporate this principle in patent law. The Andean Decision No 391 and Costa Rica's Biodiversity Law have incorporated this requirement.[79]

The Indian Patent Act 2002 stipulates that non-disclosure or wrongful disclosure of source or geographical origin can be a ground for revocation. It also stipulates that if, the patent is, obtained, on basis of Indigenous Knowledge, or, knowledge available with local or indigenous community in India or, elsewhere the patent, could be, revoked if the facts, are not disclosed when applying for patent. Whether the Patent Office has resources to check the

accuracy of such claims is a different question. The Act ensures that wrongful disclosure is discouraged. An invention can be denied patent if it is against public order and morality and this exception is valid under Article 27. The proposed amendment stipulates that the exploitation of an invention is against public order and morality if the invention is developed based on the biological material obtained in contravention of Articles 3, 8(j) and 16 of CBD. It also stipulates that the geographical origin of the plant or, animal genetic resource also mentioned in the patent application.

Under the 1998 European Union Directive on the Legal Protection of Biotechnological Inventions such a disclosure is optional and is without prejudice to the patent processing or other rights of the patent holder. It states that 'information on the geographical origin of such material, if known'. Thus, the patent application need not specify any such information and plead that the applicant is not aware of the geographical origin.

Another possibility is to combine this requirement, the mandatory disclosure with relevant documents from countries from which such materials, been obtained, indicating that the applicant has fulfilled all the legal requirements relating to access to TK and access and benefit sharing. One way to accomplish this is to use certification of origin system as envisaged in the Bonn Guidelines. However, such a measure will not work unless national and regional patent offices arrive at a format and conditions for accepting them. The certification of origin should again be compatible with Bonn Guidelines and if the legal system does not provide for one then there should be a mechanism to ensure that a corresponding or compatible certificate issued. The basic question is will it be easy to standardize such certificates and bring in a harmonization among patent offices.

If this has something to do with prior art or novelty then it makes, sense to seek this information. Is disclosure of Indigenous Knowledge essential to describe, an invention, or how it was developed? The answer is yes or no depending upon how one views the problem.

If the TK is in public domain it makes no sense to enumerate that in the application but if the question relates to what constitutes prior art or novelty then it makes sense to disclose the origin as a part of the description of the knowledge involved. This, technical issue, has more to do with TRIPS than with CBD. Article 29 deals with conditions on which patent is granted. The proposal by India and the amendments to the Patents Act show that India views this as an important element against biopiracy.[80] The Brazilian proposal is to amend Article 27.3. UPOV has argued that while it is not against the idea of disclosure per se, but is opposed to making it an additional condition for protection. [81]

In case of a patent on drugs, and pharmaceuticals it may be possible to give a brief and exact description of the origin of the genetic resources and their use. The application may mention the synthetic compound or the equivalent of the naturally obtained product. The generic resource may have been obtained from a source which may not be willing to disclose the origin. And unless it could be proved that the genetic resource is endemic to a particular region and it has been used for a particular purpose and forms part of the traditional or Indigenous Knowledge it is extremely difficult to prove that its origins. Still the law can make such a disclosure however incomplete it is as mandatory and, request the applicant to provide an affidavit that the patent application is not based on Indigenous Knowledge obtained without consent.

Whether such conditions could be part of the conditions to grant a license is a question. As of now, these are not, part of TRIPS. TRIPS does give countries flexibility in framing rules relating to patenting, but whether, such conditions, will be TRIPS compatible is yet to be decided. For example invoking, morality or ordre public as a condition is of very limited validity as this has hardly prevented patenting life forms in USA or Europe.

In case of plant varieties, it is all the more difficult to impose such a condition. Let us recall the basic fact that provisions of CBD apply for transfer of germplasm, after the CBD

coming in to effect and the collections in gene banks obtained prior to that date, are not covered by provisions of CBD. In case of plant varieties for many reasons, particularly historical reasons it is difficult to establish a country of origin. Development of a new variety needs more than one variety and the genetic resources available in gene banks themselves can be the product of innovation involving more than one variety obtained from many countries. Some varieties might have originated in one country, domesticated and developed in another country, and would have undergone further development and testing in another country. Fowler has argued that the country of origin concept under CBD is problematic and both as a scientific concept and as legal concept it has many limitations in practice.[82]

Although the above arguments put forth in the context of farmers' rights and benefit sharing, the point is that complex pedigree is more the norm than the exception in plant genetic resources. Unless it is possible to prove conclusively that this, genetic resource was, obtained only from this place or area, implementing the certificate of origin will be difficult, if not impossible. It can be an additional evidence or proof, but elevating that to the level of a condition for patentability does not seem to be a worthwhile proposition. In case of medicinal plants or phyto-chemical genetic resources such an approach may be feasible to some extent, as this can be made as a part of bioprospecting/ benefit sharing contracts. In case of plant genetic resources, it may not be possible to implement this. Given, the fact that most of the accessions pre date CBD, and hence will not be covered any such, condition it does not make much sense to add this as a condition. The point is that although the disclosure of origin is a difficult one to implement or to enforce it is essential that this option not discarded. It can be used a bargaining tool by the developing nations in TRIPS negotiations. When many countries insist on this or similar rules in the legislations on intellectual property rights, and access and benefits sharing it will give them an opportunity to walk the talk and find out how this principle could be tested and refined. Since, developing nations are the mega diversity

centers and are home to most of the indigenous populations they can devise common rules and regulations on this. The Andean Decision is a good example. Similarly, countries in different regions can form regional agreements and protocols that recognize mutually the Indigenous Knowledge and promote sharing of biodiversity and Indigenous Knowledge. For this purpose it will be necessary to ensure that Indigenous Knowledge in country A is recognized in country B and any attempt by another country C to obtain patents based on Indigenous Knowledge of country B in country A can be checked by this. This is possible only if countries in a region develop mechanisms that provide access to databases on Indigenous Knowledge in each member country. In many cases the plants are common or spread over many countries and once the countries have proper databases n this it will be easy to infer that the plant genetic resource is from a particular region or country although the patent application does not indicate that or provides false information on the country of origin.

Thus although the disclosure of origin principle has many limitations it can be used to a limited extent and as an idea it could be used by the developing nations to reduce, if not eliminate biopiracy.

The Certificate of Origin:

Certification of origin is an idea that is being studied by Secretariat of CBD.[83] This is very similar to disclosure of origin and in this case, the certification of origin has to be obtained by the relevant communities and the governments. This again is to ensure that the national laws and rules have been observed and the provisions of CBD are also met. The limitations of this idea are similar to that of the disclosure of origin. This will work only if all countries have enacted laws on access and benefit sharing. However this is not the case. Another issue is whether the laws are compatible with Bonn guidelines or with provisions of CBD. A mere certification of origin is useless unless it enables the applicant to apply for a

patent or seek intellectual property protection. The progress on legislative measures on access and benefit sharing has been slow and even after a decade of signing of CBD the progress on this has been uneven. Although many countries have passed laws, their effectiveness is yet to be known nor have, the countries reaped huge amounts as royalty or license fee from such measures. One reason is that the expectations over bioprospecting have failed to materialize and in many cases thanks to controversies international collaborations on bioprospecting have been scaled down or withdrawn. The Certification of Origin is thus of limited use.

Database Rights

Nuno Carvalho has put forth the suggestion that TK Databases can be protected under special data base right.[84] The issue is although databases on TK are being developed the process is not undertaken in most cases by the indigenous people. And to control access to the knowledge in that copyright is not sufficient. The rationale for database rights stems from the fact that although Indigenous Knowledge is in public domain it needs protection from unfair use for gainful purposes and misappropriation. This is similar to the protection available under TRIPS 39.3 for test data. Under Article 39.3 governments have to protect data submitted to them the test or other data submitted to them as a pre requisite for approving a product (usually a pharmaceutical or agrochemical product) and making available that data and collecting it involves extensive work for the applicant. The governments cannot disclose them unless such a disclosure is necessary to protect the public. This is necessary to ensure that competitors and others do not appropriate the data or benefit from the data. The idea put forth by Nuno Carvalho is similar to this. So based on the article 39.3 it has been suggested that some features can be incorporated in a legal framework for the protection of TK. [85]

It has been suggested that such databases can be registered with national patent offices and novelty can be defined as a commercial novelty and not as an absolute novelty.

Hence although the disclosure is on the knowledge already in the public domain or past knowledge it could still be considered as novel as it has not been commercialized.

The idea sounds nice in theory but many issues limit its application in the real world. The issue of databases raises some questions as discussed earlier and some more are raised in the subsequent paragraphs. Establishing rights in data is difficult as dealing with communities and their knowledge is the issue here and not with a test data that has been collected for a specific purpose and provided in a specific format.

Can all TK be reduced or classified in databases and if so on what basis and on what system of classification. It is possible to classify the knowledge in so many different forms on different principles. Organizing TK in terms of databases also raises issues relating to trust, verifiability and integrity. TK healers are not manufacturing chemists who produce drugs but are healers who incorporate other aspects also in the treatment. A Shaman is not a pharmacist who issues drugs. So the database idea assumes that all TK can be neatly divided and classified into databases and database rights can be established.

In terms of database rights, the key questions are who vets the database and asserts the rights and how such rights are exercised in practice. The idea of database rights is very new and not many countries have incorporated such rights. In many developing nations, the IP regimes are now being put in place to meet the WTO norms. Hence, database rights are an idea that needs more analysis before put to practice.

The UNESCO-WIPO Model Provisions on National Law and Illicit Use of Expressions of Folklore is not directly relevant to TK on biodiversity. The Model provisions avoid a formal definition of folklore, instead provides a list of expressions of folklore and this is only an indicative list and hence countries are free to expand this list or use this as a basis. The TK or Indigenous Knowledge can, also be indicated as a list of expressions. Just as the Model Provisions define illicit exploitation as expressions of folklore as expressions made

both with gainful intent and outside their traditional or customary context, and without, authorization the laws can define, an unauthorized, or illicit exploitation of Indigenous Knowledge and which uses are authorized and how that authorization is obtained. The law can define the traditional use and customary use, and some provisions can define the moral rights of the communities. The law can also indicate the period of protection and this need not be very long but should be sufficiently longer enough to give adequate protection. The TK is an evolving knowledge and hence the provisions should consider this. The Tunis Model Law is another attempt to protect folklore from unauthorized use. It has some interesting features that are relevant to Indigenous Knowledge. The copyright has provisions for moral rights. IP protection for Indigenous Knowledge can incorporate the moral rights and a copyright like protection can be given, with due scope for fair use. This can be a sui generis system.

Databases and Indigenous Knowledge: Some Issues

Thus many proposals have been put forth to protect Indigenous Knowledge and most of the proposals assume that intellectual property protection is in the best interests of both indigenous communities and Indigenous Knowledge. It is true that Indigenous Knowledge is often misappropriated. Is granting intellectual property the ideal or optimal solution for this?. Will this result in Indigenous Knowledge reduced to a knowledge that is devoid of its cultural context and processed in, procrustean bed of intellectual property and codified in databases and patent applications, not to speak of trade secrets and geographical indicators. It depends on how indigenous property and indigenous communities are viewed. Carvalho has identified separate elements in a shaman's treatment that could be protected by different IP rights.[86] According to WIPO as collective entities hold IPRs communities can also be expected to hold patents.[87]

Indigenous communities are not equivalents of Ford Motor Company or modern universities. Nor can they be considered as juridical persons. A shaman does not look at his/her healing ceremony as a combination of items classified as design, folklore, medicinal knowledge, and performance. Is Indigenous Knowledge is only about property rights and claims and practices that are to benefit only a few? Is a shaman is someone who claims property rights by virtue of his position and experience? Unfortunately when Indigenous Knowledge is vied in terms of separate elements that are fit for protection as intellectual property rights the holistic character of Indigenous Knowledge is lost and instead a reductionist perspective is substituted. It is not that, the indigenous people share everything in common, and have no idea about property rights. This does not mean that all Indigenous Knowledge could be reduced or classified into neat categories that can meet the norms of intellectual property rights. However WIPO's approach does not consider the role of knowledge in indigenous communities and in modern society. Nor it considers the position of a shaman in indigenous society, which is not equivalent to that of a doctor or pharmacist.[88]

Knowledge divorced from its communal context and responsibility may fit the norms for intellectual property protection, but is that Indigenous Knowledge still. Knowledge is also based on context and once that knowledge that held in common is registered in databases and disseminated does it still retain all the elements that are unique to that. Disclosure of knowledge has its own ramifications and responsibility in disclosure and possession of knowledge is important in indigenous communities. Thus dissemination itself raises some ethical questions.[89]

Most of the healing practices and traditional ecological knowledge do not make sense except in that contexts in which a community has a shared understanding and notions of sacred and profane. Even the knowledge documented from texts, not from practices or oral testimonies has some vision of cosmology behind it. For example Ayurveda has some

principles about causes for diseases, cures and how the body woks. These need not be compatible with the understanding of the western medicine or modern science. But when such knowledge is divorced from this basis and reduced to entries in digital databases is that not a kind of epistemological violence. It can be argued that Ayurveda has to modernize itself or change the ways the drugs are produced and prescribed to meet the needs of today, and, otherwise it cannot compete and survive. But the question, if it so, where to draw the line and should all knowledge, indigenous and traditional be reduced to categories fit for databases devoid of their communitarian and cultural contexts.

Communities and healers do not always view knowledge as a commodity. It could be considered as a common property or as a gift and hence relational aspects of IK is important.[90].In fact the indigenous communities opposed the attempts to obtain patents based on their genetic information as that amounts to commodification and it is a gift from Nature and not a product of human intervention.

Building databases involves classification and checking the integrity of data and its validity in different contexts. And any attempt to classification involves many assumptions on the basis of classification. Thus although these issues may sound as only matters of technique they involve questions about responsibility, accountability and representation of data. For instance, who represents the data on Indigenous Knowledge and on which basis. Whose authority counts and how such knowledge is legitimized.

The use of such knowledge on online databases is all the more problematic because online access makes the knowledge available to users who would be considering it as another information product that could be used to verify patent claims. Here the issues relating to credibility, trust and values cannot be wished away.[91] Van House's work based on a biodiversity database raises questions about epistemological trust and networked trust. In case of digital databases it is assumed that they contain indigenous or TK that is valid and

credible. But who can attest this. Is there anyway of cross verifying or counter checking to ensure that there is no duplicate entry or the same information is presented in two or more contexts. If the Indigenous Knowledge database of community A and the Indigenous Knowledge database of community B assert the same claims or information can one conclude that both communities know this independent of each other or the knowledge was transmitted from one community to another. If there has been a transmission how to identify the original innovator or inventor?. Similar problems will rise with respect to knowledge claims in two different medicinal or health systems. The same plant can be used in two systems of medicine in different ways and so the composition of drugs or preparations may vary. Again as often local health traditions rely on medicinal herbs and plants available in a particular area or region codification of this information needs to be accompanied by health practices or systems, which use similar plants or same plants. In all such cases, differences in medicinal systems are important. For example, Ayurveda and Siddha are practiced in south India but there are not the same. Although both may be using to a great extent many plants and chemicals in common the drugs produced by one system cannot be reduced as a derivative of another. One wonders how, such nuances can be incorporated in a database based on textual sources only. The practical implication of this is that the prior art, in two systems of medicine need not be the same.

The de-contextualization of Indigenous Knowledge into databases and other forms also involves questions relating to valuing which part of local knowledge and in comparison with that. For example neem is not valued just because it has medicinal and other properties and the knowledge relating to knowledge has to be neatly classified in to two parts, one that could go into databases and the others that is irrelevant for this purpose. People do not neatly classify knowledge like this. The Indigenous Knowledge is transformed from a contextual knowledge into a universal knowledge that can be accessed from databases. Is such a

transformation desirable just because intellectual property rights seem to offer some form of protection. Is objectifying knowledge a right approach? [92]

The logic of creating databases in based on some assumptions and processes which tend to view Indigenous Knowledge as another tool for development and validate it for this purpose. In this process Indigenous Knowledge is abstracted and is reduced to categories that fit the needs of the developmental state.[93]

The solutions that flow from the centers may not be in the best interests of those in periphery and good intentions alone are not sufficient. The development context in which these suggestions are made and are to be implemented is crucial to understand their impacts.[94] When Indigenous Knowledge which is in periphery is remodeled to fit the needs of the knowledge in the centers it is no longer Indigenous Knowledge. Rather Indigenous Knowledge becomes a knowledge that is compatible with validated knowledge that suits both development and global IP regime.

In the case of biodiversity registers the idea was to record and register Indigenous Knowledge and to express the knowledge claims of the communities and to assert their collective rights over the same. The biodiversity registers created, documented and vetted by the community are expressions of the community. Although the databases can be created out of such registers the objective is different. Although the objective is to ensure that Indigenous Knowledge is not misappropriated in the process the database becomes a knowledge base that has knowledge abstracted out of the communal and cultural contexts and serves a different purpose. The basic problem is Indigenous Knowledge cannot be easily classified like this. The registers are collective expressions of knowledge claims and hence are expressions of political will and rights. Nevertheless, databases when created and maintained by governments from various sources become an instrument in the hands of the state that stakes its claim based on the sovereignty over natural resources and thus need not be in the best

interests of indigenous peoples. Often the indigenous people are at odds with the nation states and this power politics is too important to ignore. The databases idea is a technical solution whereas the Indigenous Knowledge and the issues relating to that is not just a technical question.

The databases discourse is a continuation of the attempts to document Indigenous Knowledge and to justify that for the purposes of sustainable development. At a particular juncture, the Indigenous Knowledge attracts much attention in view of its usefulness in promoting conservation and development. Donor agencies and institutions like World Bank evince interest in 'capturing' Indigenous Knowledge and record it in databases. The development dimension of Indigenous Knowledge gets the maximum attention but the cultural and other aspects of Indigenous Knowledge do not get the attention they deserve. In contrast in many works by anthropologists the cultural dimension of this knowledge is evident and the Indigenous Knowledge is described in the specificities of its contexts.

The production and reproduction of Indigenous Knowledge in databases and records involves questions of classification, inclusion and exclusion. In fact, the Indigenous Knowledge or local knowledge often survives because it is in the margins. When it becomes an entity in databases it is no longer a knowledge that is in the margins. This reproduction of Indigenous Knowledge as a part of the global knowledge is occurring at a time when the biocultural diversity is diminishing and languages are batting for survival and indigenous communities are struggling to secure their rights. The protection of, Indigenous Knowledge cannot be separated from the protection of biocultural diversity.

When the indigenous knowledge is integrated into databases after validation it results in erasure of the difference.[95] By the reproduction of Indigenous Knowledge as discrete elements in databases "the commensuration between the indigenous and the scientific is established, in other words, by denying culturally produced ways of experiencing time, ways

of sharing and experiencing time that underpinned the initial awareness of specific Indigenous Knowledge" (Geertz 1991, 132). One can compare the critique of Naddasy with this.

This is not to argue that Indigenous Knowledge and the global knowledge are mutually exclusive and in many cases the Indigenous Knowledge itself is a hybrid.[96] The parallel between herbal medicine and Indigenous Knowledge today are striking. Herbal medicine if it becomes a globalized industry instead of a tradition then its focus will change and medicine will become a part of the global alternative medicine/therapy. This will be at the cost of the traditional and cultural practices and the demands of the global market will threaten the cultures and ecologies. The globalizing herbal industry thrives on the marketing and is not necessarily compatible with local cultures and values.[97]. Interestingly even those who argue in favor of protecting IK cite the global demand for herbal medicine and products and argue that indigenous communities do not get adequate returns despite this boom.[98]

Thus although the move to create databases and database rights are done with good intentions they ignore the complexities in knowledge production, transmission and the cultural contexts in which such knowledge is produced. For example, to farmers seeds and native varieties are sacred but when this knowledge becomes, a part of the database this aspect, is ignored and database records only the genetic composition and the qualities of the seed or its special properties. Most of the traditional ecological knowledge is, infused with cosmology and religious faith and these are contextual. They do not make any sense in terms of western scientific knowledge. To separate the faith from science and label it as unscientific is to sunder the Indigenous Knowledge into two components.

The attention that is bestowed, on Indigenous Knowledge today is partly due to its unique features and elements, distinct from scientific/western knowledge and the context specific nature of Indigenous Knowledge. Once reduced to such databases the unique

character will no longer get the attention it deserves. Indigenous Knowledge was, dismissed as superstitious or unscientific or at best had some curiosity value. Now its value is beyond question, and it has become part of the development speak. . Thus in one sense, the databases and the debate over them is a welcome development. Unless the power-knowledge nexus, is debated and understood such attempts will do more harm than good in long run. It is not that one dismisses the idea of databases of Indigenous Knowledge per se as an irrelevant option. It has some value as a strategy but as with many ideas and grand projects, one has to be skeptical about it. It is a good technical solution but the questions relating to Indigenous Knowledge and intellectual property rights are much more than that. The strategic use of such databases will really be useful to indigenous people only if they have some control over Indigenous Knowledge and its use by others. However, state will play a key role in this process, and, only the state can assert, the sovereign rights over natural resources and the provisions of CBD do not give such rights to indigenous people.

Rethinking Indigenous Knowledge:

Should, Indigenous Knowledge be protected, to such an extent that it resembles trade secrets? Will data base rights that give exclusive rights to indigenous communities be inimical to scientific research? New ideas such a Digital Rights are examined as a means of protection and documentation of IK.[99]

If each indigenous community begins in terms of exclusive rights, what will happen to sharing and mutual exchange of knowledge and biomaterials among communities? In the debates on Indigenous Knowledge and intellectual property rights two extreme positions been expressed – one is the rejection of intellectual property rights as a means to protect Indigenous Knowledge, the other using intellectual property rights to the fullest extent possible for protecting Indigenous Knowledge. The comparison between Ford Motor Company and indigenous communities misses the crucial difference between both.

Indigenous community is a collective of shareholders, as one cannot buy a membership of a community. Rather an indigenous community is an entity has some common beliefs and Indigenous Knowledge is a knowledge that undergoes changes over the years. To compare Indigenous Knowledge with a patent held by Ford motor company is misleading. One can acquire shares from the market but one cannot become a member of a community like that. The Indigenous Knowledge has some elements of secrecy but a good portion of the knowledge is available to all in the community. In many instances, communities have a shared knowledge about plants and ecosystems. Hence, it is very difficult to identify one community as the sole owner or originator of knowledge relating to some species or plants. The same is true of seeds. Farming communities have a long history of sharing seeds and improving the existing varieties. Seeds travel from one region to another by various means and non-native species, are, not rejected but are domesticated. Communities have exchanged, borrowed and have enriched the bio cultural diversity.

Unfortunately, the arguments in favor of exclusive rights and using intellectual property to tighten the control over Indigenous Knowledge ignore such facts. It is easy to think of Indigenous Knowledge in terms of discrete knowledge elements that need protection. This is, nothing short of an epistemological violence. The point is Indigenous Knowledge needs, to be protected from misappropriation but that should not result in developments that are similar to privatizing Indigenous Knowledge.

It is true that most Indigenous Knowledge is in public domain. The knowledge relating to neem and turmeric is known all over India. So does that mean that to prevent misappropriation of this knowledge what is in public domain should be privatized. In the debates on Indigenous Knowledge it has been recognized that the western notion of intellectual property is not suitable for protecting collective knowledge. Some have pointed

out that the existing intellectual property regime excludes some forms of knowledge for which no specific author could be found or the authorship cannot be established.[100]

At the same time, the strengthening of intellectual property rights has not enriched public domain. Rather the extension period of protection under copyrights, the restrictions on fair use, the application of copyright in cyberspace and in digital media have been against the expansion of public domain. Public domain is crucial for innovation and for enhanced access to knowledge. A good portion of the Indigenous Knowledge is in public domain and this enables poaching or misappropriation. Is privatization of Indigenous Knowledge is the solution to this. Will the privatization benefit the common good and the indigenous communities or will it pit one against the other in the race to acquire intellectual property rights and make claims and counter claims. Any step taken in the name of protecting Indigenous Knowledge should be, evaluated for its impact on the public domain. The interaction among the communities is a continuing one and communities depend on each other for various purposes. Thus to speak of an indigenous community that does not need any other community is impossible. The very fact that Indigenous Knowledge has drawn so much attention is because of the continued interaction and the influence of other communities over indigenous communities. Just as indigenous communities depend on the other communities for various goods, and services other communities too need indigenous communities and their knowledge. This knowledge should be used for the common good. It is essential that Indigenous Knowledge is available for innovation and for research purposes. Indigenous Knowledge should not be reduced to something that is free for all and something that can be used and privatized by others.

Conceptualizing Indigenous Knowledge is thus important to find a just solution to this problem. Carol Rose discusses a hybrid property form, which she calls as 'Limited Common Property' (LCP). LCP is a hybrid property that is neither totally public nor totally private.[101]

For example a community resource is accessible only on the basis of being a member of the community and the customs and rules within the community prevent individual abuses. Although for an outsider this may appear to be a free for all situation it is not so. The rights are not property rights based on ownership or possession. Due to the hybrid nature of LCP the interests of the community is not served best by privatizing it to others or auctioning it off to various bidders both within the community and outside. But a community's right need not be always be exclusive to the extent of enclosure. Indigenous Knowledge can be thought, of as a Limited Common Property. The community has a stake and their interests, can be treated as legitimate interests of a property holder. At the same time it is possible that the knowledge need not be the exclusive LCP of a single community. Once it is recognized that communities have rights to decide about access and use of the LCP mechanisms that avoid both 'tragedy of the commons' and 'tragedy of the anti commons' can be thought of. [102]

Communities have rules and norms for access. Communities may allow outsiders some rights, and insiders have more rights than outsiders but all these rights are not absolute rights. And an indigenous community can be generous when it comes to giving access to another indigenous community but very restrictive and cautious in providing access to outsiders who do not belong to any indigenous community.

So a community can share its Indigenous Knowledge with others by treating it as a limited common property. For example, a community can insist that this knowledge should not be used in such a way that no other community or research initiative is prohibited or in a way that is inimical to the interests of the community. A form of compulsory licensing can be insisted upon so that the monopoly right is not abused For example a community can insist that in case of a drug developed as a cure for a disease it should be made available on easy terms to the community for its own use. Communities can insist on reasonable royalties or

fees from users. As in the case of compulsory licensing, no user can be excluded from this. By treating Indigenous Knowledge as LCP it will be possible to promote innovation and inventions and prevent misappropriation by outsiders.

The transaction costs in this have to be low and the system should work in a transparent manner. Communities can collectively enter in to agreements in some cases where the knowledge is common to all the communities and communities have been using the resource or the knowledge in common. If indigenous communities are considered as closely knit groups or collectives with cultural rights granting LCP in Indigenous Knowledge can be tried. The Indigenous Knowledge in this case is not a finished product but a work in progress.[103]

In case of Indigenous Knowledge on drugs and plants that could be used for drug discovery the indigenous community can be considered as a collective that has a limited common property right in that knowledge. The collective rights and obligations can be specific and the community should have the rights to enter into contracts and decide on benefit sharing arrangements. It should also be possible for the community itself to apply for patents, based on the petty patents model suggested by Thomas Cottier.[104] Another possible solution is creating a trust or foundation to negotiate on behalf of the community and to share the benefits with the community.

Indigenous communities need not and should not become another Microsoft or Monsanto when it comes to intellectual property rights, nor should they end up as victims whose knowledge, treated as common heritage of humankind, is misappropriated. The Indigenous Knowledge can contribute enormously to the welfare of the humankind and hence it is essential that it is used properly and wisely.

Obviously, different models and different strategies are needed. What works best in case of folklore may not be appropriate in case of medicinal plants. In case of seeds and plant

germplasm the collective contributions can be used to produce new varieties. So indigenous communities can be considered, as plant breeders and be granted plant breeders' certificate. A hybrid between patents and plant breeders' certificates is more appropriate when there is a substantial innovation, which results in seeds with qualities that are highly valuable. A limited common property in seeds is an idea worth considering.

In case of medicinal plants and screening of plants for potential, drugs a limited common property model can be used to determine the conditions of access and use. In cases where the knowledge is unique to one community, and the plants in question are endemic to that region/area the community can have strong rights and can insist on the status of a co inventor if patents, are applied based on the plant. Nevertheless, the ground reality is bound to be more complex that what a theoretical model can envisage. So only when it is applied its(LCP concept) utility can be tested.

Central to the question of intellectual property rights and Indigenous Knowledge is the relationship between public domain and Indigenous Knowledge. Indigenous Knowledge can, contribute to public domain and can spur the creativity of other communities, if and only, if, it is not, privatized or parceled as database rights, access rights etc. For, this model of intellectual property rights that are useful to indigenous communities, at the same time do not become enclosures are needed.

The reality is too complex to say "they had intellectual property rights and lived happily ever after". As the communities fight for, survival and rights, issues relating to intellectual property rights do not get the same attention in every community. The decline is bio-cultural diversity and alarming. What the communities need is just a fair share in use of their knowledge but also empowerment, rights to life and culture and recognition of their control over land and forests. Intellectual property rights can be used to protect Indigenous Knowledge and to empower the communities. How that is to be done is the question. The

negotiations in Geneva and elsewhere are relevant but they will make sense only in the larger context. What is the use of Indigenous Knowledge if the plant species are vanishing or timber plantations are replacing natural forests? Indigenous Knowledge does not thrive in a vacuum. When the nature is destroyed cultures are also in trouble. Hence, protection of biocultural diversity and Indigenous Knowledge should go hand in hand. Attempts to isolate and place Indigenous Knowledge in databases or to 'capture' Indigenous Knowledge in records miss the point, as they are not sensitive to the reality. What to do with that knowledge when the community is disappearing or that knowledge is just a memory with no matching flora or, fauna?

The questions of knowledge and politics are inseparable. In case of Indigenous Knowledge, resolving many political questions is not only difficult but also involves recognition in the conflicting interests of indigenous communities and the nation states.[105]

Patenting TK

The concept of authorship and entitlements regarding ownership had been recognized by law and the emphasis was on originality.[106] Hence, craftsmen were considered as original innovators and recording of the knowledge in the form of written records and documentation and the idea of prior art gave importance to originality.

The modern copyright is based on the notion of the author and his original contribution. The intellectual property rights regime is thus better suited for works or inventions with which an author can be identified. But in case of TK it is difficult to identify a single person as the author. The TK is also a knowledge that undergoes change over a period and there are many incremental additions and innovations. Hence the concept of an individual as an author or inventor is not suitable in case of TK. On the other hand it has been pointed out that the absence of an identifiable author has not prevented the appropriating TK

or to exclude indigenous communities and groups from deriving any benefit out of their knowledge. [107]

Indeed as Roht-Arriaza and others have pointed out the distinction between heritage and knowledge, biodiversity and cultural diversity is almost non existent in many communities and societies. But for the requirements of law one need to have an author or a judicial person like a corporation. So what is acceptable for law regarding ownership, innovation, recording knowledge and the rationale for invention has more to with values than anything and one can easily trace the corresponding requirements in intellectual property laws. Hence, the challenge is how to reconcile the different value systems in intellectual property law so that Indigenous Knowledge can also be protected by IP laws. For the sake of argument here a position that Indigenous Knowledge can be patented is taken here.

Indigenous Knowledge per se is not patentable unless it meets the requirements for patents. As products of nature cannot be patented unless an inventive step is shown to have been performed Indigenous Knowledge on the nature and qualities of a plant cannot be patented. At the same time based on the lead or clue gained from Indigenous Knowledge can claim patent on a process that involves purification or isolation or processing of a substance occurring in nature. Here the crucial point is although Indigenous Knowledge forms the basis it need not be acknowledged in the patent application.

Over the years the criteria for patentability has undergone changes. If diamond Vs chakraborty resulted in justifying patents on 'handiworks of man', State Street decision extended it further to include business methods also. This has resulted in the proliferation of patents on methods of playing games, methods of teaching, technologies relating to ecommerce and internet (e.g. the patent on single click method). So seen in this light TK can also be patented provided it could be described in a different way and if it meet the other criteria for patents. For example by applying a particular aspect of Indigenous Knowledge to

find a solution to a problem or to increase the performance or yield if one could develop an invention or produce an innovation it might be possible to obtain a patent.

Novelty, Prior Art and Prior Publication

In case of TK a good portion is undocumented and is often found as oral traditions and preserved in unwritten form. Although this knowledge is in public domain not all TK is in pubic domain. Under US patent law the novelty requirement is based on knowledge that is documented and available for search. Patentability is, denied if the invention has appeared in any publication more than 12 months prior to the date of the patent application form. Patentability is, denied if the invention was, described in any printed publication prior to the claimed date of invention.

TK is, transmitted more than through oral traditions, rituals and ceremonies than through written documentation. That written documentation although written in a language in use it may need specialized knowledge to decode that and understand the knowledge expressed there in. For example in case of Ayurveda most texts are in Sanskrit and hence need special training. In case of Siddha the literature is in Tamil but is full of symbols, allegories and, indirect references that can be understood by someone trained in that field. But any publication on this knowledge by outsiders, ethnopharmacalogists or anthropologists, even if done with a noble intention that would prevent patent claims by indigenous groups. In other words, the very process of documenting and disseminating TK can be a barrier to patent that knowledge. Thus, within the one year of publication if patent right is not applied for, then that knowledge could not be patented. It is possible for a person to tinker with that knowledge or make cosmetic changes but this one year period is crucial. When TK is changing over, a period it is difficult to pinpoint the date of invention and find out the state of art at that time. Thus patenting TK per se is not an easy task.

Patents and Collective Inventions

As the *Indigenous Knowledge does not* fulfill the individualistic notions of property *rights* that are at heart of the, western *it does not get any* protection for the *communally* created knowledge.[108] So the question is can patent law be useful in case of knowledge or invention that is the result of collective action. Joint inventors is a concept recognized by patent law. Post 1984 US law permits many inventors to make a joint application although their contribution was not the same or was of the same type. All that is needed now is that each co-inventor should have contributed to at least one of the patent claims. But joint inventorship has been controversial.[109]

But in many cases the identifying a co-inventor is not easy and there will be many claimants and the role played by each is important and the invention is the ultimate result of the acts performed by many persons who contribute at different stages. For example in case of an invention based on ethno botanical knowledge botanists, biologists, clinicians, traditional healers, scientists perform different functions at different stages. Yet not everyone can be, deemed to a joint inventor. Indigenous Knowledge, which provides the crucial information in the process thus cannot be denied protection because many contribute to the process. The key difference most of these steps are of routine nature and they in themselves cannot be called as inventive steps. So one way to identify the co-inventor is to assess who has made the maximum contribution in terms of inventiveness to the project. Thus although it may be difficult to find the co-inventor it is not impossible to do so or to name an indigenous person as a co-inventor (see the Kani case study in the chapter on bioprospecting).

This question arises in case of plant breeders' rights. Although the PVPA of USA allows only one person to apply for the breeders' right although others could have contributed to the breeding project. But other countries need not follow this. When the law recognizes the collective rights it can permit a collective, or a body or an organization to apply for breeders'

rights on behalf of the collective. However since providing patents is new to many countries which have just started enacting laws for protecting plant varieties it is premature to discuss about co-inventors in seeds at this stage in case of patents.

In case of Indigenous Knowledge, the knowledge grows over generations and the cumulative contribution of generations makes it difficult to demonstrate that particular individuals only contributed to that. Similarly proving that someone is the first to invent is equally difficult. Moreover it is difficult to trace most of Indigenous Knowledge to a particular community or to communities in a given area. Although the knowledge may be maintained by a community individuals cannot be deemed to be inventors for they know that as a group knowledge and, their individual contribution may be nil. The TK need not be novel to those who are in the community. But for those who are outsiders it may be novel Again novelty is a question of definition and proving it for legal purposes. So it is more a question of legal criteria and norms than a question of fact.[110]

Communal ownership and communal invention do not mean the same. Patents are, issued in the name of actual inventors. As noted earlier a joint owner can sell off his part or deal with in any manner as long as it does not infringe on other owners patents. This gives new powers named in the patent and they can act unilaterally and all such acts need not be in the interests of the community. Communal ownership is based on respect for collective rights and common good. But when a single person gets the right in the form of patent it could lead to new conflicts. Moreover, granting rights to an individual over a knowledge that is communally held is contrary to the values of the community and is alien to their culture.

Communities can overcome this if they could limit the powers of the joint inventors. The other option is assigning the patent in the name of the community or making the community a co-assignee. There is a precedent for this.[111]

Thus it is possible in benefit sharing arrangements, to include indigenous groups as beneficiaries or assignees of patents. However, only when the community agrees to conditions as mentioned above it is possible to do so. In this case the community has made a neat distinction between use for commercial purposes and materials being held in trust for research purposes. The similarities with the example of Kani tribes and benefit sharing in India are striking. So it possible to obtain patents on, Indigenous Knowledge by carefully drafting a patent application which fulfills the criteria set out by the law. And just because the knowledge has been in use for centuries and it is also in use that does not mean that the knowledge cannot be patented.

For example by meeting the criteria of novelty TK which has been in use for centuries and which has been documented has been patented. In case of Maca which has been used for fertility purposes for centuries patents have been granted.[112] To the best of the knowledge of this researcher the patent on maca, was not, obtained by any indigenous community but by an outsider. To use the patent system effectively mere knowledge is not sufficient. The community also needs professional support, adequate finance. The danger is the patent can be obtained by any body who has access to this knowledge. The patent ironically can deny the community or other communities their rights over knowledge. In the above case if one use either maca or velvet deer antler individually there is no infringement but a combination will amount to infringement. Although this combination is novel it is not a great improvement in knowledge. It is a cosmetic change and does not require much ingenuity to do this. But the informal use of both, is an infringement in this case. In many cases, TK includes such combinations or mixtures and the absence of printed documentation does not demonstrate creativity. It is just a matter of tinkering. If each community were to do such tinkering and seek patents on all possible combinations, will there be an end to it. Thus, exploiting the loopholes in patent laws on novelty and prior art cuts, both ways. Just as in the case of neem

patents often novelty is only a cosmetic novelty and there is no real novelty worth the name. In the enthusiasm to patent Indigenous Knowledge, indigenous communities should not end up depriving themselves and others the knowledge by patenting it in a piece meal fashion.

If one thinks of Indigenous Knowledge merely in terms of patents and meeting the criteria for patents then one loses sight of the holistic nature of the knowledge and the scope for informal innovations. Indigenous Knowledge retains its vitality and still survives, because, its mode is different from that of knowledge which is recorded, documented and hence can be apportioned of the basis of authorial claims. If patenting results in an enclosure of Indigenous Knowledge it will be the end of Indigenous Knowledge as it is known. The Indigenous Knowledge in is public domain and hence can be appropriated or misused .The solution to this should not lead to impoverishing the public domain or reducing its vitality and scope for informal and collective contributions. Hence, communities should evaluate the pros and cons of choosing patent as a tool to protect Indigenous Knowledge. As patents could become a potential source of conflicts between communities, communities should ensure that patenting by one community does not deprive the other its legitimate use of knowledge.

Will patenting result in a financial gain for indigenous communities. The answer is it need not. It is expensive to patent and maintain patents. In case of court, cases it is expensive to defend patents and to litigate for years. As, patents are valid for twenty years only the community has to maximize its gains within this period. And this can result in overexploitation of resources, as in the case of bioprospecting, and hence will have an adverse impact on the long term sustainability of the resource. Some have argued that not all plant genetic resources have commercial value.[113]

Thus patenting is not the panacea for the problems of protecting Indigenous Knowledge. Patenting can be a strategic tool in defending against misappropriation in some

cases. It is a bargain as patents may limit the other rights of the indigenous communities. So, it may be used as a part of strategy to protect interests of indigenous communities.

Trade Secrets

Using trade secrets to protect Indigenous Knowledge as an option has been suggested as trade secrets have some advantages and are better suited for protecting knowledge that has commercial utility but could not meet the criteria for patents. For example from two different vantage points two researchers have argued that using trade secrets is a better option for protecting Indigenous Knowledge.[114] The handbook brought out by AAAS also suggests that using trade secrets as an option. In case of trade secrets the indigenous community will benefit even if the matter protected by trade secrets is no longer a secret. It has also been argued that with trade secrets recognized by TRIPS in Article 39 trade secrets is now recognized as a means of protection globally and all the countries will have to have some norms as minimum regarding trade secrets. Even if the trade secret, is made public it may be possible for the indigenous community to recover damages. Thus, trade secret coupled with a contract, prima facie, appears to be a better option than patents.

TK to be classified as a trade secret should have some commercial value, should not be in public domain and it should be possible to protect the same as a secret. Indigenous communities can use this knowledge and enter into a contract specifying payments for using this knowledge as a trade secret. [115]

Based on this it has been suggested that trade secrets can be used if institutions are designed to ensure that this right is placed firmly in an enforceable framework. [116]. However whether communities can really use trade secrets effectively is a controversial issue.[117]

These two are major problems and as in the case of community rights or collective rights the question of who can represent the community becomes an issue. What form of collective organization is best suited for this is the major question? If a particular knowledge

is, closely held, or known to a few only, then it is easy to protect it under trade secrets. However, if it is diffused, or widely known then it will be difficult to do so and the value of the trade secret lies in its commercial utility and not in knowledge per se. Hence, making use of trade secret as an option is not easy in many cases for the commercial value may be uncertain or difficult to assess. Thus in case of knowledge which could result in production of a valuable commercial good or the quality of information is vital in a commercial activity trade secret can be an option. In case of TK that is valuable and context specific or is unique it can be categorized as trade secret. For example a family may possess a special formula for a drug or may be in possession of elite germplasm. In such cases it is possible to use trade secret. But in cases where the knowledge is diffused or many options are available trade secret may not be an option at all. If a secret is, held by a family there is no guarantee that the whole community will benefit out of it. Indigenous Knowledge can be codified into trade secrets in many domains and specific trade secrets can be then assessed in terms of commercial value. On that basis a contract can be entered. It is also possible that indigenous communities will benefit even if the trade secret no longer remains a secret

The 'difficulties in dealing information as a resource' are too many and this is not something that is unique to trade secrets. When a good portion of the knowledge is diffused, using reverse engineering one can find alternative methods and processes. The value of information as a resource is difficult to find out. If there is a substitute for Indigenous Knowledge or the contribution from Indigenous Knowledge is not critically important then the commercial utility of Indigenous Knowledge is less. For example, in a drug discovery process, if Indigenous Knowledge is of use only in the initial stages and the discovery process will not suffer heavily in the absence of Indigenous Knowledge then the utility of that knowledge, as a trade secret is minimal. So Indigenous Knowledge, which is very relevant or vital can easily command premium and hence there will be demand for the same. Using trade

secrets to protect this knowledge is sensible, as the income component will be significant. In the absence of any estimate on the informational value of Indigenous Knowledge that has commercial value, it is difficult to assess the usefulness of trade secrets as a method to protect Indigenous Knowledge. This problem plagues most of the analysis of using trade secrets. As a, legal measure trade secrets has many advantages, and, it is relatively easy to enter in to a contract and enforce trade secret than a patent. But, the advantages need not necessarily translate into huge benefits in practice. When more than one indigenous group is in possession of the same knowledge that has some commercial value, unless both work together to maximize their benefits, the outsider will be able to drive a bargain and benefit. The information asymmetries, transaction costs and institutional failures can hamper using Indigenous Knowledge as a trade secret.

The technical problems or constraints in using trade secrets are many. But, even if there were no such problems or even in an ideal situation should trade secret be used to protect Indigenous Knowledge. The answer to this can be discussed only in the larger context what role intellectual property rights can play in protecting indigenous knowledge. Trade secrets do not have any fixed time and misappropriation of trade secrets could result in punitive damages. And unlike copyright there is no fair use exemption. So trade secret can hamper further innovation or flow of information. Indigenous Knowledges of different communities do have common elements. In such cases use of trade secrets by one or more community can affect the rights and claims of other communities. In return for a royalty and other commercial benefits should a community exchange its knowledge held in common for ages. Can the community build upon the Indigenous Knowledge if it protected under trade secrets? For this it is necessary that not only the knowledge and but also the capacity to use it in business process or methods should be with the community. Then the community can 'have the cake and eat it too'.

The dilemma is using trade secrets gets complex as reverse engineering, can be used to know the key components of the knowledge protected by trade secret. The community can have an agreement with a clause for continued payment even if the trade secrets become part of public domain. In the case regarding Listerine it was held that although the secret was known to the public, the heirs of the original developer, who licensed the trade secret to Warner-Lambert could get benefits.[118]But there is a trade off as a trade secret could be used against anyone in the community using the knowledge covered under a trade secret. So to parcel off Indigenous Knowledge in bits and pieces under trade secrets will ultimately result in blocking the community using the parts of Indigenous Knowledge. For example community may be informally using a combination of drugs derived from plants as a cure but once this is covered under trade secrets the sources of the plant may not be easily available as they would have been used for commercial production or they would be available in the market, while they were freely available earlier. Thus, it is not information but also the resource that matters. Only if access to both is available to the community then the community can make use of both.

As of now there do not seem to be a project that has resulted in protecting Indigenous Knowledge under trade secret except the one sponsored by Inter American Development Bank in Peru. So it is too early to judge the usefulness of using trade secrets as a measure. Trade secrets can be used in case of germplasm and for protecting varieties. However the better method is to go for plant breeders' rights or to patent it. Trade secret is ideally suited when it involves some formula, or, a unique combination or a specific process using a secret formula. In case of plant breeding or producing new varieties, companies protect their in bred lines using trade secret but not the variety per se. Hence, trade secrets have very limited use in safeguarding Indigenous Knowledge relating to plant varieties and seeds. It has been suggested that TK can be protected by trade secrets based on a taxonomic classification.[119]

In light of the above discussion one can conclude, trade secrets is well suited in some contexts but not in all contexts. Although, it has some merits the constraints more of institutional in nature, than technical. Thus, the potential of trade secrets to protect Indigenous Knowledge is yet to be tested. But with trade secrets now being acknowledged as an intellectual property rights under TRIPS, it will be tried and tested in many countries which did not offer enough protection under trade secrets before.

The issue of legal protection to IK has been referred to in the Paragraph 19 of the Doha Declaration. [120] An international model of protection can result from the work undertaken at WIPO and CBD in this issue. National level legislation is necessary but that alone will not be sufficient for this. The preventive approach necessitates stopping misappropriation at both national and international levels. However setting up a global regime for protecting IK/TK is not a task that can be expected to be completed soon.[121]. Under the Recital of EU Biotechnology Directive there is no binding commitment to disclose the origin.[122] Belgium is one country, which has tried to implement the letter and spirit of the Recital 27 seriously. To what extent, the amendments in the law in Belgium would be a solution to this problem, i.e. misappropriation is yet to be proved. [123]

Of late, the idea of an international initiative to protect IK/TK through a binding international convention/protocol has received much attention.[124] () Since the discussion and debates relating to IK/TK are held at various fora which is the most appropriate forum for a debate on an international convention is not clear. There are many initiatives on TK/IK on at this juncture and they are either top to bottom (e.g. the initiatives taken by WIPO, UNCTAD) or bottom to top (e.g. the initiatives to create registers, ideas such as Communal Intellectual Property Rights, initiatives by NGOs and indigenous communities on using trade secrets), apart from the national level legislations and regional level initiatives on IK/TK. Thus there is little synergy among the plethora of initiatives at all levels. So whether an international treaty

to maximize the benefits from Indigenous Knowledge through intellectual property rights it does not make sense to deny patents on plant varieties, for Indigenous Knowledge coupled with germplasm could be used to develop new varieties. Different countries are in different stages of industrial development and some countries are capable of developing drugs using Indigenous Knowledge without outside help. Such countries, for example India, would prefer to use this and try to capitalize on the increasing demand for drugs based on alternative medicine. It makes little sense then not to opt for stronger intellectual property rights. The debates and discussions in the IGC of WIPO have resulted in some concrete ideas which are being pursued, but the real battle is in WTO.

On one hand, there is an apprehension that, in the name of protecting indigenous knowledge, and interests of indigenous communities, new rights like database rights, initiatives like digital databases, will erode the uniqueness of IK/TK and reduce them to entries that could fit into the modern IP regime, and, hence, in the long-run may lead to privatizing them. On the other hand, there is also the realization that total negation of the current IPR regime is not a wise strategy, as that would foreclose even the available options, without giving anything in return. Thus while so many solutions are tried and experimented with, it is difficult to predict which ones will stand the test of time. In reality as indigenous communities fight for survival, the bio-cultural diversity is under threat, IP issues are important but the indigenous communities are aware that they have to fight at different levels with different allies and foes at different fora. For instance although indigenous communities and national governments do not see eye to eye at the national level often, they are aware that at international fora like WTO, WIPO etc they have to take an united stand on some matters. Similarly, at the international level, indigenous groups and NGOs invoke international conventions and covenants as a strategy to protect their interests, and, challenge the nation states and MNCs.

As Geravis points out interest in exploiting traditional knowledge and growing political importance of aboriginal countries in many developing nations are key factors in the movement of IK issues to the forefront.[126]

The IK/TK debate has moved center stage. As of now, it seems that within the next decade significant progress, will be made in finding solutions, but whether the solutions will result in new problems will be known much later. A combination of solutions (e.g. national laws, sui generis systems) and initiatives (e.g. digital databases, certificate of origin, the disclosure of origin) and, probably an international treaty on IK/TK, can result in some protection, if not in a perfect solution.[127] More important is the need for new concepts and new ways of approaching the problems relating to IK/TK. But since there are lot of misconceptions about protecting IK/TK, a review of the solutions is a good place to start with before formulating new concepts and approaches. In this chapter the pros and cons of many suggestions and models has been examined and on that basis it could be said that lot more needs to be done both in theory and in practice to come to grips with the complex nature of the problem. One of the objectives of this dissertation is to suggest some new perspectives which will be relevant to reframe issues and to help in finding solutions that could work in the real world.

In this chapter the idea of Limited Common Property was examined and its relevance for IK/TK was highlighted. In the subsequent chapters another idea will be explored and its relevance for IK/TK issues will be examined.

Notes and References

[1] For example Coombe (1998); Roht-Arriaza (1996); Ragavan, Srividhya (2001); Ritchie, Mark, Kristin Dawkins, and Mark Vallianatos (1996); Aguilar, Grethel. (2001); Barsh, Russel L. (2003), Bodeker, Gerard (2003); DeGeer, Marcia E. (2003);Marden (1999); Meetali Jain (1999); R.V. Anuradha (1997); Yano, Lester I. (1993); Jacoby & Weiss (1997); Duttfield, Graham. (2001); Stevenson, Gelvina R (2000); Huft, Michael J. (1995); Greaves, Tom. (Ed) (1994); Brush, Stephen, and Doreen Stabinsky.(Eds) (1996).

[2] Pottier, Johan, Bicker, Alan, Sillitoe, Pau (2003)

[3] See the discussion on TEK in the subsequent paragarphs.

[4] Shroff, Farah (2000)

[5] ICSU (2002a) "Traditional knowledge is a cumulative body of knowledge, know-how, practices and representations maintained and developed by peoples with extended histories of interaction with the natural environment. These sophisticated sets of understandings, interpretations and meanings are part and parcel of a cultural complex that encompasses language, naming and classification systems, resource use practices, ritual, spirituality and worldview "

[6] According to WIPO indigenous knowledge is

"All tradition based (i.e., generally developed on the basis of transmission from generation to generation) intellectual (i.e., based on intellectual activity) creations and innovations, in the very broadest sense, which are constantly evolving in response to a changing environment and are generally regarded as pertaining to a particular people or territory"

[7] According to Leistner

"... Consequently, definitions based on modern conventional law with its distinction of protected intellectual property, and, cultural property, which generally falls into the *domain public* may thus be perilous to the very root concepts of the development of traditional knowledge". (Ed) S. Von Lewinski (2004)

[8]"...What is 'traditional' about traditional knowledge is not its antiquity, but the way it is acquired and used. In other words, the social process of learning and sharing knowledge, which is unique to each indigenous culture, lies at the very heart of its 'traditionality.' Much of this knowledge is actually quite new, but it has a social meaning, and legal character, entirely unlike the knowledge indigenous peoples acquire from settlers and industrialized societies" Barsh, Russel (1999).

[9] "Traditional environmental knowledge, or TEK, can generally be defined as a body of knowledge built up by a group of people through generations of living in close contact with nature.... With its roots firmly in the past, traditional environmental knowledge is both cumulative and dynamic,

building upon the experience of earlier generations and adapting to the new technological and socioeconomic *changes of the present* "

Johnson, Martha (2002). See also Gadgil, M et al (1993)

[10] "Embedded knowledge "that is knowledge that conveys not just information, but that also has social and cultural meaning and gives the holder of such knowledge a sense of belonging and certitude "embodied knowledge" : that is knowledge that cannot be represented adequately in explicated rules or textbooks, but is ingrained in people through socialization and the incorporation of skills and habits" Daele, van den, Wolfang (2004).

For an extensive analysis of the various perspectives on IK and marginalized knowledge systems see Kothari, Brij (2002)

[11] Caillaux, J. (1994)

[12] For an over view of this see Roussel (2003)

[13] Balick, M. & Cox, P (1996)

[14] Ellen, R, Harris. H (1999) cited in ICSU (2002a)

[15] See ICSU (2002a), Hoppers, Catherine A.O, (2002);

Sefa Die, George J. JHall, Budd L. Rosenberg, Dorothy G. (2000). Watson-Verran, Helen and Turnbull, David (1995); Agrawal, Arun. (1995). Warren and McKirenan (1995) argue "Indigenous Knowledge is local knowledge that is unique to a given culture or society. This is in contrast to the international knowledge system generated through the global network of universities and research institutes. By documenting these [IK] systems, we can compare and contrast them with the international knowledge systems " in Warren M.D. et al (eds)

[16] Visvanathan, Shiv (1997); Nandy, Ashis (ed) (1988); Escobar, Arturo (1995). See also Cavalcanti,Clóvis (2002)

[17] Sillitoe, Paul (1998)

See Kothari (2002) also

[18] Warren, D.M, Slikkerveer, L.J, Broekensha, D (Eds) (1995); See Crossman, Peter,

Devisch,Rene (2002), Kothari, Brij (2002)

[19] For instance see Indigenous Peoples, Forests and Biodiversity International Alliance of Indigenous-Tribal Peoples of the Tropical Forests, International Work Group on Indigenous Affairs 1996

[20] Nettle, Daniel, Romaine, Suzanne (2000)

"A striking correlation between areas of highest linguistic diversity, allowing us to talk about a common repository of what we will call biolinguistic diversity the rich spectrum of life encompassing

all the earth' species of plants and animals along with human cultures and their languages. The greatest bio linguistic diversity is found in areas inhabited by indigenous peoples, who represent around 4 percent of the world's population, but speak at least 60 percent of the world's languages"

See also Crystal, David (2000). According to Crystal 'Languages are dying at unprecedented rate. If the estimates I reviewed in chapter 1 are right, another six or so have gone since I started to write this book'

See. Nabhan, P.Pynes, T.Joe in Stepp, John R.

Wyndham, Felice S. Zarger, Rebecca K. (2002) also.

"On one point there is agreement: traditional knowledge systems are rapidly fading away. Linguist Michael Krauss suggests that half of the 6000 or so languages spoken at the beginning of the 20th century have now vanished, along with the cultures they once kept alive. Of those languages that remain, 80% are spoken only by small groups of elders.

Consider, for example, the Gosiutes, an Amerindian tribe of several hundred people clustered in two small reservations in Utah and Nevada. Fluent speakers of the language number fewer than 20. When those last 20 Gosiute speakers die, their language and much of their culture will disappear forever. Why, on the cusp of a new millennium, should we care?

Among the 20 are elders whose experience as little children is extraordinary: they were raised as hunter-gatherers in the high deserts of the Great Basin. The desert life they described from their childhoods is not, however, one of deprivation. They were taught to demarcate seasons by the flowering times of different plant species. By tracking a diverse palette of edible roots and tubers, a desert habitat that might otherwise appear foreboding was transformed for them into a moveable feast. Unlike agricultural peoples dependent on a few crops, the Gosiutes could rely on many plant and insect species for nourishment. Gosiute children, though, have scant interest in learning this wisdom. As one aged Gosiute matriarch sadly told me, her grandchildren would rather watch television than listen to stories of a now-forgotten way of life. Whether the cause is considered to be the touted superiority of Western technology, the introduction of foreign money and goods, or the siren call of a new culture to young people, few indigenous societies have been able to withstand the onslaught of Western culture". (Cox, Paul Alan 2000). See the responses also.

[21] See Maffi, L., ed. (2001)

[22] According to Nettle and Romaine:

"Because language plays a crucial role in the acquisition, accumulation, maintenance, and transmission of human knowledge concerning the natural environment and ways of interacting with it, the problem of language endangerment raises critical issues about the survival of knowledge that may be of use in the conservation of the world's ecosystems. . . The knowledge contained in indigenous

languages has much to contribute to scientific theories through the uncovering of potentially invaluable perspectives on a variety of problems such as land management, marine technology, plant cultivation, and animal husbandry."

"The areas of greatest biological diversity are areas occupied by people with distinctive cultures and in those occupied by indigenous peoples whose languages and traditional lifeways are threatened. Contemporary linguistic studies demonstrate that as languages disappear so does traditional knowledge, and that when traditional knowledge is supported, rewarded, and encouraged, we actually see a revitalization of local languages and an increase in local biological diversity. These things are interrelated such that we can say that there is a relationship between biological diversity and cultural diversity; maintenance of the former helps to preserve the latter and vice-versa. The CBD recognizes this."

Coombe, Rosemary J (2001) at 278,279

[23] Brookfield, H. (2001) *Exploring Agrodiversity.* Columbia University Press, New York

[24] Hoppers, Odora (ed) (2002)

[25] According to Parry:

"..What had once been understood as simply a material resource B plants, animals, some bark or seeds B had become also, with biotechnology's capacity to access the genetic or biochemical components within it, what could be referred to as an informational resource. It is now possible to extract genetic or biochemical information from living organisms, to process it by replicating, modifying, or transforming it, and to produce from it minor modifications of this information that are themselves able to be utilized as raw materials, commodified as resources. The genetic information embodied within material resources has become, in effect, the instrument of production, not only for that resource, but also for a range of other potential resources that could be produced by recombining the information in an almost limitless number of ways." Parry, Bronwyn (2002).

[26] Brown, Michael (2003)

[27] Ziff, Bruce & Rao, Protima (Eds) (1997).

[28] "Commodification is about compartmentalization. It is positivistic and technological. If you can put the Maori into neat packages of tribal groups, then you can split up the money pie and say this tribe has so much and this tribe has so much .... Maori cultural values and thinking tend to reinforce the *aku* mode when we are talking about ownership of property. For instance, in the cultural worldview, knowledge is perceived as belonging to the whole group" Smith, Graham. H (2000).

[29]" Indigenous people also feel that their approach to sharing knowledge is incompatible with the 'commodification' of arts and scientific discoveries in contemporary intellectual property

law.....Among indigenous peoples, higher priority is given to proper use of knowledge, locally, rather than accelerating growth in the total quantity of knowledge globally" Barsh, Russel (1999).

[30] According to Whitt:

'Intellectual property laws have been a particularly effective strategy for acquiring, commodifying, and rendering profitable, intangible indigenous resources, such as artistic expressions and medicinal and spiritual knowledge" Whitt, Laurie Ann (1999) See Whitt, Laurie Ann (1998) also

[31] For example Cahill, Lisa S (2001)

[32] In the context of Human Genome Diversity Project, Mead writes

" Western science goes to great lengths to de-humanize the humanness or life-force of human genes ; hence terms such as 'specimens' 'materials' 'properties' and 'collections' are adopted as a means to ignore the essence of life contained within. ..... It is contrary to indigenous tradition to "objectify" a gene or human organs as these are living and sacred manifestations of the ancestors"

Mead, Aroha te Pareake (1998); See also Whitt, Laurie Ann (1998), Awang, Sandra (2000)

[33] Magnus, David, Caplan, Arthur ,McGee, Glenn (2002)

[34] See Brown op. cit. for a discussion on this

[35] Dove, Michael R (2000)

[36] Ellen, Roy Parkes, Peter, Bicker, Alan(2000), Rao, R.R (2002); See also La Duke (1994); See also Huttington (1998).

[37] For instance, an environmental historian writes:

"The discussion of sacred groves among environmental historians illuminates the tension between competing metropolitan, indigenist and ecological nationalisms. Scholars manifest these struggles in the ways they choose to record how Indians lived in engagement over time with the physical environment, where the environment is considered as context, agent and influence in human history. Colonial foresters, tribal rights activists, and ecological scientists are among a distinguished array of experts who have described sacred groves in India's forest history. In the words of a scientist, who in collaboration with an anthropologist has spent many years documenting these sacralized and, thus, protected landscapes in India, sacred groves are 'ancient nature sanctuaries where all forms of living creatures are afforded protection through the grace of some deity.' In most instances, the groves are associated with Hindu mother goddesses, fierce deities who have preserved old growth and endemic biodiversity. By aligning the deities with religious cults predating agrarian sedentarism, this account claims forms of rural religiosity for a wider and antique nature devotion embedded in the Hindu pantheon.

In contrast, a group of philosophers and religionists have dealt in greater detail with this question – to what extent do indigenous religious ideas have the potential to support ecological awareness in India? They provide a useful typology of Indian environmentalism by speaking of Brahminical models, tribal models, renouncer models and modern secular activism and rightly identify the inherent tension always present in Indian environmentalism between learning from western struggles and defining a distinctive Indian cultural practice.

In a study specifically directed at discovering the shape, role and politics of sacred groves, Rich Freeman finds 'little correlation between the concerns and depictions of the modern environmentalist's models, and the actual local reasons for instituting and maintaining sacred groves.' He goes on to demonstrate the fluidity of both society and its natural environment in the recent historical period, challenging thereby what he describes as 'neo-Hindu ecology'".

Krishnan, Sivarama (2003), See Kalland, Arne (2000) also.

[38]"Without distinguishing between what people think, feel, and know about the world(their culture) and the things they do, it is easy to make the mistake of assuming that the societies which appear to have their little impact on their environment must necessarily The have environmentally benign cultures. .... Once we distinguish between a society's culture and its members' actual uses of their environment, it is possible to see that low environmental impact can exist alongside a culture which espouses no environmentalist principles". Milton, Kay (1996)

[39] For example see Warren et. Al. (eds) (1995)

See also the issues of IKDM and publications of World Bank on Indigenous Knowledge for development.

"IK is a key element of the social capital of the poor and constitutes their main asset in their efforts to gain control of their own lives. For these reasons, the potential contribution of IK to locally managed, sustainable and cost-effective survival strategies should be promoted in the development process." Gorjestani, Nicolas (2002)

[40] Nadasdy, Paul (1999).

[41] See the articles published in Seedling and made available by Genetic Resources Action International (GRAIN) www.grain.org

[42] See for example Dumoulin, David (2003)

There exists a large and ever growing literature on this, most of which is based on field work and case studies. Some of them have been cited elsewhere in this dissertation in the context of bioprospecting.

[43] He cautions that:

"Proponents of intellectual property rights for Indigenous Knowledge seek to expand capitalism and market relations to control the exchange of biological resources such as seeds. Overturning the historic practice of free exchange and common heritage for biological resources is a heavy cost to pay for benefits that are uncertain and poorly distributed" (P139 in greaves (ed)).

[44] Trotti, John L (2001)

[45] Posey (1999)

[46] Posey, Duttfield (1996)

[47] . According to Posey and Duttfield "TRR is an integrated rights concept that recognizes the inextricable link between cultural and biological diversity and sees no contradiction between the human rights of indigenous and local communities, including right to development and environmental conservation" (P. 95).

[48] "The upshot of this short discussion is that the view that all intellectual property rights are human rights by virtue of their universal recognition is problematic..... Having one's artwork copied is not the same as being striiped of ones bedding, food, medicines or other personnel possessions that form the essentials of a daily existence" Drahos, Peter (1999).

[49] See Henietta (2000),Geertrui Van Overwalle (2002), Halewood, Michael (1999),.Goplakrishnan (1999)

According to a WIPO Document 'Elements of a Sui Generis System for protection of Traditional Knowledge' sui generis rights will include:

"Right to prevent unauthorized use of traditional knowledge, a strong moral right, a right to assign or transfer, particularly in respect of benefit sharing under the CBD and the right in respect of databases similar to the right of preventing unfair commercial use and preventing disclosure contained" WIPO/GRTKF/IC/4/3 October 20, 2002, p. 24-25.

[50] This would

(1) Allow the initiatives to make their documented TK from the public domain available to intellectual property offices; (2) allow intellectual property offices to integrate that knowledge into their patent application process; and (3) assist the electronic exchange and dissemination of this documentation. This system would ensure all documented TK is retrievable by patent examiners worldwide.

[51] Therefore, the WIPO Committee has identified four measures for this:

(1) Assisting in the documentation and publication of TK as searchable prior art; (2) properly classifying TK documentation; (3) using "minimum documentation" lists for non-patent literature that

contains TK information; and (4) increasing the inclusion of TK databases and digital libraries in existing intellectual property information systems

[52] "After having successfully completed the project to construct a digital library of the 36,000 medical formulations contained in traditional ayurvedic texts to prevent bio-piracy, the Council of Scientific and Industrial Research is all set to prepare a similar library of the traditional knowledge database of South Africa" CD on ayurvedic digital library released Sunday, Oct 26, 2003 The Hindu www.thehindu.com

[53] "The deep indexed China Traditional Chinese Medicine (TCM) Patent Database was established by the State Intellectual Property Office (SIPO) of PR China. The purpose of creating this database was mainly to meet the need of patent examination. The database has already been put to use in the patent examination department in SIPO since April 2002.The Chinese version of the database covers TCM related patent applications published from 1985 to current in China. It contains over 19,000 bibliographic records and over 40,000 TCM formulas. In order to present this database to WIPO, an English demo version was created and opened to the world through the WIPO gate. There are 29 search fields in the database that fall into four categories: bibliographic information, subject index terms, uses/effects, TCM formulas. Rewritten titles and abstracts provide users with more searchable information. The system was built with multiple search features: quick search, advanced search, TCM formula search, and search history tracing function. Moreover, two special features created in the system are very useful for improving searching efficiency: cross-file search based on TCM dictionary and TCM similarity search. The cross-file search enables users to locate a specific TCM in the TCM dictionary file and then cross-file search that name in the patent bibliographic file for relevant records. TCM similarity search enables users to do one-stop searching easily for complex search queries." Liu Y., Sun.Y (2004). See Bodeker, Gerard (2003) for an attempt to develop a centralized registry system in Ethiopia and its shortcomings.

[54] Duttfield (2003).

[55] Sharma who is critical of the proposed digital libraries points out

"Take the case of a patent granted on the ailment 'dry eyes'. In Indian literature, 'dry eyes' control has been spelt out through the use of leaves of the 'kumari' plant (aloe vera). The remedy is to take few leaves of aloe vera, wash these in clean water and then crush the leaves. Put some drops of the solution that is extracted from the leaves into the eyes and the 'dry eyes' problem is taken care of. In the patent application that has been granted by the USPTO, the only difference is that clean water has been replaced with chlorinated water. And, of course, there is enough technical jargon like temperature, etc, to make it look as if it is a novel product." Devinder Sharma (2002)

"The heavens are not going to fall if documentation of traditional knowledge and putting it in the form of a digital library is stalled till an effective safeguard mechanism is prepared. The only other plausible approach is to do what the Chinese have done. Between 1992 and 2000, China revised its patents laws twice to ensure that it could draw intellectual property control over its unique system of medicine. China has drawn a total of 12,000 patents on its medicine system and therefore does not have to worry about constructing a digital library." Ibid

[56] Bowker (2000)

[57] "... what should be the contents of a database compiled by countries to document traditional knowledge or botanical knowledge in this way? A tension between the protection against IP and protection for IP exists here. In order to protect against IP, if you want to make something part of the searchable prior art, you have to disclose as much as possible. If you want to exploit the traditional knowledge by means of a compilation or a transfer technology agreement, then it is in your interest to disclose as little as possible in the agreement. I am working on a project in Venezuela. The solution there seems to be to tag only. So you would list in the database only the items that are available for the transfer of technology. Whether that would help with searchable prior art is a different question, but the decision taken there was to go for protection of IP for the purposes of exploitation. Visser (2002). At 769

[58] It has been observed that 'For example, there are currently no standardized linkages between different subjects within ethnobotany, even in one applied field' Wang Y, Jianchu. X, and Pei. S – (2002) at 256

[59]"The terminology used in traditional knowledge is another problem. Apart from the difficulties inherent in translation, traditional words used are often general in nature and cannot be equated always with the present medical terminology – one word or phrase may cover several different types of a particular disease. For example, Indian old texts use various general words for a liver complaint, while the Western world today uses the terminology 'Hepatitis A', 'Hepatitis B', 'Hepatitis C', etc. Thus, while a particular plant may be genuinely effective and prescribed over centuries in India for liver problems, the Western world may refuse to accept this as prior use and may say that since words, like say 'Hepatitis B' were not used in the traditional knowledge system, such a use is novel today16. Thus cases of patents being assessed solely within the Western cultural paradigm cannot be ruled out. A traditional knowledge database would not be useful in such cases. It would serve the purpose of the innovator or entrepreneur much better than that of the traditional knowledge holder. In such a situation, the database would serve only to encourage 'bio-piracy'."

Udgaonkar, Sangeeta (2002)

[60] Utkarsh G, Gadgil M and Rao P R S (1999)

[61] "Thus, any future steps to define legal rights relating to traditional knowledge in databases will need to respond not only to concerns about protection of database makers' interests — and not only to concerns about protection of indigenous and local communities' interests in their knowledge — but also to concerns about the broader interest of all social groups in access to and exchange of information. An additional problem is that the sui generis rights desired by database owners

extend beyond the conventional scope of copyright, such that owners would have rights to prevent others from using information even when that information is not creative or new, simply because it is contained in the database. "Downes, David R., Laird, S.A et. al. (1999)

"One important caveat to the argument in support of a registry system (and the benefits it would provide to indigenous peoples) is the requirement that the indigenous peoples that the registry is designed to protect also believe in it. If a registry system would be implemented without the support of a majority of indigenous peoples, it would realistically benefit no one and could potentially add to the problem that it was meant to solve. The working document from the Workshop on Traditional Knowledge and Biological Diversity has identified that it may be the case that a representative group of indigenous peoples feel that a registry system would not provide the best solution to the protection of their traditional knowledge. The debate over the usefulness of a registry system remains open; most importantly, attempts are being made to solve the problem of traditional knowledge misappropriation and to satisfy the indigenous peoples, as well as the many other people who may benefit from its many uses." Krumenacher, Thomas. J (2004) at 159

[62] Stenson, Anthony J. Gray, Tim S. (1999)

[63] Brown (2003), Karlsson, Bengt G. (2003)

[64] Wiersema (2003) See also Anaya (2003). A detailed discussion on this is beyond the scope of this chapter.

[65] According to him

"Communal patents give scope for blocking the issuance of future patents on biological diversity and also afford weak local communities a stronger basis for the negotiation of terms for access and benefit sharing "Mgbeoji, Ikechi (2001)

[66] The Philippines Indigenous People Rights Act of 1997 is one such act, which states:

"Indigenous Cultural Communities/Indigenous Peoples are entitled to recognition of the full ownership and control and protection of their cultural and intellectual rights. They shall have the right to special measures to control, develop and protect their sciences, technologies and cultural manifestations, including human and other genetic resources, seeds, including derivatives of these resources, traditional medicines and health practices, vital medicinal plants, animals and minerals,

Indigenous Knowledge systems and practices, knowledge of the properties of fauna and flora, oral traditions, literature, designs, and visual and performing arts"

The act also stipulates that any patent based on the above knowledge will not valid unless the prior informed consent of the community is obtained. It states

"Access to biological and genetic resources and to Indigenous Knowledge related to the conservation, utilization and enhancement of these resources shall be allowed within the ancestral lands and domains of indigenous peoples only with a free and prior informed consent of such communities obtained in accordance with customary laws of the concerned community"

[67] "The sui generis system of Panama actually constitutes the first comprehensive system of protection of TK ever adopted in the world" Duttfield (2003).

[68] Its important features are:

"Obliges interested parties to obtain the prior informed consent of communities providing the biodiversity-related knowledge; promotes mutually agreed terms by recognizing the need to sign licenses (contracts) for the use of the knowledge when a commercial or industrial application is intended (whether or not in the public domain); includes unfair competition procedures to defend the rights recognized in the regime (in the case of misappropriation or unauthorized use); calls for the establishment of different types of registers to document collective knowledge and make it more or less (depending on the type of register) available to third parties; creates a Fund for the Development of Indigenous Peoples; and associates the protection of TK with intellectual property regimes by imposing the obligation of presenting a license when applying for a patent."

[69] Correa (2004)

[70] For example Gudeman, Stephen (1996), Dove, Michael. R (1996)

[71] Because they Recognize individual, not collective rights;

Require specific act of 'invention'; Simplify ownership regimes Recognize only market values Are subject to economic powers and manipulation Are difficult to monitor and enforce Are expensive, complicated and time consuming .

Posey (1999)

[72] Ragavan (2001)

See also Bengwayan, Michael A.(2003) for a comprehensive overview about the situation in Asia and the responses of the indigenous communities.

[73] Drahos (2000), Gulati (2001), See Drahos (2004) also

[74] See Reichman, J.H (2000)

"Jerome Reichmann has distinguished between sui generis systems derived from a copyright model and those derived from a patent model. While those following a copyright model inevitably result in weak protection, a sui generis system derived from a patent model is seen to offer protection against value-adding users by preventing the production of derivative products. In a discussion related to the hybrid seed industry, but equally applicable to the field of TK, Reichmann has noted that the failure of the prevailing IP system to come to grips with the real problems in the field is likely to stimulate a new round of legislative experiments with sui generis regimes. These are argued to be "likely to repeat the cycle of under-and over-protection with even greater anticompetitive effects along the way." Alternatively, Reichmann proposes a **compensatory liability regime** which would obligate developers to pay equitable compensation for borrowed improvements over a short period of time. This sui generis model has resonances with the OAU model legislation and its call for advance payments of benefit sharing." Bodeker, Gerard (2003) at 807, 808.

[75] Correa (2004)

[76] Duttfield (2003)

[77] Joint Communication from the African Group WTO Document IP/C/W/404 dated 26th June 2003

[78] Carvalho, (2000); See also Carvalho (2002)

[79] The Andean Community's Common Intellectual Property Regime stipulates that

"A copy of the contract for access, if the products or processes for which a patent application is being filed were obtained or developed from genetic resources or by-products originating in one of the Member Countries; [and] if applicable, a copy of the document that certifies the license or authorization to use the TK of indigenous, African American, or local communities in the Member Countries where the products or processes whose protection is being requested was obtained or developed on the basis of the knowledge originating in any one of the Member Countries."

[80] India's position can be found in WT/GC/W/147).

[81] (IP/C/W/347/Add.3 June 11, 2002, at Para 19-20).

[82] "A typical crop breeding program might involve more than a few land races (traditional farmers' varieties) as well as a number of advanced breeding lines. The popular VEERY line of wheat is the product of 3,170 different crosses involving 51 parents from at least 26 countries. Imagine the complexity of ascertaining the genetic contribution (qualitatively or quantitatively) or the economic value of a particular parent in a breeding program with multiple land races and breeding lines" (P 487).

"It is easier to imagine a multinational agreement that would create appropriate international benefit-sharing mechanisms than it is to believe that the CBD's "country of origin" approach will create certainty of title and functioning markets for plant genetic resources for food and agriculture" (P487). Fowler (2001)

According to Srinivasan:

"A single variety has contributions not only from traditional varieties in India, but also from varieties from fifteen different countries. Faced with such complex pedigrees, it is difficult to see how the PVP authorities in developing countries with limited administrative capacity can adjudicate on benefit-sharing claims. Such adjudication has to address such issues as how far back the pedigree of a variety should be traced and how contributions from varieties from other countries should be treated (for example, should foreign countries/communities be allowed to make claims for benefit-sharing?)." Srinivasan (2003)

[83] "Decision VI/24/C calls on the Secretariat to CBD to undertake further information gathering and analysis of the feasibility of an international "certificate of origin" system as evidence of prior informed consent and mutually agreed terms. Although, undefined, the term "certificate of origin" has fallen into popular use as defining a system for tracking flows of genetic resources and traditional knowledge through documentation of PIC." UNU-IAS (2003)

[84] According to Carvalho (2002):

"It is necessary to establish a mechanism of industrial property protection that ensures the exclusivity as to the use of the contents of the databases, rather than to their reproduction (copyright)".

[85] "Establishment of rights in data, the enforceability of rights in the data against their use by unauthorized third parties; and the non-fixation of a predetermined term of protection" Carvalho (2002)

[86] Carvalho (2002)

[87] "Most intellectual property assets are owned by collective entities, which in many cases represent large and diffuse group of individuals. (General Motors owns intellectual property rights on behalf of a community of shareholders that is much large and more diffuse than most identified traditional communities). On the other hand, patent law is not necessarily about protecting inventors, but about appropriating inventions" Survey of Existing Forms of IP for TK Dec 3 2001 Para 24 WIPO/GRTKF/IC/2/9

[88] According to John Bowder:

"... Indigenous Knowledge is associated with a system of social accountability absent in modern society. Someone(e.g. a shaman) is held responsible for the application of Indigenous Knowledge, whereas no one is responsible for (mis)application of modern knowledge" cited in Townley (2002)

[89] "In some cases, an individual or group is assigned the responsibility of possession and proper exercise of knowledge. And even when the community as a whole is the possessor of knowledge, it is sometimes ethically irresponsible to disseminate that knowledge indiscriminately. Further, knowledge properly disclosed in one context cannot be considered properly disclosed in all contexts. Wide disclosure of knowledge often transforms its meaning. Also, often what is not disclosed might be as important as what is revealed and, finally, transmissions of knowledge involve relationships of discretion, discrimination and trust. Indigenous knowers are parties to these elements and not mere possessors of knowledge." Townley, C (2002).

[90] "Instead of regarding knowledge as detached information atoms available for distribution, collection and purchase, we might consider that exchanges of knowledge also carry relational significance." Townley. C (2002)

[91] Van House (2002a,) (2002)

[92] Writing in another context Nandy points out

"By objectifying and impersonalizing knowledge, by de-historicising the producers of knowledge , one could argue away the imperfect reality of living persons and human history from the world of knowledge." Nandy, Ashis (1989)

[93] "Ultimately, the irony involved in the scientisation of Indigenous Knowledge is driven by a particular relationship between development, science and power. Development is founded on the conceit that scientific knowledge can help transform social processes. Because the current attention to Indigenous Knowledge finds justification in the claim that it is useful for development or some similar broad social aspiration, scientific criteria for production of knowledge are inevitably invoked in the making of Indigenous Knowledge. Once Indigenous Knowledges test true on these criteria, they can be deployed to accomplish development – in ways that are likely to undermine the very conditions that have facilitated the continued existence of indigenous peoples" Agrawal (2002).

[94] Dove in Greaves 1986.

[95] "The elimination of that very difference that the advocates of Indigenous Knowledge seek to build and defend" Geertz, C. (1991) cited in Fernando (2003).

[96] Michael Dove puts it "mix of hybridity, mistranslation, and incommensurability" (p. 356).(Dove 2002). Again as Geertz points out "the opposition, if we must have one (and I am not persuaded that an opposition—another opposition— is what we need or ought to want rather than a shifting focus of particularity), is not one between local and universal knowledge, but between one sort of local

knowledge (say, neurology) and another (say, ethnography). As all politics, however inconsequential, is local, so is all understanding, however ambitious. No one knows everything, because there is no everything to know. . . . Let us then try to avoid any radical dichotomy between local and universal knowledge. Little is purely local, less is truly universal. Geertz (1991).

[97] Jagtenberg T, Evans S (2003) See also Reddy, (2002)

[98] "The global market for herbal products is exploding. It is estimated to touch 5 trillion$ by 2020. Four out of ten people in the US are using what they call 'alternative medicine', even when all the cost is not covered by medical insurance. Sale of herbal products was in the vicinity of 21 billion US $. The increase for pharma products in Japan, in recent years has tripled whereas for herbal products the growth in demand is over 15 fold. Similarly in the European Union, sales of herbal products rose from US 1.6 billion to 3.3 billion in1998. The market is huge and it is growing. China and India are major sources of medicinal plants. Whereas China's sales of herbal products is in the range of Rs. 25000 crore India holds only 1% of the global market, selling roughly Rs.500 crore worth of products. This situation will have to change if herbal products are to become important enough to provide sufficient incentives to ensure the survival of traditional knowledge that supports it.

Take the American patent taken on Phyllanthus amara , a plant known in India and some other parts of Asia, to have curative and regenerative properties for the liver and effective in the treatment of hepatitis. A liver medication based on Phyllanthus or any of the many other medicinal plants with their IK that have been stolen from developing countries, would be worth hundreds of million dollars. Suppose we set aside 40 to 50 million $, even 100 million $, for standardising for the western market and packaging and another 100 million $ for promotion and advertising etc., we are still talking about a product worth something like 600 million $ which has been taken from communities. This should form the basis for calculating benefit sharing in the pharma sector. If the community's share were to be calculated at 5 % of $ 600 million, that works out to 30 million US $ as a flat rate. In addition to this should accrue a percentage of the annual profits." Sahai (2002).

See also Wilder, Richard (2002)

[99] See Richard Owens (2002)

[100] Boyle, James (1996)

[101] "This category is what I call the "limited common property" or LCP - property held as a commons among the members of a group, but exclusively vis-a-vis the outside world. I will argue that the new developments in cyberspace and environmentalism particularly demonstrate how much we need to develop our concepts of the LCP, a property type that is neither entirely individualistic nor entirely public. Our legal system has hitherto been oddly oblivious to many forms of limited common property - even though common property itself is actually ubiquitous, if unremarked. The reasons for that

obliviousness are in some measure economic, but they are also in part cultural - a culture now quite dramatically challenged by the questions of property in intellectual creativity and environ-mental protection." Rose, Carol M (1998)

[102] See the discussion in the chapters in the next part of the dissertation

[103] "Along those lines, Robert Merges has urged that intellectual property law should encourage limited common productivity by positively nurturing contractual regimes among intellectual property rights-holders, who in turn can develop internal norms for their own internal relationships. Although there are some non-property legal issues involved (particularly antitrust), this is not necessarily a long reach for current intellectual property; the current regime already has room for shared property rights when a set of creators define themselves in advance as joint participants in the common creation of some fixed product. In this respect, intellectual property is similar to the law of landed property, which also can accommodate various mixes of limited common property, sometimes in very complex contractual schemes like condominiums and cooperatives - so long as the participants and their rights are identified in advance. Much more difficult and problematic, however, are the emergent intellectual products of less easily defined groups - folktales, folk art, local cultivars, and so on - products that are in some ways always a work in progress, and that include incremental contributions of group participants who are not easily identified as individuals". Rose, Carol op.cit at 158. See also Rose, Carol. M (2003)

[104] Cottier, Thomas (1998).

[105] "Groups and individuals that have control over their own destinies are far better placed to benefit from legal protection of their knowledge. For example, indigenous groups empowered with rights to control access to their lands and communities have a better chance of preventing misappropriation of their knowledge and negotiating favourable bioprospecting arrangements. But in all too many cases, indigenous groups and TK holders suffer from extreme poverty, ill health, unemployment, lack of access to land and essential resources, and human rights violations. With so many immediate problems awaiting a solution, there are serious limits to what can be achieved in Geneva." Duttfield (2003).

[106] "Its emergence complete, the Romantic conception of authorship pervaded modern thought about ownership of intellectual property and determined the entitlement one had in a "work." The full limitations of the socially created author had been wholeheartedly incorporated into law, protecting the product of the inventor(s) only as far as Western law's vision would extend. The Romantic individual was placed at the core of the ownership regime". Riley, Angela R (2000)

[107] "Perhaps the most prevalent and insidious form of appropriation of Indigenous Knowledge and resources has been the construction of conceptual and legal categories of valuable knowledge and

resources that systematically exclude the knowledge and resources of local communities, farmers, and indigenous peoples. This construction of exclusion takes several forms. First, Western science characterizes certain natural materials that indigenous and local communities have cared for, preserved, improved, and developed as mere "wild" species or, at the most, as "primitive species" (commonly known as "landraces.)" Formal, scientific systems of innovation and research have therefore, at least until recently, denigrated and denied the value of indigenous and subsistence farmers' informal systems of knowledge-transmission and innovation. Second, while the products of formal knowledge systems have been protected as "property," those of informal, traditional systems have been tagged the freely available "common heritage of humanity." In particular, patentability under current intellectual property law is systematically biased against the innovations and knowledge of indigenous and farmers' communities. Finally, the products of indigenous and local communities' knowledge have been detached from their ecological and sociocultural base through removal and preservation in Northern-dominated ex situ collections and projects, while the knowledge underlying the products attains merely anthropological interest. Thus Western science and industry treat the living knowledge of existing indigenous and local communities as "quaint," "quackery," or "quits." Roht-Arriaza, N. (1996)

[108] Reiley , Supra.

[109] According to Ho

"The importance of inventorship also extends into patent ownership. In particular, patent laws reward inventors with presumptive ownership of patents on their inventions. The ownership presumption is crucial because patent ownership conveys the right to exclude all others from any use of the patented invention without the owner's consent; accordingly, ownership of a widely utilized invention can be of huge financial importance. Patent ownership rules also favor inventors who jointly create an invention by providing each joint inventor with the same presumptive right to patent ownership. The Patent Act explicitly provides that patents have attributes of personal property and that each joint inventor can license the patented invention without consent or even accounting to other co-owners. Accordingly, being the inventor or even a joint inventor of a patent conveys extensive privileges." Ho (2002) at 132.

Matt (2002) points out

Thus, the crux of the controversy over joint inventorship doctrine is the following inequity: under current law, a person may become a joint inventor because of a minor contribution to an invention, yet obtain ownership rights commensurate with every other joint inventor on the patent.

[110] The Chinese attempt to patent traditional medicine based on such a premise has resulted in mixed results. While it has resulted in large number of patents there are many problems also. So China has also tried a sui generis solution also.

"Be it these difficulties or others, China enacted a sui generis legislation on protecting traditional medicine in the Regulations on Protection of Traditional Medicine 1992. The Regulation distinguishes between traditional medicine with special therapeutic results and that with noticeable therapeutic results. The former receive protection for 10, 20 or 30 years, the latter for seven. Applications may be made to the national health departments, yet the right of applications is limited to enterprises engaged in the preparation of traditional medicine. The health authorities seek advice from the National Committee on the Assessment of Traditional **Chinese** Medicine, and even upon grant of protection keep the application secret. Just as other **Chinese** attempts for a sui generis protection, e.g., for domain names, neither scope nor enforcement mechanisms seem to be entirely clear.

Heath, Christopher, Weidlich, Sabine (2003) at 93

[111] As McMannis points out

"These patents will name individual Aguarunas as inventors where possible, and will in any event recognize the Aguarunas as contributors to the invention. The Aguarunas, in turn, recognize the ownership and patrimony of the Peruvian state over the genetic material collected by the participating researchers in Peru for research purposes. They also acknowledge the need for voucher collections to be permanently deposited and curated at both the Museo de Historia Natural in Lima and the Missouri Botanical Garden in St. Louis (one of the world's leading botanical research institutions) and researched for non-commercial purposes at national and international depositories. This is to be done with the understanding that biological collections obtained for the purpose of extracting compounds for commercial purposes remain under the control of the Aguarunas unless released by them and that these materials are held in trust by Washington University as recipient of the grant.

The application named the confederation of participating Aguaruna communities and organizations, along with the three participating universities, as assignees (i.e. co-owners) of the application. While the details of the patent application must remain confidential for the moment, the inventors and their employer, Washington University, have consented to the disclosure of the existence and general nature of the patent application" McManis, C. R. (2003).

[112] "The patent applicants carefully satisfied the definition of novelty. Claiming the use of maca alone to enhance fertility would not suffice for the criteria set forth in the novelty definition. The patent applicants patented the combination of macca and velvet deer antler and were subsequently granted the patent. Velvet deer antler also has known and documented usefulness in enhancing fertility, no prior art was previously established documenting the two plants used in combination. If the

knowledge has been publicly documented, therefore search for a combination. By combining known knowledge in a unique manner, it may be possible to meet novelty criteria for a patent. If the knowledge has not yet been documented, it is novel" Hansen, Stephen A. and VanFleet, Justin W. (2003)

[113] "Landraces are likely to have very little commercial value because of breeders' strong preferences for genetic material with known agronomic traits rather than exotic, unknown, and, unadapted materials". Marshal (1989).

[114] Sampath, Gehl (2003), Stevenson, Gelvina R. (2000)

[115] "Trade secrets seem to be especially suitable for the protection of ethnobotanical knowledge because of two reasons. Firstly, it affords protection for informational goods that do not fit into the strict standards set out by patent law. Secondly Article 39 of the TRIPS Agreement has made trade secrets an internationally acceptable intellectual property option". Sampath (2003) op.cit.

[116] 'Whatever be the mode of intellectual property option chosen for the right (trade secret or a know-how license), the institutions have two major tasks: that of representing the communities effectively, and of providing for rules of contract formation that take into account the difficulties of dealing with information as a resource'. Sampath (2003) op.cit.

[117] For a skeptical view see Godshall, L. E. (2003)

[118] Hansen, Stephen A, Van Fleet, Justin. W (2003)

[119]

TRADITIONAL KNOWLEDGE	CONTEMPORARY	NON-CONTEMPORARY
TANGIBLE	(1) NEEM PACKAGED AS TOOTH PASTE	(2) NEEM TWIG FOR DENTAL CARE
INTANGIBLE	(3) NEEM FOR CALCIUM ABSORPTION IN MAMMALIAN BONE TISSUE	(4) NEEM AS ANTI-SEPTIC

NOTE: *The neem tree (Azadirachta indica or Free Tree) has been the subject of at least 153 patents worldwide. Inventions described in virtually all neem-related patents used public domain traditional knowledge as the starting point. Neem-related traditional knowledge is cited here to distinguish between different categories of traditional knowledge. In Figure 1, knowledge*

of neem in categories (3) and (4) could constitute a trade secret or be disclosed for taking a patent. Thus, (3) has been patented but not (4), being part of prior art in the public domain until someone succeeds in adding an inventive step or some other ingredient and claims a new use. Category (1) can only be protected by trade mark unless neem is synthesised which could make it patentable. Category (2) knowledge is in the public domain. In this example, the diffusion of traditional knowledge delimited this knowledge from being confined to a local indigenous group or community.

Mathur (2003). See also Timmermans, Karin (2003) for a discussion on domains of knowledge and IP claims in traditional medicine.

[120] 'We instruct the Council for TRIPS, in pursuing its work programme including under the review of Article 27.3(b), the review of the implementation of the TRIPS Agreement under Article 71.1 and the work forseen pursuant to paragraph 12 of this Declaration , to examine, inter alia, the relationship between the TRIPS Agreement and the Convention on Biological Diversity , the protection of traditional knowledge and folklore, and other relevant new developments raised by Members pursuant to Article 71.1 .In undertaking this work, the TRIPS Council shall be guided by the objectives and principles set out in Articles 7 and 8 of the TRIPS Agreement and shall take fully into account the development dimension."

[121] "Until detailed analysis has became more advanced, the EU is also prepared to further examine whether in addition to legislation regulating the access to, the protection of, and the reward for the use of TK at the national level, it would be necessary, within the framework of the International IP system, to make changes to patent practice and patent law at the national and international level." Van Eeckhaute (2002)

"To conclude, the EU believes that, although it might be possible to some extent protect

TK or at least TK-related innovations and goods through existing forms of intellectual property rights, it may be necessary to develop an international sui generis model for protection of TK. .... At the same time, we should be wary of overlooking difficulties ahead of us and of creating false expectations and quick results. In view of the complex and controversial nature of the issue one should be aware that the setting up of a protection regime for TK will not prove an easy task" (p. 147 ibid.)

[122] The Recital of EU Biotechnology states

"Whereas if an invention is based on biological material of plant or animal origin or if it uses such material, the plant application should, where appropriate, include information on the geographical origin of such material, if known; whereas this is without prejudice to the processing of patent applications or the validity of rights arising from granted patents".

[123] Overwalle, Geertrui Van (2002)

[124] For example refer to the ideas outlined in Cottier T.; Panizzon M. (2004) , Drahos (2004)

[125] Towards An International Treaty For Protecting IK/TK – Work In Progress

[126] Geravis (2003)

[127] Such a treaty of course is necessary but that alone is not sufficient to prevent misappropriation of IK/TK.