

IP for Traditional knowledge on-line: Recognizing, Respecting and Rewarding Creativity and Innovation at Grassroots¹

Anil K Gupta

Legitimacy of the global intellectual property right systems is in question for its inability to generate symmetrical opportunities for traditional knowledge holders vis-à-vis the inventors and innovators in formal sector. There is a widespread appreciation that IP systems have to reduce transaction costs of the various stakeholders involved in documentation, validation, value addition, IP Protection, dissemination through commercial or non-commercial licensing or otherwise and fair benefit sharing. There are several issues which are to be resolved if transaction costs have to be reduced reciprocally, i.e., not just for the well connected and resourceful formal sector but also for the disadvantaged informal sector. However, before the conceptual and empirical issues involved in online IP administration for traditional knowledge can be identified, it is desirable that we understand the institutional context of traditional ways of knowing, creating and innovating in various societies. The knowledge, innovation and practices produced through these ways may require different kinds of instruments for protection. The electronic administration of these instruments would have to contend with the challenges of linguistic, cultural and socio-economic diversity of communities around the world. The central thesis of this paper is that given the inadequacies in the technical competence and infrastructural capabilities of most of the developing, international registry administered electronically by WIPO and/or its subsidiaries might provide the most effective tool for meeting the aspirations of grassroots innovators and traditional knowledge holders. This registry will help accomplish what I call as golden triangle of rewarding creativity, i.e., link innovation, investment and enterprise around the globe. Without a system of protection of knowledge globally, incentives for disclosure and dissemination cannot be provided to the holders of valuable traditional knowledge about biological and genetic resources as well as other resources. If erosion of knowledge has to be stemmed, on line intellectual property rights administration may provide a necessary, though not sufficient condition for the same.

The paper is organised in three parts. Part one deals with the conceptual dimensions of traditional knowledge systems and the ethical, equity, efficiency aspects of the disclosure. In part two, I present the challenges involved in reducing ex-ante and ex-post transaction costs of IP protection of on line IP administration for both producers and users of traditional knowledge systems and innovations at grassroots. I also highlight the potential advantages of linking grassroots knowledge systems with global opportunities for financing the valorization and commercial and non-commercial dissemination of the traditional technologies and grassroots innovations. Finally, the policy and institutional

¹ Invited Paper presented at the Second WIPO International Conference on Electronic Commerce and Intellectual Property, Geneva, 19-21 September, 2001

implications of operationalising an on line IP system are discussed in part three. The linkage with PCT, CBD and international undertaking has been discussed under the inter governmental committee to discuss the IP for traditional knowledge, gender resources and folklore under WIPO.

The justification for multi language multi media capabilities as demonstrated by the Honey Bee database (<http://www.sristi.org/knownetgrin.html> sristi.org/honeybee.html) will be emphasized. The practical examples through which the on line IP management databases such as M.cam.com have helped in licensing grassroots innovations from India to global companies will also be shared.

Part One:

The dimensions of traditional ways of knowing and generating the intellectual property.

Local communities have survived against all odds in various parts of the world through a constant process of experimentation, innovation and mutual learning. These processes helped some communities and individuals therein to make a transition to modern lifestyles and associated privileges of dealing with various constraints of managing survival. At the same time, for a very large number of communities and individual knowledge experts, the forces of globalization have reduced over a period of time, the opportunities for their continued expression of their values. Accordingly, a very large number of traditional communities have been impoverished precisely because their values encourage them to conserve biodiversity and other resources and associated knowledge systems and not exploit the same in a non-sustainable manner. While these impoverished communities have provided leads for modern pharmaceutical and seeds industry and many other commercial sectors, the benefit sharing has been almost totally absent. Because of asymmetrical recognition of the contributions of various actors in the value chain of knowledge in formal and informal sectors, this chain is not sustainable. It is obvious that this asymmetry is neither sustainable nor ethically justified. There is no reason to expect that communities and individuals would continue to disclose their knowledge, innovations and practices to outsiders without any reciprocal recognition of the rights and entitlements of local communities and individuals. The illegitimate exploitation of the traditional knowledge of local communities by the formal sector without any acknowledgement and therefore benefit sharing cannot be stopped without putting in place traditional knowledge digital libraries (TKDL) as being attempted in India. The incentives not only for disclosure but also for further augmentation of traditional knowledge systems by communities and individual knowledge experts are necessary to sustain the positive elements of the knowledge systems. The underlying ethical and cultural values, which have contributed to the conservation of biological and other resources and associated knowledge systems have a role to play in future. This will help in modifying and moderating the negative influences of market economy and enhance the positive elements of the modern market oriented exchange economies. Honey Bee network has pursued this goal through textual as well as on-line multi language multi media data bases.

The contested domains of knowledge systems:

The socio-cultural and institutional knowledge systems are extremely important and have been discussed elsewhere (Gupta, 1995a, 2000, 2001, Gupta and Sinha, 2001). There is no doubt that technological knowledge exists in an institutional context. What kind of rules govern the evolution of knowledge and its dissemination are therefore important to determine the typology of incentives that will nurture or impair the processes of knowledge production and reproduction. The generation of creative and innovative solutions for local problems will also be influenced by these incentives. Therefore, the interaction among three sets of knowledge domains is important to understand the complexity of knowledge systems.

Contested Domains of Local Knowledge: private, community and public

The knowledge could be produced (see figure 1) by individuals, and or groups alone or in combination. Some of this knowledge may diffuse only locally to be characterised as community knowledge while other may diffuse widely among various communities in a region and some time across regions and countries to become public domain knowledge. Within the community knowledge, there may be elements which are restricted in scope or in terms of accessibility while others may be in public domain. Similarly, individuals may also produce knowledge, which they may share widely with the community and outsiders in a manner that the knowledge might become public domain. However, some of the knowledge produced by the individuals may be kept confidential and accordingly may be accessed only with restrictions.

Table – 1 Contested domain of Knowledge

a) Private individual knowledge inherited from forefathers	K1
b) Acquired the skill to practice it faithfully without modification or with modification	K1-wm K1-m
c) Individual rights to use the modified and unmodified knowledge according to same rules Or different rules	K1-sr K1-dr
d) Knowledge known to the community	K-2
e) Knowledge practiced by individuals if known to individuals	K1-l
f) Knowledge practiced by individuals if known to community	K2-l
g) Knowledge practiced by community if known to community	K2-c
h) Knowledge practiced by community even if details known to individual/s	K1-c
i) Known to community but not practised by individuals or community	K2-n
j) knowledge known to community and accessible to outsiders	K2-a
k) Knowledge known to community and not accessible to outsiders	K2-na
l) Knowledge known to wider public through documentation or otherwise	K3
m) Knowledge known to wider public and practised by only few individual	K3-l
n) knowledge known to wider public and practised by wider public	K3-P
o) Knowledge known to wider public and not practised by any one	K3-n

Within the community knowledge, there may be elements which are restricted in scope or in terms of accessibility while others may be in public domain. Similarly, individuals may also produce knowledge, which they may share widely with the community and outsiders in a manner that the knowledge might become public domain. However, some of the knowledge produced by the individuals may be kept confidential and accordingly may be accessed only with restrictions.

Contested Domains of Local Knowledge

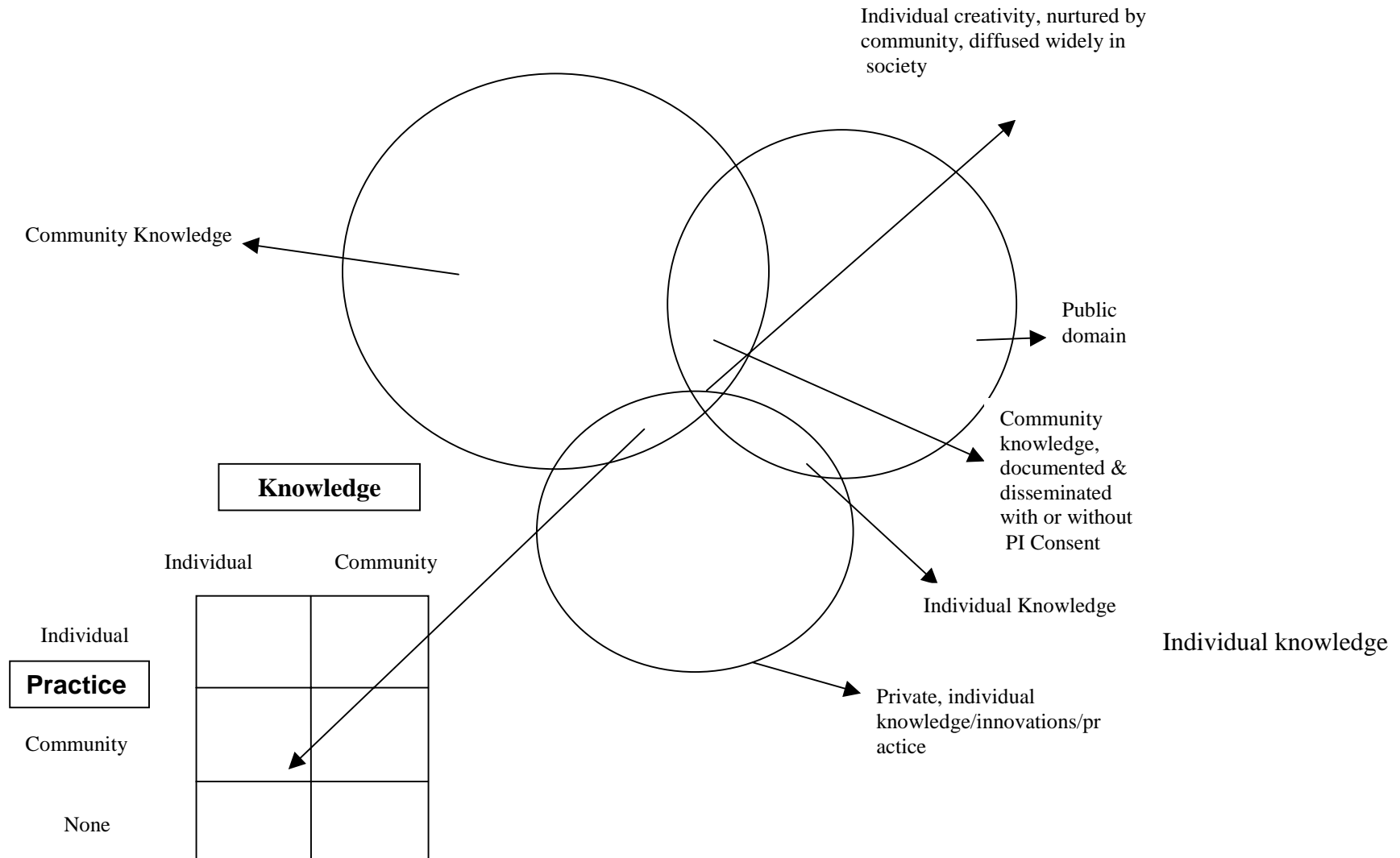


Figure 1. Source: Gupta 2001

The three subsets in figure 1 thus refer to three overlapping domains of knowledge. The contestation emerges when the producers and users of knowledge have unequal access, ability and assurances (Gupta, 1995) about the resources and the benefits emerging out of commercial or non-commercial usage of the resources with or without value addition. The private individuals may have knowledge which they may have inherited from their forefathers (K1), and they may have acquired the skill to practice it faithfully without modification or with modification (K1-wm or m, see table one). The individual contribution in modifying traditional knowledge may be treated according to the same rules as the non-modified knowledge is used, or its use and dissemination may be governed by different rules (K1-sr, K1-dr). Knowledge may be known only to individuals (K1) or to the community (K2) and may be practiced by individuals (K1-I, K2-I) or by the community (K1-C or K2-C), or by none (K1-n or K2-n). In the last case the knowledge because of discontinued use may still be effective or may not be effective. When individual knowledge is shared with the community, its practice may still be restricted to individual experts. There are healers who know how to calibrate the dose and combination of herbal drugs according to the condition of the patient. The general relationship between the plants and their uses in some cases may be known to the community. The experts who produce knowledge and also the contingency conditions under which this knowledge should be used may be free to share their knowledge or may not be free to share their knowledge. Emmanuel and Weijer (2001) provide example of Amish community which may restrict the right of individual members to give consent to participate in a research process. This is not an uncommon case. The communities may circumscribe the conditions under which individuals may or may not be able to share their expert or other knowledge with outsiders or even with other members of the community. There is a famous case in Australia where an art piece designed by a native individual was printed on a currency note by Reserve Bank. The community objected to such use because it argued that the individual did not have rights to assign even individually designed work to outsiders without community's permission since the art work was conceived after rituals and taboos sanctified by the community (Blackney, 2000). There are also taboos implying that a particular remedy might lose its effectiveness if revealed to others. Such a taboo leads to erosion of knowledge when such a knowledge expert dies without ever sharing the secret. The incentives for such knowledge experts to share their knowledge will bring down the transaction costs of external users now or even among the future generation to find such leads for developing various products. But if we argued about the logic of rewarding current generation for knowledge that might have been partially or completely developed by previous generation, we might win the argument and lose the knowledge.

Further, community knowledge may or may not be accessible to outsiders (K2-A and K2-NA). Different communities may have varying capability to produce, reproduce and practice the knowledge for individual or common good. Wider the sharing, greater is the probability of feedback coming from larger number of people and thus improving the knowledge. At the same time the incentives for individuals to improve such knowledge may go down because such individuals in view of widespread awareness cannot extract the rent. *Some communities govern the access to biodiversity resource by different rules than the access to knowledge about such resources.* The knowledge within a community

is therefore not distributed symmetrically. The variability not only influences the power differentials but also the extent of efficiency gains that different members of a community make by using the same knowledge differently. The communities benefit from the individual knowledge and thereby revere the local knowledge experts or healers. But this reverence may not be the sufficient motivator to encourage young people, to acquire this knowledge and take it forward with or without improvement. There may be other factors also such as public policy, media exposure, life style changes etc., which may affect the incentives for younger people to acquire particular knowledge. However, the point remains that the existing set of incentives may need to be modified if traditional knowledge has not only to be conserved but also augmented.

The third set of knowledge system includes public domain knowledge (K3) which may be practiced by individuals, or wider public or not practiced by any one (K3-I, K3-P, K3-n). Ethno biologists, other researchers and firms may document individual and community knowledge and bring this into public domain. Some people have argued that even the community knowledge known only to the members of a village community should be considered public domain knowledge. However, in our view this is not a proper interpretation. From the point of view of protection of intellectual property rights, the knowledge, which is reasonably accessible, can only be considered public domain knowledge and part of prior art. Most of the time the knowledge of people is brought into public domain without the consent of concerned individuals or communities. It is obvious that this way of dealing with people's knowledge is neither fair nor just. What is even more disturbing is the dominant tendency on the part of outside researchers not to share what they have learnt from people back with the same community after value addition in local language. Honey Bee network has tried to counteract this tendency of making people anonymous by insisting that knowledge providers, producers and reproducers must be acknowledged explicitly and attributed as authors and communicators of the specific knowledge. We should also ensure that whatever is learnt from people is also shared with them in local language so that people to people linkages can also be established. In addition, the Honey Bee philosophy (see <http://www.sristi.org> and [sristi.org/knowledgrin.html](http://www.sristi.org/knowledgrin.html)) also requires sharing by outsiders of any gain that may accrue to them from commercial or non-commercial dissemination of the raw or value added knowledge provided by the communities or individuals. Honey Bee newsletter for last 12 years has tried to propagate this philosophy through SRISTI (Society for Research and Initiatives for Sustainable Technologies and Institutions) in India and 75 other countries. We strongly believe in the need for protecting intellectual property rights of knowledge rich economically poor individuals and communities. However, to provide such a protection one would have to characterize such knowledge in the manner that the novelty and non-obviousness can be established. This would mean a comparison with available formal scientific knowledge. The present instruments of IPR can provide limited help in this manner. However, with modifications these instruments can indeed go a long way in protecting the intellectual property of individuals as well as communities. The greatest advantage of this system would be that the people will have incentives to disclose their traditional and contemporary knowledge and make it available to others for learning purposes. Once this knowledge becomes a basis for livelihood, conservation, lateral learning and social networking, a knowledge society starts emerging. Once this

happens the public domain provides incentives and not disincentives for individual and communities to share their knowledge after due acknowledgement.

Transition from natural capital to intellectual property

The natural capital has provided the spur for economic progress all through the history, though its role has varied. The natural capital can be governed by social capital, some of which is also ethical capital (Figure 2).

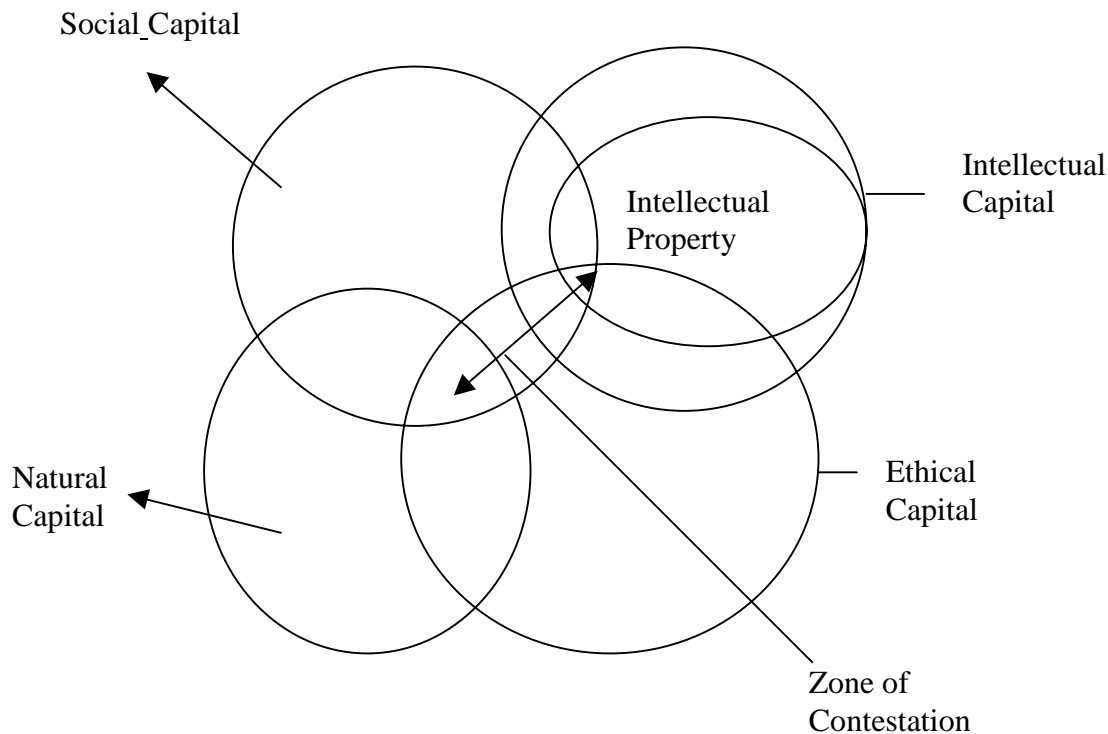


Fig 2. : Source: (Gupta 2001 own compilation)

The social capital could be defined as community based institutional arrangements which help in conservation and reproduction of natural capital. It is essentially a trust based community capital. The ethical capital is essentially such investments and institutional arrangements that may be governed by ethical norms of accountability, transparency, reciprocity and fairness to both human and non-human sentient beings. Some of the ethical capital is a sub-set of social capital. When common property institutions follow ethical values, then the intersection of social and ethical capital takes place. Knowledge about natural capital as well as other kinds of technological and social interactions constitutes the intellectual capital which is embodied in literature, data bases, folklore and other kinds of formal and informal sources of wisdom. Part of the intellectual capital constitutes intellectual property from which the knowledge producers can exclude others for a given period of time from commercial exploitation.

The purpose of this discussion is to emphasize that intellectual property is only one means of conserving and augmenting natural resources and associated knowledge systems. Since in the absence of this kind of property it is unlikely that private sector would invest resources to add value to traditional knowledge, the discussion becomes relevant. It is not our contention that private investments can alone help in conserving resources and the knowledge systems. In fact, there is considerable evidence that expansion of market institutions has led to erosion of biodiversity as well as associated knowledge. It is more due to the fact that the traditional knowledge was not valued properly within and outside the communities than due to expansion of market alone. Once a commodity becomes valuable, the bidders would try to appropriate it. Some critiques suggests that commoditization of traditional knowledge is contrary to the local culture and ethical values. This may well be true. However, one has to appreciate that every commodity that local communities and individuals have to buy from the market place has to be paid for. It is an ironical situation that the critics see no impropriety in commoditization of rest of the market in which local communities have no comparative advantage. But in resources in which they are rich, the commoditization is supposed to be disruptive. It is also ignored many times that the concept of intellectual property is not inconsistent with community wide sharing of knowledge for self-use. It is only when somebody tries to enrich oneself at the cost of the community or individual innovator that the protection could help. Therefore the communitarian spirit, which has helped conserve resources and generate respect for nature, has to be nurtured. Our contention is that this spirit will give way when options for survival require deforestation or other resource degrading livelihood options because the resource conserving options are not available. *The knowledge based approach to livelihood, and conservation of biosphere regions can indeed be evolved without causing any injury to the local institutions that have helped in conservation so long.*

Intellectual property rights protection for traditional knowledge, innovation and practices:

The part of intellectual capital which is incorporated in the intellectual property systems requires clarifications of several aspects of interface between traditional knowledge system and modern IP arrangements.

a. Prior art

There are parts of traditional knowledge systems, which have been brought in public domain by the formal sector researchers, corporations and sometime the committees themselves by wider dissemination of their knowledge, innovation and practices. These parts of knowledge systems would need not only the copyright protection but also digitization so that various patent offices do not issue patents inadvertently on such prior art. The traditional knowledge digital library (TKDL) being attempted in India provides one very useful model of establishing prior art. Issuance of patents on public domain knowledge as was the case in turmeric patent, which was subsequently invalidated will thus be prevented. However, one of the most difficult questions to be resolved is: Should knowledge, innovation and practices not yet documented or disseminated widely be considered prior art? In the Indian Patent Amendment Bill, 1999 there is a provision that a patent can be denied if the claims can be anticipated by the oral knowledge systems of traditional and/or local communities. Such a provision would be highly inappropriate

for recognizing the IP rights of local communities. It will imply that even if the knowledge is not documented and has unique features amenable for industrial applications, it will still constitute prior art. My contention is that we should the precedence of “reasonable accessibility” as a necessary condition for constituting the domain of prior art, i.e., if a particular practice of innovative way of managing any resource is known to a community and/or a knowledge expert, but is not reasonably accessible to an inventor in the formal sector, then it should not constitute prior art. Accordingly, it should be amenable for protection. The distinction between discoveries and inventions has already been blurred in the case of micro-organisms and plant varieties. Therefore, that cannot be a basis for denying the novelty to a unique contribution of a community and/or individual knowledge experts.

b. Grace period

Related to the issue of prior art is the aspect of grace period, i.e., how much time should be permitted for a knowledge, innovation or practice to be revealed within which it retains the eligibility for IP protection. In the US, one year grace period is provided for any disclosure. However, certain kinds of disclosure in a specific context do not constitute a knowledge or innovation becoming a prior art. There are two issues, which we have to appreciate from the point of view of local communities. One, what should be the mechanism to deal with disclosure by people in good faith without being aware of the implications of the modern IP system; and second, what is the ethical basis of a very large body of ethno biological literature where outside researchers have documented local and traditional knowledge without any acknowledgement or reciprocity in terms of sharing. One possibility is that we give five-year grace period for traditional knowledge disclosed in good faith. The basis for five years is that the TRIPS coming into force in 1995. This provision will generate tremendous goodwill among the traditional communities though it will not satisfy all those who criticize and justifiably so, the historical bio piracy and usurpation of traditional knowledge systems.

c. Community intellectual property rights versus individual intellectual property rights

The legitimate representatives of the communities should have the opportunity to protect their knowledge for a longer period or bring it in public domain or permit the individual members to keep it as trade secrets. In various countries, various customary or constitutional institutions may exist which can execute the choices. In the Indian context, a village council could authorize anybody to sign on its behalf, the application representing all the community members who have contributed to the production and reproduction of knowledge systems. It will be difficult to isolate the contribution of each individual since these contributions may have been made through feedback processes, through conservation of resources or through direct experimentation. Just as we have collectors societies for protecting the collective rights of individual performing artists, we should think of similar institutional innovations for protecting individual IP rights of grassroots innovators. This will further reduce the transaction costs of the innovators.

There are several other related issues concerning period of protection, multi community rights and grounds for revocation of patents. Without going into the detailed analysis which is beyond the scope of this paper, it may be suffice to mention that justification for present generation to be given the right to protect and assign their intellectual property is very clear. It is the action and values of the present generation which would determine whether or not the traditional knowledge system or part thereof survive in future.

It is important to recognize that some of the traditional ways of knowing are similar to the modern ways though the motivation and values underlying those ways may be different. For example, a farmer spots an odd plant in the field and select the seed, tests them next year and if found superior to existing germplasm, retains as seed for future use. Many farmer-bred varieties have come up through this process. For instance, the cardamom variety by Sebastian Joseph ; the pigeon pea variety by Dhulahbhai , chilly variety by Sundaram and Alibhai Abhvani were selected in the same way. Modern plant breeders also make selections of off type plants and develop varieties. Many varieties of pulses and oil seed for rainfed regions have been developed in this manner. The traditional and modern methods converge in this case. Likewise, many herbal pesticides, veterinary medicines or farm implements may be developed through experimentation.

Part two

On line IP administration of traditional knowledge.

One of the major purposes for developing on line IP administration system is to reduce the transaction cost of the innovators, potential investors and entrepreneurs, researchers, policy makers and others who want to draw upon the intellectual property systems for sustainable economic development. There are two kinds of transaction costs, ex-ante and ex-post. The ex-ante transaction cost includes cost of searching, negotiation/prosecution and drawing up the contract/issuance of the patent. The ex-post transaction costs include the cost of enforcement/keeping patents valid and ensuring action against infringers, side payments(inducements, concessions) , conflict resolution and if nothing works, redrawing the contract, revoking the patent or filing amended applications, renegotiating with the licensors, etc. There are several ways in which on line IP administration can reduce the transaction cost of the traditional communities and/or individual knowledge experts.

1. Objection to improperly issued patents through unauthorized use of traditional knowledge

If the local communities have access to abstracts and summaries of various patents having remotest connection with local traditional knowledge, they would be able to scrutinize and file on-line objections to the patents which are improperly issued.

2. Open access public databases and felicitation centres

There should be a small tax on every licensing agreement from the proceeds of which global, community IP facilitation centers should be set up in different countries. These facilitation centres can enable local communities to understand and identify any case of usurpation of their knowledge rights.

3. On line submission of applications

it should be possible to file applications nationally and internationally through e-commerce platform at a very low cost. The proposed global fund for IP protection of traditional knowledge and grassroots innovations should be able to subsidize the cost of communities and individual knowledge experts, which cannot afford to pay the fees. Consortia of global attorneys can be constituted for providing free legal advice to the interested communities and individuals. Recently, Testa, Hurwitz & Thibeault, LLP Boston, a US company has offered to file pro bono patents in a few cases on behalf of Society for Research and Initiatives for Sustainable Technologies and Institutions (SRISTI) and already four applications have been pursued on behalf of grassroots innovators.

4. Enforcement of IP by traditional knowledge communities and knowledge experts

It is obvious that the tasks of obtaining IP, validating it and monitoring its Fair Use are quite complex and beyond the competence of majority of the local communities and individual knowledge experts. One way in which these costs can be reduced is by imposing heavy penalties for those who have filed claims without authorized and informed access and use of traditional knowledge and/or local innovations. I have made several suggestions in the past to deal with this problem. One is that every applicant in a patent office should be required by the international law to declare that knowledge and/or resources used for filing claims have been obtained lawfully and rightfully. The lawful access implies compliance with the national laws on access, sustainable utilization and benefit sharing with traditional knowledge holders and conservators of biodiversity and other resources. The rightful claim implies the access to knowledge is obtained in an ethical manner through prior informed consent. The issue here is that it is not the responsibility of the communities alone to ensure that their rights are not tampered upon. It is also the responsibility of the patent offices to ensure that only bona fide claims are filed and granted. It may be useful to recall here that even on the issue of disclosure of country of origin with regard to biodiversity based resources, EU directive only encourages such disclosures but does not make lack of disclosure as a ground for refusing patent on the subject. This is an extremely unsatisfactory position and can neither be considered morally justifiable nor socio economically fair. The desire of European countries to enforce their IPs in developing countries is understandable and appreciable. However, it is difficult to understand as to why the desire to respect the IPs of traditional communities and individual experts should be so weak. Special watchdog groups should be supported in various countries to provide services to the civil society so that the quality of IP administration improves. Some organizations like RAFI are already making valuable contribution in this field. One may disagree with their goal of keeping

knowledge of people entirely in public domain but their efforts to uncover the unauthorized protection of traditional knowledge is appreciable.

5. On line licensing support to traditional communities and knowledge experts

The protection of intellectual property serves very little purpose if it doesn't generate any economic advantage for the IP holders. It is well known that almost 80 per cent of the IP is not worked. However, mechanism for licensing technologies through fair negotiation and benefit sharing are extremely important for legitimizing the effectiveness of IP for traditional knowledge holders and grassroots innovators. Mr. David E Martin, CEO of M.Cam.Com had offered to help SRISTI in strengthening the creativity and innovations at grassroots. Subsequently, while looking at the on line databases at SRISTI (<http://www.sristi.org/knownet-grin.html>) he identified the technology developed by Parbhai bhai using a foot pedal sprayer for sprinkling herbal pesticide. He looked at the extremely rich patent database developed by them at M-Cam and identified all those who had used foot pedal pump. Rather than restricting to the companies dealing with spraying of pesticides, he recognized that a few toy companies were also using the same technology. He identified one of such companies viz., International Technologies and negotiated with them the licensing rights for this technology keeping rights for Indian markets with the innovator. A technology of which not a single piece had been sold generated considerable income for the innovator. In addition, the licensee had also agreed to contribute a significant fund through a Grassroots Innovation Promotion Fund at SRISTI so that those who have not been so fortunate as Prabat Bhai, could license their technologies or commercialise it themselves. A clearinghouse and innovation auction system or stock exchange of innovations could be developed so that low cost licensing opportunities become available to the traditional knowledge holders and individual innovators. The Association of Licensing Experts should also offer pro bono help just as M.cam.com provided to SRISTI without any charges. The licensing of technologies globally not only improves the general esteem of knowledge systems but also make the IP SYSTEM relevant and meaningful for the local communities.

6. International Registry for grassroots innovators – INSTAR

SRISTI suggested in 1993 that an International Network For Sustainable Technology Application And Registration (INSTAR) be set up to achieve following goals:

- i) acknowledgement of individual and collective creativity
- ii) grant entitlements to grassroots innovators for receiving a share of any returns that may arise from commercial applications of their knowledge, innovations or practices with or without value addition
- iii) Linking the golden triangle of entrepreneurship by linking Investments, enterprise and innovations. Small scale investors in North and South can not afford to go to various countries, scan diversity of knowledge and resources, negotiate contracts and invest up front huge investments for value addition. If they do not participate, then the field will remain dominated by only large corporations. This register will help small scale

investors seek opportunities of communication with communities and individual innovators and explore opportunities of investment. Large number of potential negotiations will take place increasing the opportunities for innovative communities and individuals. The competition among the investors tempered by competition among potential suppliers of a various kinds of knowledge as well as diversity will moderate expectations on both the sides.

- (iv) an autonomous authority of which local community representatives will be the majority members could be entrusted with the responsibilities of having access to all the contracts. A copy of the contracts may have to be deposited with this Authority so as to avoid short changing of the communities. These contracts will also be scrutinized to see whether management plans for sustainable extraction of diversity have been drawn upon scientifically appropriate manner or not. Penalties may have to be imposed for non-sustainable extraction of herbs by domestic as well as external extractors,
- (v) Each entry in the Register will be coded according to an universal system like ISBN. The postal pin code of the habitat of the community or individuals registering innovations will be incorporated in the indexation system so that geo-referencing of innovations can be done. In due course the contextual information of innovations can also be incorporated in the system so that this systems of innovations can help cross connect the communities having similar ecological situations or facing similar constraints or challenges.
- (vi) The entry in the register will also entitle short term protection say for ten years, with five claims and be granted IP protection quickly.
- (vii) The registration system will also be part of Knowledge Network linking problem solving people across the world at grassroots level(see discussion on Knowledge network elsewhere, Gupta, 1995, 1999). This will promote people to people learning and serve as a multi-language, multi level, multi media(oral, textual, electronic) clearing house for local and indigenous communities. Wherever necessary and possible, formal scientific institutions will be linked up in the network.

Apart from the registration system a large number of specific incentives would need to be developed for different categories of knowledge, innovations and practices. Similarly the incentives for preservation of sustainable lifestyles of indigenous communities would also be different.

A geo referenced database of innovations protected for varying durations depending upon the system which is agreed upon among the parties through an international treaty will go a long way in promoting the cause of IP at grassroots. We must at the same time, appreciate that the open source movement has generated many useful concepts of general

purpose license. If a small farmer uses a technology described in the international register (INSTAR) for one's own use and livelihood, normally there should be no objection to that. However, if an individual or a company tries to generate commercial benefit from the innovation then it should not be allowed without proper authorisation. Many times, the critics of IP system forget one of the most important goals of such a registry. This is to encourage the cross-pollination and lateral learning as having been the basis of the Honey bee Network. In the absence of such a registry while corporations might benefit by individually gaining access to local knowledge systems, the transaction cost of the communities would be enormous to overcome the barriers of language, literacy and localism. It is here that multimedia, multi language registry should be justified for widening the repertoire of individual and community knowledge experts leading to sustainable and equitable development. This goal of GATT and TRIPS has remained unoperationalised for so long. On line administration of IP for traditional knowledge and individual knowledge experts can indeed provide a new way of integrating these knowledge systems, which have remained isolated from each other for a very long time. The globalization process which strengthens the options of local communities is a change that is urgently warranted.

Part three: summing Up

To operationalise various ideas mentioned so far one needs several policy and institutional changes. One would need an international agreements to provide a global registry for the purpose. It would help those countries particularly where national capacity is very weak and who would need far more time to become TRIPS compliant. In such countries, local communities and traditional knowledge experts need not suffer just because their national governments lack this capacity. Any individual from any country should be able to register one's knowledge, innovation or practice and gain may be a ten year right immediately, and after examination 40 or 60 years right. Wherever disputes arise among communities, general policy should be to err on the side of inclusivity rather than exclusivity which means that competing communities could be made collaborators rather than competitors.

The duration of the protection is the matter of detail. However, a short term protection say upto ten years should be provided on the basis of sufficient disclosure. While novelty and non-obviousness should be expected but need not be examined to reduce transaction cost and make the system robust and quickness of response. The Innovation Patent System of Australia and National Patent System of Switzerland provide useful precedence for thinking along this line. It is understood that rights are enforceable nationally. Under PCT, same application can be processed in several countries. The international registry through the proposed international treaty should make it possible for signatory country to provide protection in their jurisdiction. The on line administration should facilitate this task even in the countries where national systems are inadequate. One of the most difficult challenges in this entire strategy is the extremely poor internet infrastructure in most of the developing countries. Not to speak about the multimedia database, even the normal email service is not feasible with the current quality of telecom of line in most countries including many rural parts of India.

Therefore, we should either think of satellite based communication systems specially designed to provide access to the databases in remote areas, which are rich in traditional knowledge but poor in economic infrastructure. Alternatively we should think of CD based depositories in as many locations as possible and as often updated as possible.

There is no other competing technology by which such a big task can be accomplished at the lowest possible cost for increasing accessibility to the largest number of people. The on line administration of IP provides a unique opportunity to empower knowledge rich economically poor people. The Honey Bee Network and SRISTI and NIF have provided a basis already for the purpose. A National Register built by NIF provides on line registration facility at the moment in two languages. It should be possible to complete that in as many different languages as possible in future.

National Innovation Foundation ([www. Nifindia.org](http://www.Nifindia.org)) has provided under the leadership of Dr Mashelkar, DG CSIR, India, and a champion of grassroots innovations around the world, an unique platform to build a national register of Innovations and outstanding traditional Knowledge. This can act a template for setting up registries in various countries as well as at WIPO level.