E

WIPO/ECTK/SOF/01/3.9
ORIGINAL: English
DATE: May 2001

THE PRESIDENT OF THE
REPUBLIC OF BULGARIA

WORLD INTELLECTUAL
PROPERTY ORGANIZATION

INTERNATIONAL CONFERENCE ON INTELLECTUAL PROPERTY, THE INTERNET, ELECTRONIC COMMERCE AND TRADITIONAL KNOWLEDGE

organized
under the auspices of
His Excellency Mr. Petar Stoyanov, President of the Republic of Bulgaria

by
the World Intellectual Property Organization (WIPO)

in cooperation with
the National Intellectual Property Association of Bulgaria

Boyana Government Residence
Sofia, May 29 to 31, 2001

INTELLECTUAL PROPERTY, TRADITIONAL KNOWLEDGE AND GENETIC RESOURCES

HOW CAN ASIAN COUNTRIES PROTECT TRADITIONAL KNOWLEDGE, FARMERS' RIGHTS AND ACCESS TO GENETIC RESOURCES THROUGH THE IMPLEMENTATION OR REVIEW OF THE WTO TRIPS AGREEMENT

Contribution by
Mr. Anil K. Gupta, Executive Vice Chairman, National Innovation Foundation and Professor, Indian Institute of Management, Ahmedabad, India

THIS PAPER[1], IS A CONTRIBUTION TO THE CONFERENCE PROGRAM
BY
PROF. ANIL K. GUPTA[2] INDIAN INSTITUTE OF MANAGEMENT, COORDINATOR OF SRISTI, EDITOR OF HONEY BEE, AHMEDABAD
e-mail: anilg@sristi.org / http://www.iimahd.ernet.in/~anilg/
http://www.nifindia.org

[1] Paper presented at the Joint ICTSD/CEE/HBF Regional Dialogue for Governments and Civil Society, organized by the International Centre for Trade and Sustainable Development, Geneva at Chiang Mai, Thailand, March 29 - 30, 2001. I have drawn upon in part one considerably on an earlier paper Rewarding Traditional Knowledge and Contemporary Grassroots Creativity: The Role of Intellectual Property Protection, presented at a seminar at Kennedy School, Harvard University, May 2000. Part of it was originally developed but not used for a study for WIPO, Geneva.

[2] Professor, Indian Institute of Management, Ahmedabad 380015, and Coordinator SRISTI and Editor, Honey Bee - E-mail: anilg@iimahd.ernet.in / Website: http://www.iimahd.ernet.in/~anilg / http://www.sristi.org / http://www.nifindia.org.

Introduction

1. The growth of biotechnology, seed and drug industry relying primarily on biodiversity and in many cases, associated knowledge systems has alerted the biodiversity and traditional knowledge rich communities and countries around the world. There is a feeling that the outside users of local and traditional knowledge as well as genetic resources have not fulfilled their ethical, institutional and economic responsibilities towards knowledge and resource providers. In the wake of globalization, most Asian countries need considerable access to international capital for which they have to deregulate and also liberalize their economy. The pressure on natural resources is increasing but the livelihood options of the local communities and disadvantaged people in many cases have not increased. Under such a situation, the concerns about asymmetry in sharing of benefits through the use of traditional knowledge and biodiversity resource are bound to become more acute and urgent. The charges of bio-piracy against various international companies and research organizations continue to be leveled by the NGOs and other civil society actors because of lack of reciprocity in sharing of benefits. At a time when need for international cooperation to enhance the incentives for conservation is highest, we notice the degree of mutual faith at its lowest ebb. There are several reasons for lack of faith in the current institutional arrangements particularly existing system of intellectual property rights such as, (a) lack of explicit recognition of the rights of communities and individuals in their knowledge produced in past and/or recent times through collective or individual efforts, (b) absence of any obligation on the part of those seeking intellectual property rights protection to disclose the ethical, material and institutional propriety in using local knowledge, (c) lack of institutional arrangements involving very low transaction costs to register local knowledge, innovations and practices at national and international level to get recognition, reward (material as well as non material for individuals as well as groups), and attract potential investments, (d) lack of national and international funds for supporting the protection of intellectual property rights of small innovators, (e) modification in the IPR instruments and policies to deal with the vexing issues of prior art, public domain, traditional knowledge, local varieties or land races, collective or community knowledge, etc., and (f) lack of non-IP based reward systems to supplement IP based incentives.

2. In this paper I describe in part one the boundaries of various knowledge systems and the inherent tensions as well as complexities in dealing with traditional knowledge and contemporary innovations. The discussion on modifications in various IP instruments is given in part two.

I. UNDERSTANDING TRADITIONAL KNOWLEDGE, ACCESS TO GENETIC RESOURCES AND FARMERS' RIGHTS: CONCEPTUAL FRAMEWORK

3. Many times researchers have tried to portray traditional knowledge systems as totally different and opposed to the so-called modern and western knowledge systems. Nothing could be further from the truth. Some aspects of traditional knowledge systems contain most of the elements that make a scientific proposition valid. At the same time, many scientific institutions use traditional cultural symbols and practices to generate an extra ounce of confidence or certainty. For instance, when a farmer decides to sow his crop at a particular time, taking various factors such as meteorological conditions, soil, moisture, temperature, etc., he is using his empirical knowledge, which generates replicable, refutable, and verifiable results. No matter who sows crops at that time under the given conditions, other things remaining the same, he or she should get the same result. Likewise, every time the same crop

is sown with similar conditions, it should give similar results and if one wanted to prove this wrong, it should be possible to sow early or late and get different results. The scientific nature of much traditional knowledge formed the basis and philosophy of grassroots innovators' own initiatives for benefit sharing in their traditional knowledge. For example, the Honey Bee[3] philosophy about the scientific nature of local innovations was the basis for the creation of the Honey Bee Network a twelve years ago. At the same time, I and other members of HB network realized that there are cultural codes and institutional mechanisms associated with some of the traditional knowledge systems which ensure that the knowledge, innovations and practices are understood and explored in a given context. This is not to say that all the elements of this context are scientific in nature. Cultural contexts based on shared beliefs may provide a basis for dealing with a whole range of uncertainties and at the same time provide a common understanding of social, biological, cultural continuities.

4. Whenever some members of a community recognize the need for a discontinuity, a major transformation takes place. A new crop is introduced, a new implement is invented, a new variety is developed through selection or sometimes through grafting or budding – an innovation takes place. Some of these innovations over a period of time get embedded in the socio-cultural contexts. While constructing a modern building, setting up a laboratory, installing a new machine, prayers are routinely held in many parts of the world as if the technological insurance is not sufficient, a kind of spiritual assurance is sought even in most of the modern institutions. It is true that causal explanation of modern scientific proposition is sought and provided in the material structures of science, i.e. verifiable principles governed by universal laws and which can be tested and measured. In certain aspects of traditional knowledge systems, non-material beliefs and cultural codes are supposed to explain or guide the consequences of material transactions. For instance, a healer may not reveal his or her knowledge lest it loses its significance on being told. It is possible that this belief seemingly unscientific might have been a means of ensuring that a complex or risky recipe is not pursued or practiced by someone untrained or untutored in the art. It is also possible that it is just a superstition, but in any case it lends coherence to the knowledge system and the surrounding context. It is not my contention to argue that traditional knowledge systems and associated institutional arrangements cannot be dismembered at all. However, in many cases, when we take a plant or some other element of local knowledge systems out of its institutional context, even if a scientific relationship between cause and effect does not get adversely affected, the *institutional* context in which the plant is collected (for example, only when necessary and only in limited quantities) may get affected. Therefore, we may be able to develop a good and effective drug by just dealing with the utilitarian part of the traditional knowledge systems. But we may not necessarily maintain the restraint that may have been kept in place by some of the traditional institutions for conservation of that plant. That is the reason why many groups oppose bio-prospecting by outsiders in order to avoid the risk of over exploitation of the resource itself. What they however, miss is that the problem is not so much with bioprospecting as with the institutional arrangement.

5. The context of local knowledge systems combining traditional skills, culture and artifacts with modern skills, perspectives and tools is not something that has happened only in the recent past. From time immemorial, new crops were introduced from one part of the world to another and cultural and ecological knowledge systems evolved while adapting these crops, animals, trees, tools, etc., into their new contexts. This is an ongoing process. What may set the traditional ways of dealing with local resources and external knowledge and

[3] The lessons learned from Honey Bee Network are given in annex one.

inputs apart, may be a slower trial and error approach, which may not necessarily be unscientific. But, it may not be fully compatible with modern methods of experimentation, validation, and drawing inferences. In some cases, the correspondence is close but in many cases it may not be. However, it is possible that through flexibility, modification and mutual respect and trust, traditional knowledge experts can and may work with the experts from modern scientific institutions to generate more effective solutions for contemporary problems. After all, the "tool view" of science implying excessive reliance on specific methods of solving problems has never helped in taking scientific research very far. Traditional contexts reflect and embed certain rules about how we relate to nature, to each other and to our inner selves, which can help in generating sustainable and compassionate approaches to solving problems. Incentives for creating a sufficiently strong desire for experimentation will become embedded when modern institutions *recognize, respect and reward* the experiments done in the past. The experiments and innovations have led to very significant and identifiable advances in our knowledge about biodiversity and other natural resources and their application in our day-to-day life. One can make an equally strong case for recognizing traditional art and craft forms, music and other kinds of expressions of local creativity of individuals as well as communities based on traditional as well as modern materials. However, in this paper, we are not dealing with other forms of creativity, but only those, which deal with biological materials.

Contested domains of local/traditional knowledge

6. The conceptualization of indigenous knowledge as an autonomous subset of local knowledge evolved through interaction among local communities, individuals, and their environment over a long period of time, is problematic on two accounts: (i) there always are interactions with other knowledge systems through trade and other exchanges from time to time incorporating elements of these outside systems with or without their contextual incorporation, (ii) knowledge is not produced only collectively and is not only inter-generational in nature. I have argued (Gupta, 1980, 1984,1987,1988, 1989, 1992-99) that knowledge is produced locally and sometimes indigenously by individuals without any interface with the community or outsiders. Just as it is also produced otherwise. The contemporary knowledge could build upon traditional knowledge but may also be developed autonomously. Merely because a particular innovation builds upon traditional reserve of knowledge produced within the community or outside does not invalidate or minimize the contribution of individual in the contemporary context. The possibility of such contributions being recognized by modern IPR systems is obvious, notwithstanding the transaction cost involved therein. The problem arises when (a) knowledge is produced over a long period of time by a community in isolation (a1) or in conjunction (a2) with other communities, (b) knowledge is produced by some individual experts in the community sanctioned, authorized, recognized or legitimized by the community formally or informally, (c) knowledge produced in long past and codified in some texts (c1) or retained in oral traditions having continuity through informal institutions or rituals (c2) or recalled by some individuals without any continuing tradition of practice in real life through rituals or otherwise (c3), knowledge produced over a long period of time but practiced and specialized by a few individuals (c4) and knowledge produced in recent past with author known (c5) or unknown (c6) with limited or wide diffusion; (d) knowledge produced in contemporary times by the community in the wake of some crisis or through some common institution and (e) knowledge produced by individuals (e1) or groups (e2) or associations or guilds (e3) based on some external resources introduced by state, markets, NGOs or simply through some individual exchange with outside world (for instance, local knowledge about use of neem developed in some African countries

where it was introduced in mid 70s or similar knowledge produced by local communities to use tyres of automobiles as fish reefs or in the boats or as flower pots, etc).

7. In figure one, I have described three circles, which signify the domains of private or individual knowledge, community knowledge and public domain knowledge. It is possible that individual produces or discovers a specific bit of knowledge which he or she shares with the community. The feedback from the community helps in improving it. Eventually, through a word of mouth or otherwise, several other communities come to know of it and this knowledge becomes well known. In the process it comes in public domain. The interface between individual and community has been captured in the points b, c, c1 to c6 and e1 to e3 above. The important issue here is that the complexity of traditional knowledge system requires a contingency approach to intellectual property protection. We should not assume that every bit of knowledge, innovation and practice can be protected by the same instrument.

8. There could be many other variations in production and reproduction of knowledge by individual or communities. For instance, knowledge produced by some individuals in past (a variety selected by some specific farmers) may be reproduced by a community (which grows this variety and provides/does not provide feedback to the original developer). Likewise, a landrace may be developed through collective effort of a community but may be reproduced by only one or two individuals for whatever reasons. The assignment of intellectual property rights in these varied situations will have to follow different kinds of modalities and institutional arrangements. Just as variations have already taken place in the evolution of Plant Variety Acts through acceptance by UPOV of new concepts such as, “wild discovered plants” having DUS property as the new variety (Gupta, 1999). There is a similar need for modifications and adaptations in the IPR laws to reward different kinds of contributions by individuals and communities in long past or recent times through improvement or innovations in local materials, knowledge systems, or external materials or knowledge systems or a combination of these.

9. Biodiversity cannot be conserved by keeping people poor even if, historically biodiversity survived largely under such conditions (Gupta, 1990). Our studies (Gupta, 1989, 1991, 1997) have shown that many communities, which conserve diversity, have remained poor because of their superior ethical values. This happens when many healers refuse to demand or accept any compensation or payment for their services provided to individuals within and outside their community. Further, when they decide not to pluck more plants than are necessary for immediate use they forego an opportunity of accumulating wealth by processing the herbal diversity in larger quantities and selling or dispensing it to others for consideration. There are others at the same time (including local people as well as large corporations - national as well as international) who have no hesitation in extracting biodiversity without taking care of regenerating the same. One of the challenges is to modify ethical positions that threaten biodiversity and, at the same time, to ensure improvements in livelihood prospects for indigenous peoples, through the implementation of the CBD and relevant IP conventions. These communities will then continue to conserve biodiversity along with their associated ethical and cultural values.

10. The rate of erosion of local knowledge about biodiversity has never been so high as it is in the current generation in areas, which did not go through large-scale annihilation of local tribal communities as happened in many Latin American and African countries through the influx of missionaries. There are several factors which explain this: the changing family structure from extended to nuclear families, consequently weakening links between the grandparent generation (which holds much of this knowledge) and the grand children

generation (the parents' generation is alienated from these knowledge systems already, due to the heavy influence of modernity), lesser esteem for this knowledge in primary school curricula, the transition from oral to written culture, and the inability or unwillingness of many older healers and herbalists to share their knowledge or agree to its transcription, or to transcribe it themselves. This unwillingness arises in many cases because outsiders (such as ethnobiologists) have extracted the local knowledge, commercialized it or published it without any attribution, reciprocity, or benefit sharing and thus have offended local communities. Knowledge erosion is a threat as serious as resource erosion itself. The reasons are obvious. If there is no knowledge about given resources, plants become weeds. It becomes not only difficult to locate what is useful or known, but also the incentives for conserving what is not known is much reduced. In ecological economic terms, the option values decline if the probability of finding something useful in the current generation is lower because of the loss of knowledge about the resources. Conserving biodiversity without conserving associated knowledge systems is thus like building and maintaining a library without a catalog. It is true that users of such a library might in fact develop a catalog over a long period of time but meanwhile the users would suffer. By analogy, biodiversity users, who are without a knowledge base, will not benefit from centuries of experimentation and knowledge accumulation by local communities and indigenous peoples. It is true that formal scientific knowledge of plants and animals is diverse and rich. However, the bases upon which different communities have classified and organized their knowledge as well as practices are similarly complex and dynamic.

11. There are three crucial assumptions underlying this perspective. First, not all knowledge, innovations and practices prevalent in a community are communal in nature. There are individuals who have great expertise in various aspects of local knowledge that is not known at all or known only partly to the local community. Second, not all the knowledge in use by a community is traditional in nature. There are many examples of contemporary innovations by local communities, developed collectively or individually. Third, local knowledge can be conserved perhaps in a more sustainable and dynamic manner if the associated cultural values and ethical institutions contributing to conservation of biodiversity are also conserved and/or strengthened. Sustainable and dynamic conservation would mean conservation in a manner that the knowledge grows through constant experimentation and innovation rather than just being maintained as a fossilized form of historical knowledge, produced at one point in time and carried forward by succeeding generations. The implications are obvious. Incentives for the conservation and sustainable use of biodiversity will have to be sufficiently flexible and diverse so as to provide for the growth and development of the traditional as well as the contemporary knowledge that is held by individuals as well as groups. The same or similar incentive structures or philosophical assumptions cannot provide adequate motivation to conserve what exists and restore what is lacking. Devising appropriate incentives is challenging because many local communities lack access to resources for some basic needs and are impoverished. Factors that have contributed to this linkage between high biodiversity and poverty are discussed by Gupta (1989, 1991a, 1993). SRISTI (1993) has noted the following factors (see also Gupta, 1990, 1992). These factors include:

(a) Biodiversity is high in rain forests, mountains, some arid and semi arid areas, humid areas, primarily due to diversity in soil, climate and other physical and social structures.
(b) Poverty is high because markets are often unable to generate demand for diverse colors, tastes, shapes and qualities of natural products. Products of mass consumption particularly when processed by machines, have low variability

because throughput by machines has to be of uniform quality and maturity level (for instance for processing tomatoes to make ketchup, local varieties will not be suitable because these are not synchronous in maturity, have uneven ripening status and thus, taste, color and flavor can not be standardized). The cost of inventory, transportation, display in shelves of large varieties of, for example, tomatoes is obviously quite high compared to that of only one variety. Consumers who do not demand larger varieties either because they have not been exposed to the same or are unwilling to pay the extra costs also contribute to lower demand of bio-diverse products.

(c) The regions of high diversity also have very poor public infrastructure (in tandem with weak private market forces), because the people have limited surplus to attract public servants and they are less articulate and organized to create political pressure (except through insurgent movements as is becoming evident in different parts of the world).

(d) The low demand for the ecological and technological skills of these communities characterizes them as 'unskilled' labor, fit for being a part of the urban slums, squatters, or other similar work force. Once the knowledge system is devalued, cultural and social decline follows. The tenuous relationship with nature is ruptured. Ecological degradation spurred by various external resource extractors is aided and abetted by many poor as well as not so poor people for whom survival in the short term seems possible only through eco-degrading strategies. Thus when the demand for local biodiverse products (main items for the communities to dispose off) is low, exchange value will drop, consequent purchasing power will decrease, and poverty is bound to follow. Supplies for basic needs also get constrained due to administrative and political apathy towards people in these regions where population density is low and thus the number of votes and other kinds of political pressures are lower.

Incentives for Conservation and value addition

12. To overcome many of these constraints, four kinds of incentives have been proposed (Gupta, 1991, 1995, 1997).

13. The matrix resulting from the interaction of two variables (a) nature of benefit, whether material or non-material and b) target of benefit, whether individual (including group of individuals) or community provides the framework for designing these four incentives for rewarding innovations.

		Forms of Benefit	
		Material	Non-material
Target of Benefit	Individual		
	Collective		

A. INDIVIDUAL – MATERIAL

These rewards are in material form such as royalties from patents, copyrights or trademarks, biodiversity user fees, monetary rewards, fellowships, land assignment or equipment, etc., to individuals. These could arise from those who license technologies of herbal- or animal-based recipes by local individuals or educational or research grants etc.

B. INDIVIDUAL – NON-MATERIAL

Documentation, press coverage, TV and other media, public felicitation, invitation to lecture in schools, centers of learning and research. Invitation to conferences, workshops attaching the name of the innovator to the innovation (an incentive frequently used by the local communities themselves), photographs being placed in village or district councils, access to new skills. For example, SRISTI has been giving the SRISTI *Sanman* (honor) for the last five years to outstanding innovators at grassroots level.

C. COMMUNITY – MATERIAL

These are quite relatively important. The rewards in material form to communities or groups of people help to generate the right signals for mobilizing the collective action which is so important for conservation. The instruments of such rewards could include risk funds, trust funds, priority in the development or allotment of infrastructure such as schools, health care system, access roads etc. free or easy access to data banks, access to external expertise, community awards, community grants/ risk funds, external aid in developing common property assets, marketing intervention for organic produce, etc.

D. COMMUNITY – NON-MATERIAL

These are rather difficult to implement but may have quite an endurable impact particularly when the rewards change the values of the communities positively. Rewards include policy changes to ensure greater control over local natural resources, removal of perverse incentives (that is indications which encourage non-sustainable use of resources) for conservation, favorable policy environments for eco-friendly products, conservation practices, media attention, community awards, capacity building through transfer of technology, building up of negotiation skills, pedagogy changes, inclusion in the curriculum of lessons which raise social esteem for local, eco-friendly practices and innovations, etc.

14. The magnitude, manner and form of incentives or benefits may influence the degree of involvement of the local communities or individual innovators in future projects of biodiversity conservation.

- Incentives could be in cash or kind, conditional (linked to research) or unconditional.

- Community incentives could be of a direct nature or they could be indirect. They could be provided at one point in time or over an extended period of time.

- Incentives could be provided by external agencies or by the local communities themselves. The improved status of the innovators on account of social recognition may or may not be associated with a greater say in decision making at the societal level.

- Incentives may focus on empowerment of local communities so that they may have better negotiating skills and better knowledge for conservation of local resources. Alternatively, the incentives may be targeted directly at conservation. Incentives targeted at the community may lead to action either at the community level or even at the individual level.

15. The concern for local knowledge has been there for a long time. As early as 1969, Verma and Singh raised questions about the continued relevance of indigenous knowledge in the context of animal husbandry. The modern health system for human beings was quite weak. For animals it was even weaker. Local communities in many parts of the tropical developing world rely on local knowledge of animal husbandry even today. This is indicative of the fact that mainstream education and public policy still do not give due attention to the peoples' knowledge system. One implication of this is the downgrading of those knowledge systems in the eyes of young people of the same communities. Once the esteem for local knowledge goes down, there are less incentives for young people to acquire that knowledge and to experiment and rejuvenate the same. This leads to serious discontinuities in the intergenerational flow of knowledge. Once the "local experts," the older generation, are gone and there are no successors, the knowledge held in trust by those individuals for future generations is lost forever. Young people are not acquiring the skills of local experts because of a lack of incentives. However, some of these skills might lead to new career options; for instance, the skills of restoring the health of degraded lands, water bodies or forests are becoming increasingly valuable as international conventions and their implementation gain momentum.

16. Access to biodiversity *per se* should be distinguished from access to genetic resources, despite the difficulty to draw the line between both categories. This is because genetic access has never been regulated and genetic resources had been considered the common heritage available to everybody before the CBD came into being. Secondly, the monetary gains arising out of genetic resource use are significantly higher than those arising from physical access.

17. The tension on the issue of applying intellectual property right laws to local knowledge, innovations and practices also stems from the conceptualization of the local knowledge as essentially cultural and community construction. Posey and Dutfield (1996) suggest a concept of Traditional Resource Right (TRR) which recognizes, "the inextricable link between cultural and biological diversity and sees no contradiction between the human rights of indigenous and local communities, including the right to development and environmental conservation" (1996:95). It is obvious that intellectual property right systems never evolved to deal with various other rights that are included in the bundle of TRR. The contributions specifically dealing with intellectual capital are covered by the intellectual property rights. So far as the rights of the communities are concerned which are collective and deal with knowledge produced in past, these may have to be dealt with new instruments. The Community Intellectual Property Rights (CIPR) were articulated by Crucible Group (1994) to enable local communities to assert their "rights to seed" such that no outside company or institution could use their knowledge or resources without their permission – a proposition which is in line with Article 8J and some aspects of FAO's Farmers Right Concept. The Crucible Group also suggested a need for national legislation, an international database for tracing germplasm possibly through CGIAR system and appointing a 'public defender' to mediate or act as ombudsman (1994). The Third World Network (Nijar, 1994) suggested a model Community Intellectual Right aimed at preventing the privatization and usurpation of the rights and knowledge of the communities to be called as, "Community Intellectual Rights"

(CIR). It was further proposed that local community leaders who would act as trustee of the community and the farmers rights would be held in perpetuity because knowledge and practice evolved over long period of time as the community evolved. A 'registry of invention' was also suggested with which the community biodiversity register (Kothari, Ashish, Pathak, N, Anuradha, R.V., and Taneja, B., 1998, Gadgil, Ghate and Rao, 1999) could be linked. This knowledge would lie in public domain. Subsequently, Ghate, Gadgil, Rao (1999) have modified the concept to include only public domain knowledge in the community registers and mentioning the name of local experts (but not their knowledge or innovations) in the register. This was in response to the suggestion by Gupta (1998) that by recording the knowledge of experts in the public domain register, the intellectual property rights of the experts will be not enforceable. So far as CIRs are concerned, the purpose of preventing others from patenting will be achieved by publishing the local knowledge and making such publications available to the patent offices.

18. Large number of scientists (in fact majority of them) have treated local knowledge in such a manner. At the same time, the fact that 74 percent of the plant derived human medicines are used for the same purpose for which local communities discovered their use (Fransworth, 1981) proves that scientists have not hesitated in drawing upon the useful, valid, and abstractable local knowledge when it was appropriate. Obviously the evidence only shows how much great the potential is of using local knowledge even out of its strict socio-cultural context. To what extent the users of traditional and local knowledge have contributed to the growth of the very knowledge system which generated tremendous commercial returns, is a valid issue and we will revert to it later.

19. WIPO – UNESCO (1985), Model Provisions for National Laws on the Protection of Expressions of Folklore Against Illicit Exploitation and Other Prejudicial Actions, was supposed to help national governments in enacting laws to provide protection to folk knowledge and also folk varieties. However, the only reason one can speculate, may have been responsible for widespread neglect of these provisions even by the developing countries is the lack of willingness of most developing country governments to check the domestic exploitation of folk culture, art and varieties. In the post-CBD phase, many countries are trying to correct this distortion.

20. Coombs (1998:107) agrees with the proposal of Gupta (1997) that "every patent office in a Western country should insist that the patent applicant declare that the knowledge and resources used in a patent have been obtained lawfully and rightfully". The lawful acquisition will imply that the prior informed consent and approval and involvement of local communities and creative individuals have been ensured, assuming that the donor country has laws requiring such consent and approval. The rightful acquisition involves ethical inquiries into the corporation's compensation practices. She feels that Western governments who are party to the major human rights Covenants should ensure that "private parties subject to their jurisdiction do not violate the human rights of others, such a premise is congruent with commitments to rights of subsistence, to enjoy the fruits of one's labor, privacy, environmental sustainability, and cultural integrity (although not all of these rights are necessarily implicated in every such taking)". She feels that the lawful and rightful disclosure requirements may be awkward, if not politically impossible, to enforce particularly if it was to be imposed as an absolute barrier to the patent protection. She suggests that in the shorter term this requirement need not include any minimum criteria. For instance, she suggests, "a corporate applicant might simply disclose that the source country impose no legal consent requirements, and that it has made no arrangements for compensation. To the extent that this information is made part of the public record and published by member State governments, it

would provide leverage for indigenous peoples, NGOs, concerned consumers, interested citizens, and the media to put political pressure on patent holders to improve their research and development practices congruent with developing human rights norms. Over time, some corporations might recognize the publicity values and goodwill to be accrued by greater transparency and might set increasingly higher standards to develop market distinctions" (1998:108).

21. Dutfield (2000)[4] in an extensive review of various initiatives including peoples biodiversity registers, community intellectual rights, SRISTI's local innovation databases, concludes that the relevance of international IPR regime to the CBD is beyond doubt (2000:125). The questions, which he feels are unresolved, include:

> (1) It is not certain that increased availability of IPR protection will automatically lead to greater levels of innovation in society. Innovation and creativity flourish in many parts of the world without any (western) IPR laws.[5] On the other hand, allegations are increasingly made that too much IPR protection of basic research is stifling innovation (see Heller and Eisenberg 1998); (2) The role of intellectual property rights in the erosion of agro-biodiversity has been the subject of some polemical debates, yet we still do not know how far biodiversity is affected by intellectual property rights for seeds, plant varieties and/or agrochemicals. But it can be argued that we cannot afford to wait for conclusive proof one way or another before making decisions on the design of environmentally sound intellectual property rights. It is vital to consider whether and how the precautionary principle may be applied in the IPR context to minimize the risks; (3) Some evidence suggests that most technologies supportive of biodiversity conservation are in the public domain. However, with respect to those, which are not, it is unclear whether intellectual property rights hinder or encourage their transfer to developing countries; (4) It is widely accepted that the application of traditional knowledge and technologies can add value to genetic resources. While patents are clearly unsuitable mechanisms to protect the rights of traditional knowledge holders, the use of other intellectual property rights may in some circumstances be feasible.

22. So far as the issue of erosion of agro-biodiversity as a consequence of use of IPR is concerned, the evidence in the post-green revolution era in most developing countries is quite unequivocal. The erosion has been caused primarily by the public sector induced high yielding varieties, none of which have been protected by either the patents or plant variety acts since the same have not been applicable. In the Western societies, this supposition may have been valid. It is also true that large number of private seed companies and traders have used advanced lines as well as new varieties developed by public sector R&D labs without any reciprocity of compensation or payment of royalty. The result has been that public sector R&D institutions have had to depend primarily on government for resources and thus their creativity and autonomy have been adversely affected. The application of different kinds of intellectual property rights would have made these institutions recover returns on their investment in R&D and in due course have more dynamic and vibrant organizational culture. Obviously, so far as the right of communities and local farmer breeders is concerned, it would require specific institutional innovations to reduce transaction costs and at the same time enhance incentives for contributing their know-how and resources to the public and private

[4] Graham Dutfield, 2000, Intellectual Property Rights, Trade and Biodiversity: Seeds and Plant Varieties, IUCN and London: Earthscan Publications Ltd.

[5] The knowledge, innovations and practices of indigenous peoples and local communities, for example, are rarely if ever protected by intellectual property rights.

R&D institutions where applicable. In many cases, farmer bred varieties can generate incentives for the individual farmer breeders provided they can protect their intellectual property and use it for commercializing their innovation or disseminating it without any cost to others[6]. The response to other questions requires adaptation of the current IPR regime which CBD and WIPO are currently exploring.

23. Many of these suggestions are in line with the earlier suggestion by Gupta (1995,1998,1999) in terms of (a) requirement of patent offices to ask every applicant to certify that application for patent includes claims based on 'lawful and rightful' access to local /traditional knowledge and resources, and (b) non patent prior art available in data bases like Honey Bee or Biodiversity Registers or other forms of national registers is taken into account.

II. IMPLICATIONS FOR CHANGE IN THE IPR POLICY AND INSTRUMENTS

24. The interface between natural, social, ethical and intellectual capital is given in figure two. As is apparent, the intellectual property is a subset of intellectual capital, which may draw upon social, natural and ethical capital. The social capital represents the positive trust and mutual respect that exists in the communities contributing to conditions for conservation and sustainable utilization of natural capital. The natural resources constitute the natural capital. The ethical capital constitutes that part of social capital where the concern for nature, social relations of production and the future generation as well as other non-human sentient beings is articulated. Societies can sometimes innovate the technologies and institutions, which may not necessarily be illuminated by ecological ethics. And therefore, the need to distinguish that. The intellectual capital is a broad based knowledge system including the cultural, technological and ecological knowledge of local communities and individuals. Only some part of this intellectual capital is amenable to be considered as intellectual property. It is this part which will form the substance of changes in the policy and TRIPS hereafter. It is useful to mention here that property rights in knowledge are generally defined by one's ability to exclude others from commercial utilization of the protected knowledge for a given period of time. The property right does not necessarily give a right to use that knowledge. In the classical IP sense, the right to use will be determined by other laws obtaining in a country such as food and drug administration or pollution control or mining, etc. It may be useful to mention here that every society has had traditions of intellectual property rights protection in different ways. It is a not new construction as is often assumed. Many people may not know that King Shahjahan who built Taj Mahal in memory of his deceased wife was very keen to protect the design of the monument. He got the thumb of right hand of all the workers cut so that they could never build another Taj Mahal. Likewise, there is an old tradition of textile popularly known as 'patan silk' sarees in Patan region of north Gujarat. There are only two families left maintaining this tradition involving use of vegetative dyes. They do not share

[6] Whether the farmer innovators disseminate their innovation through commercial channels or non-commercial channels should be their decision. We have no right to impose our value judgment on them. There is no reason why when an author can copyright her books, a musician can gain from the sale of copyrighted cassettes, a company can benefit from the commercialization of patented technology, only farmer innovators should be expected to disseminate their knowledge and resources without any claims on the benefits that flow to users of their knowledge or innovations. The knowledge rich economically poor innovators cannot be expected to subsidize the society which on its own does not contribute anything either for conservation of agro-biodiversity or for ensuring that conservators of biodiversity do not suffer economic disadvantage vis-à-vis the cultivators of high yielding varieties.

their trade secrets with the daughters who are supposed to go to another family after marriage. Only daughters-in-law are inducted into the tradition. A community in northern Bengal had a tradition of sending an offering of a famous variety of mangoes to the king. They punctured the seed of these mangoes with a very thin needle to ensure that nobody could grow these mangoes without their permission. There are healers who maintain that their knowledge of herbal medicine might lose its effectiveness if shared with anyone. They maintain it as a kind of trade secret. All these examples show that the concept of drawing boundary around the knowledge and resource including biological resource is not a new one. However, there are obvious problems when we use the current IPR instruments for dealing with the creativity, knowledge and innovations produced by small, dispersed individuals or communities dependent upon natural resources for their survival. It is to this problem that we turn to next.

A. Genetic Resources and Associated Knowledge Conserved by a Community

25. Tribal and/or farmer communities conserve various kinds of genetic resources. Many of these resources provide very useful inputs into seed, biotechnology and drug and dyes industry. There are five issues which need to be tackled while revising TRIPS: (i) the land races need to be protected through a registration system at national and international level so that there are incentives for local communities to disclose various properties that they have identified in these plant varieties or local herbs; (ii) the community knowledge should be subject to protection by the communities represented by the village councils or their federation considered for the purposes of the property rights as body corporates; (iii) in cases where the land races and/or the local plants have been documented and incorporated in the national or international gene banks, the responsibility of the biodiversity users to share part of the benefits must be acknowledged so that incentives for conservation are available to the communities. It should be recognized that *ex-situ* gene banks do contribute to the cause of conservation but these cannot be substitute for *in-situ* conservation. The biodiversity in the cultivated or uncultivated patches or lakes is under constant selection pressure through socio-cultural interactions. In the absence of any incentives, the rate of erosion of genetic diversity has been quite high. Indian Plant Variety and Farmers Rights Bill has an interesting provision for gene fund to share benefits with the conservators of agro biodiversity. It also has a provision for registration of extant varieties by the farmers or NGOs on their behalf; (iv) the new uses of existing diversity should be subject to registration and availability of 'use' patents. Many countries do not permit 'new use' patents. They should reconsider their position if they want to empower local communities to draw benefits from this provision; (v) the duration of protection for land races so far as the right to share benefits from commercial use is concerned, one could consider a longer duration than twenty years.

26. The fillip side of the coin is that the public sector breeding which has relied on access to the collection in gene bank may get affected if every user had to take prior permission from the community where the germplasm was originally collected from. In many cases, this may not be even feasible. The passport data sheets in gene banks do not include large number of research institutions, any information about the village or the local community from where the seeds were collected. In addition, the communities themselves have been having lot of exchanges of genetic material for their own use. Unless all exchanges for public purpose as well as local self-use are excluded from the requirement of any need to take permission from the originating community, the crucible of creativity and conservation may get damaged.

B. Agro Biodiversity Improvements by Individuals

27. There are several cases where individual farmers had made selection in the released varieties and/or wild populations. This process is no different from the breeding done by the farmer breeders. For instance, in each of the following example, a discerning eye of a farmer has developed something new.

28. Thakershibhai Savalia, a 70 year-old farmer from Pankhan village in Saurashtra, dry part of Gujarat had a very keen eye for variation in the field. During 1987, there was a severe drought, said to be the worst in the last 100 years. Most of the crops of groundnut had withered. However, there were two plants which he found were not only green but also seemed healthy and different from the rest. He marked those two plants and started observing their growth every day. After maturity he used the seed of these plants to multiply next year and within five years through recurrent selection, he developed a variety which he initially named as Morla. The pod of this variety had a peacock's beak kind of curvature on one hand. Hence was called Morla, i.e. like peacock. Apart from having very good oil content, it had two unique characteristics, a) the lack of ridges on the pod and b) the strong peg. Further the variety also had better than average disease and pest resistance. Through word of mouth, the variety spread to more than 40 villages in the last few years. It was also tolerant to drought more than other varieties. The taste was extremely good. While the variety was rejected in the All India Coordinated Research trials conducted by ICAR (Indian Council of Agricultural Research), the farmers in the region continue to grow it. Thakershibhai is very keen to get varietal protection for his selection. The stronger peg and lesser ridges help in digging out the groundnuts after maturity easily. Harvesting involves heavy cost because some of the pods are left in the soil requiring second or third digging. Much soil does not attach to the pod due to near absence of ridges and the weight is thus lighter. The stronger peg further helps in digging process.

Case Two: A Pigeon pea Variety with Pink Flowers

29. Dhudabhai Punjabhai Patel of Gadha village, Sabarkantha district, Gujarat, selected an odd plant in a field sown with BDN-2 variety. He found in his field a few odd plants, which were neither affected by pest or disease nor seem to have the flowers or pod bearing pattern similar to other plants. These plants had pink flowers. Most varieties of pigeon pea have yellow flowers which attract the pests. In addition, the new type had higher number of pods, five to six seeds per pod and most of the pod bearing was on the upper part of the plant making it easier for women to harvest. The green pods were very good to cook and the yield was satisfactory (25 to 30 quintals per hectare) even when low level of fertilizer was provided. It was also resistant to wilt and was early maturing. The farmer had named the variety as Gadha Dudhabhai Punjabhai – 1 (GDP-1). The cooking time for the dried pulse was lesser. The grain was bolder and it was found highly suitable for certain specific recipes.

30. A selection in 1994 led to development of this farmer bred variety which has been registered with National Bureau of Plant Genetic Resources. Mansukhbhai Ramjibhai Murani has also made a selection of pigeon pea mutant from BDN-2 variety. This has bigger leaves, four to five seeds per pod, equal pod bearing on each branch, requires less water, seems resistant to the sucking pests, the flowers are red from outside and yellow from inside and yields well.

31. Laljibhai Ramjibhai, brother of Mansukhbhai, made another selection of sesamum variety, which had higher yield and larger number of grains per pod. In 1994, he had sprayed an insecticide which was time barred and apparently caused mutation in the field. He observed erratic pod bearing behavior in the crop. He selected some plants, which had up to

eight rows of grains as against two to four in the normal varieties. There were pods with two halves/rows, as well as four and eight halves/rows of grains. Variety was found to be resistant to pests and diseases besides yielding 50 per cent higher than Gujarat Ses-1, the official release varieties. One of the short-coming of the new variety developed by Laljibhai is that it has pods with two rows as well as up to eight rows in the same plant. The number of pods is much higher. He has named it as Adarsh-8 (Agricultural Development and Research Superhouse Seed Farm-8).

32. Sundaram is one of the most enterprising young breeders and experimenter that Hone Bee Network has found in recent times. He has developed a very innovative agro-forestry system in arid parts of Rajasthan having rainfall less than 20 inches per year. In addition, he has developed larger number of varieties of vegetables as well as pulses and spices through selection in farmers' fields. He has made unique selections which even the formal research system does not have. One of his first outstanding selection was a variety of chili which had three times more color value than the best variety in the country so far, 50 per cent higher yield than the popular improved variety and two times more market value than the other varieties.

33. Among his notable selections, there are two varieties of garlic, which have early maturity than the rest and one which has better yield than all the improved varieties released by formal research system. In onion, he had six varieties which recorded higher productivity than the improved released varieties. In cluster bean, he had four varieties which were free from powdery and two from leaf curl disease. In sesamum, he had a selection which was resistant to drought and free from red rot disease. In green gram, fenu greek, chikpea, cumin, he found many disease and pest resistant varieties. In coriander, he found 13 varieties which were resistant to both blight and wilt. In several varieties, he observed synchronous maturity. In pearl millet, he found 22 varieties which were free from black smut and 19 which were free from downey mildew. For one farmer to have made so much of improvement single handedly is an unique contribution. Support from SRISTI and a small grant from using diversity project supported by IDRC and administered by SRISTI have made small contribution to his research. He also got a national award from Indian Council of Agricultural Research. He has maintained complete details of each farmer from whose field he has made these selections so that part of the benefit should go to the original conservator of germplasm, should some of these become commercially successful. At this point he has no external support to continue his research though SRISTI and National Innovation Foundation are trying to provide some support to him.

34. In West Bengal, a farmer Dholaram Mondal had grown two types of broad bean variety along side in his field. Three years ago, he noticed a plant with odd pods. He grew these seeds separately and found that new variety had higher number of pods, larger number of grains per pod and thicker skin. He thought that the new variety was developed by natural crossing between the two of the local broad bean varieties.

35. Jita Bhai of Wetla village, Wadali taluka, Sabarkantha district in Gujarat presented his selection of a new bean variety in a recent meeting of Shodh Sankal held at Modasa in North Gujarat. He had procured fodder during drought of 1987 and found mature beans mixed with the dry fodder. He grew these separately and found that few of the plants were very vigorous in growth and yield. He kept seeds of those plants separately eventually a new variety was developed. IT has become quite popular in the local region.

36. Each of these examples shows the potential for innovation by individuals in terms of developing plant varieties. The issues involved are:

i. The farmer breeders may not be able to provide data required by the Plant Variety Authority. It should be necessary for the authority to fund generation of this data whether in farmers' fields or on research stations. Pending that stage, the claims of the farmer breeders may be accepted provisionally.

ii. The requirement of uniformity and stability may not be necessary for composite varieties designed to deal with fluctuating environments. This requirement may need modification in specific cases.

iii. Any applicant seeking plant variety protection must declare that s/he has not used any variety developed by a farmer/community without their authorization.

iv. Applicants seeking protection for varieties that have incorporated characteristics from public domain agro biodiversity must be willing to contribute a specific part of the sales or licensing fees towards national gene fund and in case of international companies, International Gene Fund proposed under FAO.

v. The farmers right to exchange, store, sell or distribute protected seed material without brand name should be allowed since more than sixty to seventy per cent of seed materials is obtained through such exchanges or storage. There is a need for this modification to be made in this regard.

C. Modification in the Implementation of TRIPS

i. The Asian countries must recognize that 'first to invent' system as used in US is far more favorable to small, scattered and disadvantaged innovators than the 'first to file' system. It is necessary to review this provision and ensure that we provide opportunities to small innovators.

ii. Every patent applicant must declare that claimed invention is based on material/knowledge obtained lawfully and rightfully ensuring due compensation to the providers. The 'lawful' implies compliance with the laws of the country from where the knowledge/resource is accessed. The 'rightful' implies moral duty to have prior informed consent of the provider ensuring equitable benefit sharing, even if the law of the country did not require it.

iii. The community or individual knowledge, which is not reasonably accessible, i.e., which has not been coded and/or catalogued in publicly accessible databases, should not be considered prior art. Such knowledge should also be considered a patentable subject so long as it meets the novelty criteria.

iv. Grace period. The traditional knowledge shared in good faith by the local healers and herbalists after 1995 should be considered patentable subject by providing a special grace period for the purpose. Generally, only one-year grace is provided in US in case the innovation has been published or disseminated.

v. The public domain traditional knowledge is put in a digital library by every country in the region so that issuance of patent to third parties on knowledge

already in public domain is avoided. India has already started TKDL (Traditional Knowledge Digital Library) project to avoid issuance of frivolous patents. The US Patent Office has in fact written to Dr. R. A. Mashelkar, Secretary, DSIR (Department of Scientific and Industrial Research), Government of India, requesting for access to such a database so that USPTO can avoid issuing patents on materials like turmeric.

vi. Just as collective management systems have been developed for protecting IP in music, songs, performances, etc., institutional innovation is required for collective management of individual product and process patent applications on behalf of small innovators, tribals, local communities so that their transaction costs for seeking such protection can be reduced.

vii. International registry is required as suggested by SRISTI (Society for Research and Initiatives for Sustainable Technologies and Institutions) either as INSTAR described earlier or some other format with the provision of short-term protection. The emphasis should be on disclosure rather than examination of novelty or non-obviousness. If an innovation were not worthwhile, nobody would license it. A lesson can be learnt in this regard from the practice in Swiss National Patent System.

viii. A national innovation patent system should be developed on the pattern of Australian proposal. In this small innovations are given eight to ten years protection, with maximum five claims, a small fees of less than ten dollars and protection granted within three months. A product patent in this framework may stimulate linkage between innovation, investment and enterprise.

ix. Local language databases on traditional knowledge and patents need to be developed so that local communities can also track any usurpation of their knowledge. In addition, such databases will promote horizontal learning among people. Honey Bee multimedia multi language databases provides one kind of template for such a mechanism. Likewise, one can think of decentralized IT kiosks for searching as well as filing applications.

x. National Innovation Foundation as done in India needs to be set up in every country to provide a platform to the small innovators and traditional knowledge experts. Such a Foundation can help in building up national register of innovations and inventions, file applications and provide other micro venture capital support for converting innovations into enterprises.

37. Geographical indications, trade mark protection, sacred marks protection and many other changes will be necessary to ensure that larger civil society in Asian region sees an opportunity for better livelihood in the emerging IP regime. At this moment, the popular notion is that IP is not for small people. The experience of GIAN (Gujarat Grassroots Innovation Augmentation Network) in India and SRISTI which have filed patents on behalf of grassroots innovators and licensed technologies to generate new wealth in the hands of innovators shows a promise, still be to be realized in most countries in the region.

[Annex follows]

ANNEX I

The Honey Bee Network evolved twelve years ago in response to a personal crisis. While I had grown in my career, received awards[7], recognition and remuneration for writing about knowledge of innovators and other knowledge experts at grassroots, very little of this gain had actually been shared with the providers of knowledge in concrete terms. Much of my work was in English language till that time. I had tried to share the findings of my research with people; it had not been institutionalized in local languages. Likewise, I had tried to acknowledge the knowledge providers; they still had remained broadly speaking, anonymous. It was obvious that my conduct was not very different from the conduct of other exploiters in society. They exploited in land, labor or capital markets. I exploited the poor in knowledge market. It is at this stage a realization dawned that something had to be done to overcome this ethical dilemma. The Honey Bee as a metaphor came to rescue one day. Honey Bee does what we, intellectuals, do not do. It pollinates the flowers and takes away the nectar of flowers without impoverishing them. The challenge was, to define the terms of discourse with the people in which they will not complain when we document their knowledge, they will have the opportunity to learn from each other through local language translations, they will not be anonymous and they will get a share in any wealth that we may accumulate through value addition or otherwise. Honey Bee Network has brought lots of volunteers together who share this philosophy partly or completely and who want to link up with an immense source of energy and inspiration available with the grassroots innovators[8].

The asymmetry in relative weight which contemporary society places on this resource of grassroots innovations and informal knowledge vis-à-vis formal knowledge and technologies in devising developmental options almost always is skewed in favor of formal science, technology and other linked knowledge systems.

I will present some evidence of this bias and also share the lessons of Honey Bee Network.

a) poverty because of generosity, and consequent knowledge erosion.

Unethical exploitation of the local knowledge continuing for centuries leading to capital accumulation in the formal sector without any reciprocity, can not continue for long. Since many of the grassroots innovators conserve nature particularly biodiversity despite remaining poor themselves, share their knowledge with outsiders generously and do not assert their rights, an anomaly has emerged. The youth in the same societies do not want to emulate in the footsteps of their elders. They do not want to be penalized because of superior ethics of their elders who shared their knowledge and remained poor. If some thing was given, it was accepted but a payment for services was not demanded. There are several consequences. One, the erosion of knowledge is taking place at a very rapid rate, the building block of

[7] The Honey Bee Network has also received many awards and recognition. Apart from Pew Conservation Scholar award to Prof Gupta in 1993, the Far Eastern Economic Review chose SRISTI and Honey bee network for Asian Innovation Gold Award in 2000, 9 Oct 26, 2000).

[8] The Honey Bee Network was founded with the help of Prof. Vijay Sherry Chand, Jyoti Capoor, and many other friends. Later Kirit Patel joined and made an immense contribution. Kapil Shah, Rakesh Basant, Amrut Bhai Agrawat, Chiman Parmar, Praveen, Mahesh Parmar, Hema Patel, Shailesh Shukla, T N Prakash, P Vivekanandan,, Sudhirender Sharma, and many others have contributed to the growth of Honey Bee Network.

healing and herbal tradition are getting lost. Many plants are becoming weeds. Just as one cannot locate a book in a library if the catalogue is lost or misplaced, likewise if the knowledge about the plants, their place in nature and uses is lost, one cannot accord them the value they may deserve. There are several other forces accentuating the knowledge erosion such as loosening links between grand parent and grand children generation. But the crucial issue is the loss of respect for this rich source of traditional knowledge. It is taking place precisely because younger generation, exposed as it is to media, and everyday news of upward mobility of some ordinary people, does not perhaps want to remain poor because of their superior ethics.

b. Articulation of social versus ethical capital.

The question then arises, how do we harness this ethical capital for social transformation? I differentiate ethical capital from social capital because trust and goodwill exists among members of mafia also. We cannot obviously interpret the trust among various segments and networks in society as an unmitigated good. Trust is very valuable when it is also mediated by desirable social purpose and helps in reducing transaction costs of disadvantaged. If it increases the transaction costs of the poor because the well off forces in a social situation have tremendous trust among themselves (Such that nothing would disturb their privileges and resource wasting life styles, no matter what), how could such trust be considered social capital. In such a case the trust among the social networks that do not necessarily contribute to the creation of common good cannot be called as social capital. The debate on the subject has included this divergence but the resolution has eluded so far. My contention is that trust accompanied with reciprocities in a social network bound by pursuit of a common good in the larger social interest does constitute social capital. However, when this good is pursued through ethical means and for non-sectarian interests, one could argue that it constitutes ethical capital. There are many other sources of ethical capital such as the norms of ecological ethics, social and professional ethics, and eventually the individual ethics which permeates all kinds of organizations whether formal or informal and political or public or private or civil society organizations.

Honey Bee Network is an attempt to articulate ethical capital of our society, guided as it is, by the spirit of innovation, sharing and networking for generating eco-compatible technological and institutional solutions for natural resource management problems.

c. Ecological ethics.

There are several ways in which ecological ethics has been articulated in the Honey Bee Network constituting ethical capital. Our first encounter with this phenomenon took place seven years ago when we were making a small film on grassroots innovations and outstanding traditional knowledge with the help of Indian Space Research Organization. The photographer and the director of the film, Jayantibhai had accompanied us to a village in north Gujarat to meet a herbal healer namely, Karimbhai. He was extremely poor economically but was very rich in his knowledge and ethical values. When Jayantibhai plucked a particular plant on the roadside growing abundantly and asked Karim Bhai to hold it in his hand facing the camera, Karimbhai suddenly became upset. He asked as to why was this plant plucked when there was no immediate need for using it. He could have held this standing plant in his hand. We realized importance of the notion that even a road side plant (which was not endangered or scarce) should not have been plucked unless there was a need for it. This was the value unknown to us till that time. Likewise, we have had many examples of ethical capital manifesting in our network. In drought prone regions, a large

number of villages have institutions to collect greens from every household to feed the birds. Despite the fact that birds attack the crops and cause loss, I have never come across farmers killing the birds by poisonous baits or shooting. On the contrary they would rather sit on a raised platform under the scorching sun and scare the birds to save their crops. Variety of birds scaring devices have been developed by the farmers but the taboo on killing birds is widely prevalent. Occasionally, one does come across a single dead bird hanging on a pole to scare the other birds but killing the birds in general does not happen, though there are other tribal communities which do kill the birds and eat them.

There are fishing communities which have common property institutions to ensure that nobody would use a gillnet of mesh size smaller than four inches. This is done to ensure that small sized fishes do not get caught. All these examples indicate that institutional innovations help in articulating ethical values and accumulating ethical capital in societies trying to live in harmony with nature. It is obvious that this capital base is narrow as evident by the extraordinary serious situation with regard to environmental externalities and many irreversible damages caused by human actions. So long as there remains a hope through continuing living wisdom, one is challenged to explore opportunities for expanding such capital base.

d. Technological innovations to overcome inertia and improve efficiency at grassroots

Honey Bee Network has documented more than ten thousand innovations either of contemporary origin or based on outstanding traditional knowledge primarily from India but also from all parts of the world. Many of these innovations are extremely simple and can improve efficiency of farm workers, women, small farmers, artisans and others a great deal. However, the diffusions of these innovations across language and regional boundaries has been extremely slow despite the fact that Honey Bee newsletter has been coming out in six languages for a decade or more. There are many barriers to the evolution and diffusion of these innovations. (i) Lot of people has learnt to adapt and adjust to a constraint rather than transcend it. In case of women based technological problems, this constraint has been a consequence of cultural institutions, which prevented them from acquiring black smithy or carpentry tools. Women are very creative in coping with the constraints and sometimes transcending them but relatively speaking, except in health, childcare and animal care, the innovations by the men have outnumbered the ones by women in our limited sample. We have to look deeper to understand the dynamics of such engendering of particular kind of creative capacities. (ii) There is a contempt in society for someone who breaks out of the mold. Despite upsurge of entrepreneurial spirit in different parts of the country in recent times, by and large a social deviant who is trying to do something new is often a butt of ridicule. Only those innovators who can withstand sometimes the indifference and occasionally the hostility of their peers can succeed in developing lasting solutions. (iii) The lack of social networking among the innovators has prevented them from faster collaborative learning or from provision of moral support in the times of crisis or failure (iv) lack of access to formal scientific institutions accompanied by lack of general responsiveness on the part of scientists has also prevented grassroots innovators in optimizing their solutions and in some cases even pursuing their innovations to logical conclusion. (v) The formal scientific institutions at national and international level have failed to build upon grassroots innovations thereby weakening the momentum for even articulating the innovations. (vi) The educational systems at different level ranging from primary to higher education have ignored this subject and have almost never included profiles of grassroots innovators in the curriculum or pedagogy. The result is that young people of ten grow with assumption that technological

solutions to their problems would come from outside and generally from west and rather than evolving from within. The defeatist mentality and pervasive cynicism add to the problem. (vii) The lack of micro venture capital prevents transition of small innovations into enterprises. The incentives therefore, remain limited for those who innovate. While micro finance facilities are now available around the world, micro venture finance for small innovations has almost been totally absent. This institutional gap shows the lack of appreciation by the global as well as national public policy institutions of the potential that grassroots innovations have for generating employment and overcoming poverty. (ix) The lack of intellectual property protection through specific instruments and legal frameworks designed for helping small innovators may also inhibit the articulation or sharing of innovations.

Despite all these reasons, innovations have indeed been scouted, documented and disseminated by Honey Bee Network and SRISTI (www.sristi.org) over last twelve years. Innovations such as a modified pulley to draw water, a gum scrapper to enable women to gum from thorny bushes or tress, or large number of small machinery, herbal pesticides, veterinary medicines, new plant varieties, agronomic practices or other products have been developed by the unsung heroes of our society without any outside help (www.sristi.org).

e. Linking innovation, investment and enterprise: Micro venture promotion fund

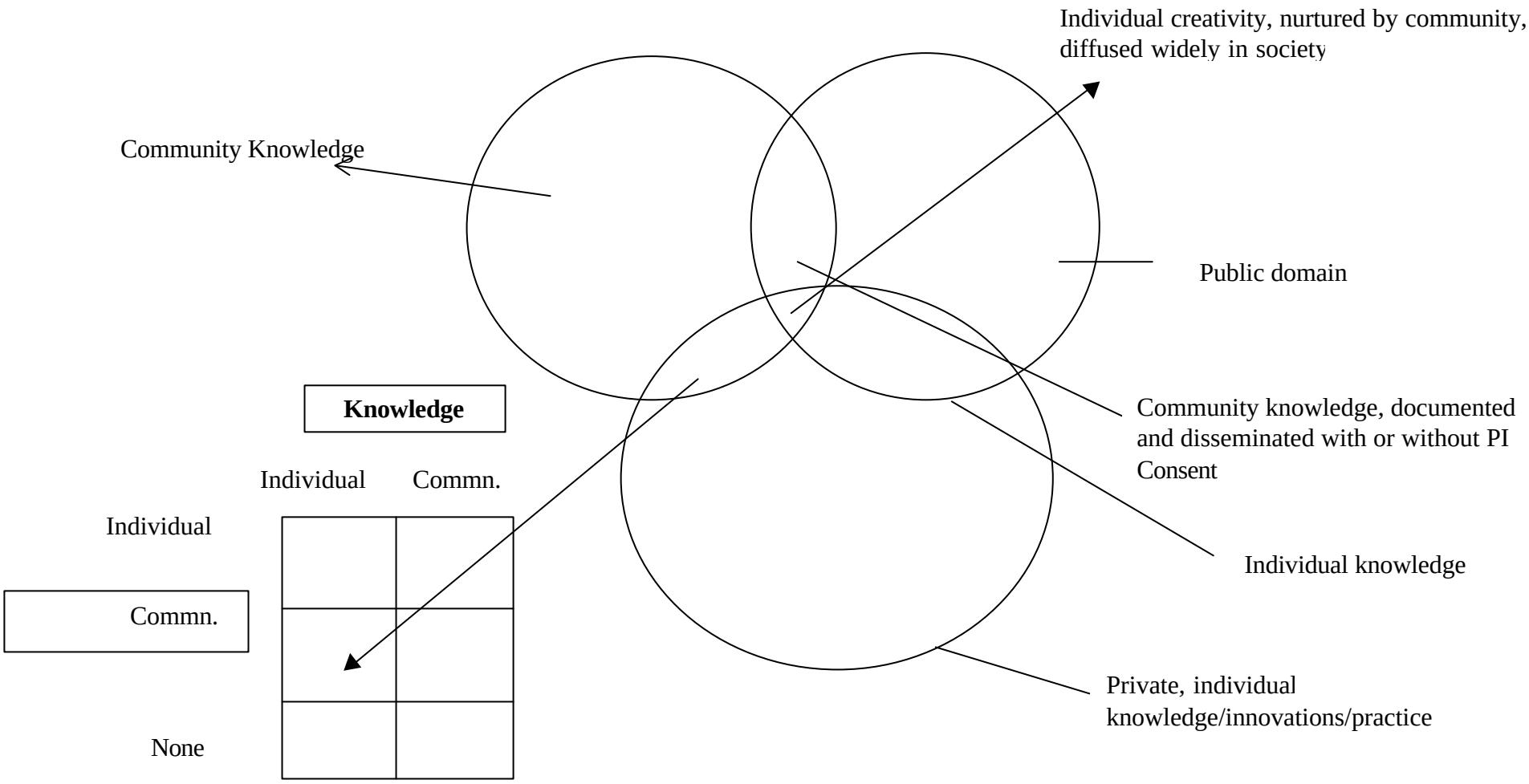
As a follow up of first International Conference on Creativity and Innovations at Grassroots held in January 1997 at IIMA, a regional fund was created in collaboration with Gujarat state government to convert innovations from Honey Bee database into enterprises. GIAN (Gujarat Grassroots Innovation Augmentation Network, www.gian.org) was set up in 1997 to link innovations, investment and enterprise. The idea is that innovators sometime may not like to become entrepreneurs themselves. And even if they want to become entrepreneurs they may not have access to risk capital, technical know-how or design input for making their innovations into a product, which can be commercialized or diffused through non-commercial channels. GIAN has filed patents on behalf of grassroots innovators, incubated several innovations into products, and licensed some of the innovations to entrepreneurs on district wide basis with the license fee going to the innovator (even when patents for the licensed innovation have only been filed and not granted). Why are there not many GIANs within the country or around the world? The possible reason could be that the development planners and international aid and investment agencies have failed to see the potential of knowledge intensive approach to development. It is useful to summarize some of the lessons of incubation process. Many times, the innovators do not prove to be good entrepreneurs. They seldom realize that by not making any two machines or products alike, they generate a doubt in the minds of the customers that some people get more features than others. Likewise, there are innovators who do not think they can learn very much from other experts particularly from formal sector. It is a different matter that many times, the experts in the formal sector also fail to see the merit of the local innovations. The lack of incubators, labs and other science and technology institutions dedicated to adding value to local innovations make the tasks of these innovators even more difficult. The lack of venture promotion capital and R&D funds constrain the pace and scale of technology up-gradation of the innovation. The lack of mentors affects the moral of budding entrepreneurs who often need a shoulder to cry on. The lack of certification facilities at concessional rates for the products based on local innovations delays and sometimes inhibits the diffusion of innovation. Finally, the lack of media support prevents the horizontal networking among the innovators and generation of the demand for their products.

While Honey Bee Network is experimenting with the use of information technology through multi media multi language databases accessible through touch screen kiosks, we are conscious of the limitation information technology has at the current level of infrastructure in making major impact on society.

f. National and International Register for Innovations and a Clearinghouse for Horizontal Networking and Innovation Market

The transaction costs for innovators around the world to learn from each other and thereby improve the livelihood options, are very high. The popular media and other channels of communication do not pay attention to this source of creativity. Unless we have a clearinghouse in multiple languages and easily accessible in remote areas through Internet as well as radio, it will be very difficult to create horizontal networks of grassroots innovators. A step in this direction was taken in India recently. National Innovation Foundation (NIF, WWW.nifindia.org) was set up in March 2000 with a corpus of US 5 million dollar by Indian Department of Science and Technology at Ahmedabad essentially to scale up the Honey Bee model all over the country. NIF will develop a national register of inventions and innovations, link innovation, investment and enterprise, connect excellence in formal and informal sciences, set up incubators and help in changing the mindset of the society to ensure respect, recognition and reward for the grassroots innovators. SRISTI has moved a proposal for Global Innovation Foundation primarily to create multi language multi level clearing houses for networking innovators. However, one of the problems that remain is the protection of intellectual property rights. It will be impossible for traditional knowledge experts and contemporary innovators to pursue standard patent protection where the average cost is about 15-20,000 dollars per international patent. The cost of validating the patent in each country every year is extra. There is a provision in the TRIPS as a part of WTO that an international negotiation be initiated to develop a global registry of wines. Obviously, it was done to persuade France to the sign the GATT treaty. There is no obvious reason as to why international registry should be restricted only to wines. It should be considered possible to develop track two system of intellectual property protection. Under this, any inventor from any part of the world should be able to register one's innovation or traditional knowledge and get at least 8 to 10 years protection with 3 to 5 claims at a very nominal cost to be paid in national currency at the national IP office. This registry will provide incentive to the millions of knowledge rich, economically poor people to disclose their innovations and at the same time explore the possibility that investor or entrepreneur from one part of the world will join hands with them to set up an enterprise in their own country or in another country. Thus, the grassroots creativity can harness global capital and entrepreneurial support for decentralized development. This is the only way I can imagine forces of globalization can be mobilized in support of autonomous development at grassroots level.

CONTESTED DOMAINS OF LOCAL/TRADITIONAL E. KNOWLEDGE



Source: Gupta 2001

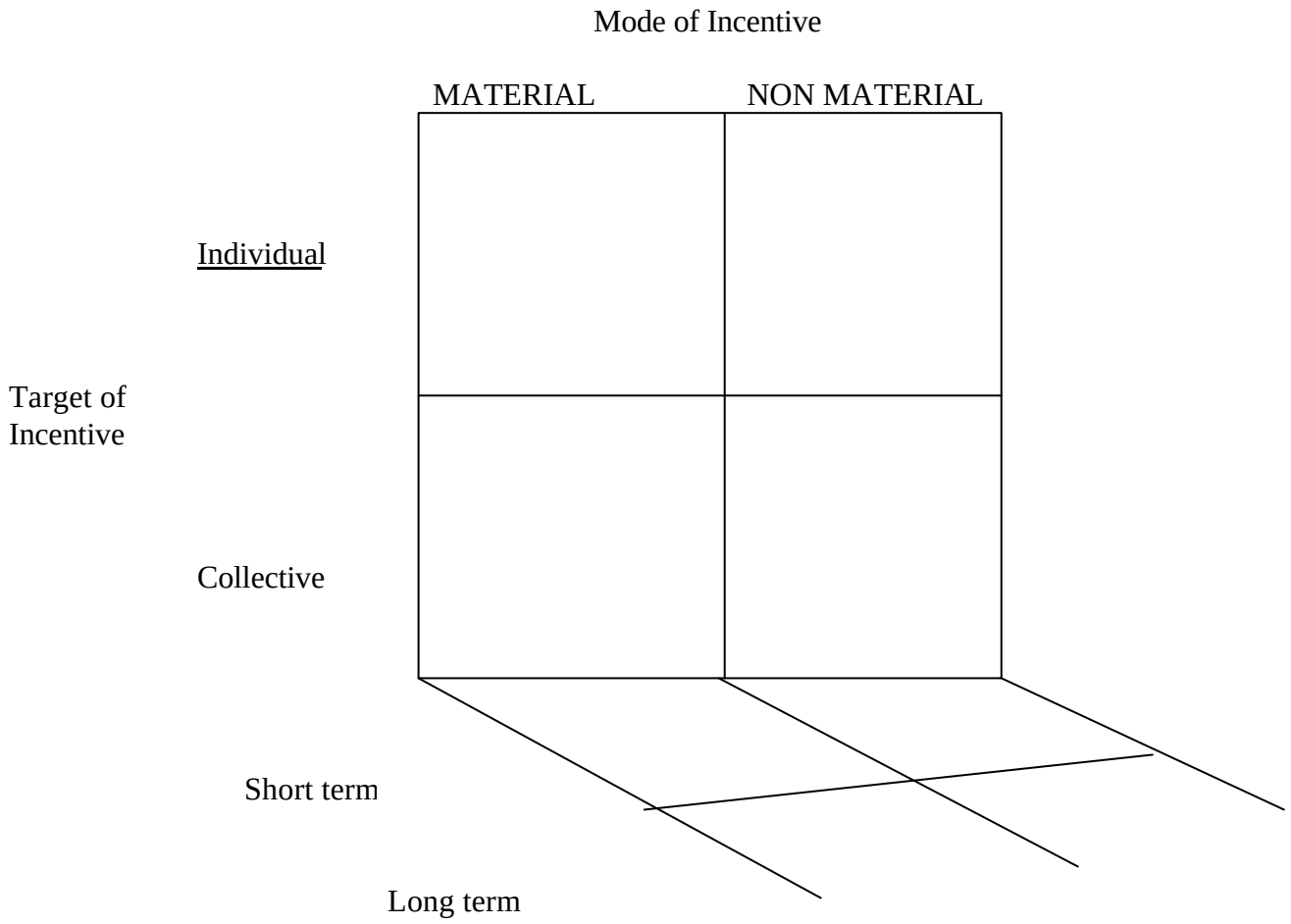
Ethical Relationships, Reciprocities and Responsibilities

Access Relationship

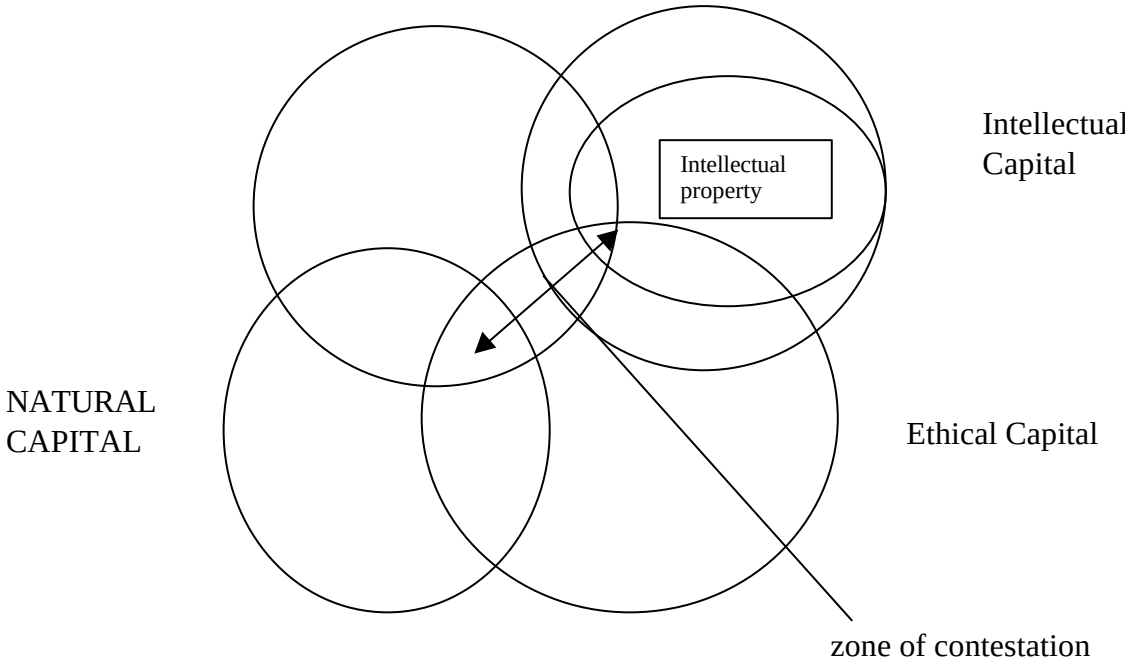
	EXTRACTION	Non Extraction
Commercial	Corporate	Ethno-botany
Non-commercial	R & D	Ecological

Contingent policy framework: who determines the rules of the game, who enforces these rules?

PORTFOLIO OF INCENTIVES

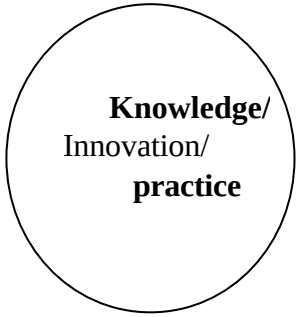


SOCIAL CAPITAL



Source: (Gupta 2001 own compilation)

Resources: Right Regines and Knowledge Domains



	Private	**Common**	**Public/State owned**	OPEN ACCESS
PRIVATE		Private knowledge based on community resources		
Community		Community resources and knowledge	Community knowledge in state resources (Biosp)	
PUBLIC				

[End of Annex and of document]