Indigenous knowledge:

Ways of knowing, feeling and doing[1]

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Knowledge systems evolve through human interactions among themselves as well as with nature within and without. They characterize the complexity involved in these interactions. Sometimes, through a specific word for each relationship, a culture creates asymmetry in defining the balance of reciprocity and respect. For instance, unlike western culture where the terms 'uncle' and 'aunt' comprise a wide variety of relationships, many eastern cultures have specific word for different kinds of 'uncles' and 'aunts'. Multiplex relationships emerge not just among people but also with nature. I teach students who come from reasonably well-endowed backgrounds for studying management in one of the most elite institutions of the country. And yet, when I ask them as to whether they would pluck the leaves of *tulsi* (basil) after sunset for taking its decoction for overcoming cold or fever, a majority would say no. There are no overt sanctions against such behaviour. The sacredness specifies spaces in human consciousness in which utilitarian logic does not dominate. The knowledge produced through sacred and profane aspects of our understanding does not always synergise. The secular mind suggests equanimity whereas the sacredness advises sanctity of certain actions even at personal costs or sacrifice. The trade offs, so caused presuppose certain preferences incompatible with the attitude of equanimity. In this paper, I submit that knowledge systems produced through indigenous thinking or exploration can accommodate external inputs whether material, philosophical or linguistic. The indigenous knowledge thus is not insulated from external influences or inputs. It is indigenous because the meanings as well as the categories of sense making are generated internally within a cultural community. The local context of the knowledge systems may sometime go beyond the boundary of local resources. A migrant labourer in a city may retain a typical way of dealing with socio economic relationships using indigenous metaphors, medicines and meanings. But, should the need arise, the same labourer also assimilates urban or external meanings as well as artifacts. We define indigenous knowledge in pedagogic sense. It is a way of knowing which may be indigenous to a community or a culture. Even in that, certain elements from other cultures may get assimilated over time. Two hundred years ago, India did not grow tea bushes. Today, Indians are one of the biggest consumers of tea. Lot of indigenous knowledge has evolved around the tea plants, tea making and using the waste tea leaves or the used leaves left over after making tea. Should therefore the duration for which communities use particular ways of solving problems or using resources characterize a knowledge system as indigenous?

Sometimes, recently introduced plants or materials are used in ways very typical of a community. And yet, this knowledge is considered indigenous despite being contemporary. Indigenous knowledge need not essentially be traditional in nature. Contemporary knowledge serving indigenous ends, or using indigenous materials or

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processed through indigenous rules or heuristics can also be part of indigenous knowledge systems provided it is interpreted through local cultural meanings. A string of plastic beads (modern material) coloured and shaped in traditional designs, put in synthetic strings (modern material) can be used for traditional fashion, ceremonies or rituals. Knowledge of how many beads be there in a string may have evolved over a long period of time. Does use of contemporary material prevent us from accessing traditional meanings underneath?

Once the elements of local or indigenous knowledge systems are identified, characterized and symbolized, the production of new knowledge can be understood and also encouraged. Not all aspects of indigenous knowledge are worth preserving or sustaining. The tragic and most dishonourable practices of killing female fetus or newborn child through local/indigenous practices, pursued often by women, must be annihilated through modern education as well as regulatory institutions. Just because a knowledge is indigenously produced does not make it necessarily virtuous or even preferred mode of expression. There is, however, a greater probability of local knowledge being more in tune with local environment and cultural context. But, we should not ignore that local communities can be very creative in conserving resources as well as in destroying them. Using dynamite to kill fishes (young and old) is a modern method but very non-sustainable.

Brush (1993) suggests that the study of folk knowledge became the study of indigenous knowledge systems (Brokensnha, et al, 1980) where the term 'indigenous' was used interchangeably with folk, local or non-formal knowledge. The cognitive anthropologists also used the word 'ethno' to characterize the knowledge of local communities such as ethno botany or ethno zoology. Much of the literature on indigenous knowledge paradoxically, fails to recognise indigenous efforts to reflect on local and global knowledge systems. Therefore, the studies by Verma and Singh and Khanna (1967) are ignored by most national as well as international scholars on the subject. Dr.Y.P.Singh who guided the two Masters theses to study indigenous veterinary and animal health knowledge of local communities during 1965-67 was a pioneer of these studies. By acknowledging the indigenous efforts, the western scholars and westernized third world scholars would have to accept the intellectual leadership of third world scholars such as Mobugunje (….) or Majumdar (1925).

The discourse on indigenous knowledge is also a discourse on politics of attribution and acknowledgement of learning from those who are supposedly good subjects of study but are seldom considered lead producers of knowledge. There are several other tensions in this study of indigenous knowledge, which need to be recognised while dealing with the subject.

These tensions are between (a) modern concepts of taxonomy vis-à-vis indigenous scheme of classification of things, thoughts and properties, (b) validation of knowledge by formal scientific methods and local approaches, (c) scientific institutional context of knowledge vis-à-vis cultural and community context of knowledge, (d) relevance of single or specialized explanation of things versus multiple and diversified explanations including sometimes purely ritualistic aspect of which scientific validity is difficult to claim or prove, (e) individual contributions well recognised in formal scientific system vis-à-vis less well established conventions for recognising such contributions, (f) casualty as a preferred attribute of functionality

vis-à-vis functionality as more important even if for wrong reasons or causes, (g) similar methods considered scientific when pursued by scientists such as random selection of natural mutations for developing varieties vis-à-vis such methods being attributed as trial and error in case of farmers' varieties, (h) ethical basis of extracting local knowledge by formal sector and by informal sector for different purposes and (i) the respect for intellectual property rights of formal sector vis-à-vis informal sector for contemporary as well as traditionally derived knowledge by individuals and communities.

These tensions unfold through various ways. Margaret Mead (1973) anticipated the dilemma as well as the tensions in pursuing research with people very succinctly. She observed:

> *Those who are studied, whether they be members of other races, other ethnic groups, the poor, the oppressed, the imprisoned, feel that to use their lives to obtain a kind of objectivity is to treat them as objects, not as subjects (65, 292). And all over the world the previously dispossessed and ignored are actively demanding an identity, which the rest of mankind must respect. For many anthropologists, the recognition of these new demands has coincided with new situations which they welcomed, such as the greater ability of previously nonliterate peoples to participate in research, to write about their own cultures (20), to become ethnologists themselves, and to engage in a mutual interchange, instead of an exchange in which one side was at least partially ignorant of the motivations of the other (234).*

Not only the tensions on account of the moral as well as professional responsibilities towards the objective research were anticipated but also the requirement of *prior informed consent* (PIC) became apparent. And yet, the tragedy is that the PIC has not been instituionalised as an obligatory method of doing research or pursuing any other interaction with the local communities within most third world countries. Ironically, those scholars who are most eloquent in highlighting, and rightly so, the injustice and exploitation by the corporate users of indigenous knowledge, themselves seldom take the PIC while working with local communities. This problem exists at individual, professional, regional, national and international level. Unlike the medical science, where PIC has been instituionalised – a surgeon would not perform an operation without PIC, in social sciences it has not become customary to have PIC. The paradox is that institution like World Bank seek to recognise the role of indigenous knowledge by having marginal activities in the area whereas almost all the major projects of World Bank violate the concept of PIC, do not respect the local knowledge and seldom incorporate local knowledge experts as evaluators or consultants in designing of the projects. No community leader to the best of our knowledge has been asked to audit the ethical and professional practices followed by the World Bank staff or their partners in designing and implementing projects affecting the lives of local communities. The discourse on development continues to suffer from such paradoxes. While the role of indigenous knowledge in solving local problems is recognised, the macro level problems are supposed to be solved by global pool of knowledge (The World Bank, 2004). The indigenous/local knowledge seems to lose its significance in solving global problems just because it evolves from a local context. Such a constraint would never be imposed on a scientific finding emerging from a local laboratory. Are we implying therefore that scientific principles

governing universalisation of knowledge apply only to knowledge produced in formal sector. The knowledge produced in informal sector must necessarily remain applicable in local context. How do we then explain world wide interest of multi national corporations as well as national research bodies in exploiting local herbal/ plant leads for drugs, pharmaceuticals or even for developing dyes, plant varieties, etc. Obviously, the international institutions seek to legitimize their continued neglect of the ethical and professional rights of local communities and their knowledge systems by accommodating the same in a marginal manner. The appeals for paying attention to local knowledge to conserve local eco systems are now commonplace because despite all the advances in the formal ecological sciences and other institutional developments, the location specific recipe for conservation seems to elude the global managers. The well-intentioned appeals (Mauro and Hardison, 2000, Gadgil, et al., 2000, Juma – Ivu – Warren –Richards --) are often situated by the planners in the context of palliatives that need to be provided to keep the professionals engaged without making significant difference to the policy.

When Indian government decided to set up NIF (National Innovation Foundation) in March 2000, it had recognised the need to provide through Department of Science and Technology, an institutional window of opportunity to the grassroots innovations and traditional knowledge. More than 50000 examples of such kind documented from over 400 districts illustrate just the tip of the iceberg that this knowledge system represents. This is perhaps the only example where a civil society initiative in the form of Honey Bee Network has been institutionalised at the national level. The Chairperson of the Commonwealth Science Council had in fact recommended this model to various Science and Technology Ministers of Commonwealth countries as a model for blending informal and formal science. In addition to the documentation, the protection of intellectual property rights, business development, micro venture fund investment, value addition and research and development and dissemination are also the functions pursued by the Foundation. A formal agreement exists between Council of Scientific and Industrial Research (CSIR) and NIF for adding value to selected technologies. Similar agreement is being discussed between Indian Council of Medical Research.

Taxonomy of knowledge:

In Sankhya Yog, any pursuit of knowledge could be influenced by *guna* (qualities), *karma* (action), *prakar* (other types or categories), *swabhav* (attributes) and *vritti* (tendencies). The epistemology that local communities may evolve in different regions at different times may involve one or the other aspect of these parameters. One of the old debates in anthropology has been that number of words for a given phenomena might explain the degree to which, the variation in the phenomena can be understood by a community. Therefore, while US Department of Agriculture could classify soils in seven types, anywhere in the world, the local communities do not feel constrained by the wisdom of universalists and develop their own schemas. Studies by Du….. have shown the complexity of soil classification in south India. In Bangladesh, I observed a similar multi layer classification of the soils based on the aspect, texture, structure, water holding capacity, organic matter and the nature of the land use. The controversy about number of words Eskimos have about snow or fishermen and women have about waves may not have been resolved. But it is clear that any resource on which people depend, the logic of survival dictates that people

classified the variance in that resource in discreet categories so as to develop viable coping strategies. It is true for a mechanic, farmer, pastoralists or even a modern scientist. The difference is in the generalisability of these categories, ability to explain underlying logic and correspondence between the categories among different communities. Modern scientific systems will not generally accommodate location specific meanings or boundaries of the concept. Though in ecology, there is a greater flexibility in this regard. Whereas the local knowledge systems often combine specific and general aspect of knowledge with great ease. Therefore, some of the attributes that a cattle rearer takes into account while purchasing a bullock or cow are universally agreed to be good indicators of the performance. There could also be certain superstitious beliefs, which might guide purchase decisions in the community. The blend of rational and irrational provides even in our own lives, a way of being sane and humane. In modern science, conjectures are allowed as unproved propositions but rationality is supposed to be the underlying logic. Studies of sociology of science have often demonstrated that scientists do pass judgments about various uncertain problems using their intuition or political beliefs. And at that moment, their behaviour is no different from a supposititious cattle purchaser. In fact, situation may be worse. The consequence of wrong purchase or not making a right purchase are borne by only an individual. In the case of scientific advice, the consequences are borne by larger society. The case of climate change debate in northern America illustrates the point.

The classification can not only be on the basis of the manner of rendering (oral, anecdotal, tacit, folkloric, etc.) but also on the basis of source (scriptural or empirical), method (observation, deduction, analogical, phenomenological, etc.), consequences (effects on human, non-human, animate or inert materials, immediate or long term, proximate or widespread, certain or uncertain, etc.), motivations (curiosity, exploration, dominance, charitable, etc.), social processes (individual, collective, sustained or episodic,), materials (endogenous, exogenous, blend of two), cultural (taboos, beliefs, motifs associated with the logic of pursuing investigation or explaining it or sanctioning it), etc. There may be many more ways in which knowledge is classified. Newhouse (2004) explains both the agency function of indigenous scholarship (‘an ability to shape the world through one’s thought, action and feelings’) and the sense making function (integrating physical, mental, emotional and spiritual along with dialogical and not necessarily dialectic basis of arriving at complex understanding). The way of knowing can itself be classified in various ways independent sometimes of what is known. Though complete disjunction between the two may not be possible. The problem arises when we romanticize a particular way of knowing in preference to and in exclusion of other. Scientists select off types of plants and develop varieties when these plants are found to possess desirable characteristics in heritable manner. Many farmer breeders also have done the same thing. The ways of knowing can thus be similar across formal and informal boundaries of knowledge institutions. Paul Richards has demonstrated many examples.

Hellier (1999) described use of indigenous knowledge for assessing biodiversity classification systems. The authors found that assessment of vegetation change based on the indigenous knowledge was strikingly different from the one developed from the analysis of land use maps. Part of the differences could be because of the scale. The species which were useful tended to be better known and data about them were

more reliable. However, species considered unimportant were not monitored carefully. It was not surprising that the authors found that communities dependent upon a given resources tended to observe it more carefully and noticed the changes in them more precisely. Semali (1999) looked at the folk knowledge in the so-called modern curriculum in African schools. She lamented the loss of knowledge because of its neglect in these schools.

The contradictions within a community about the parameters of local knowledge deserve to be recognized. Just as the purpose of knowing may vary, the power to interpret and use the given knowledge may also vary, particularly when the consequences of what is known are collectively either evaluated or experienced.

There are many studies, which show that local communities may not have been able to find answers to large number of agriculture, health, nutrition or other related questions. Lindsay (in Godoy, et al., 2005) found that 61 per cent of the boys and 57 of the girls in Tsine community were anemic and had extremely poor measure of growth in height, weight and muscularity. Godoy, et al., also referred to another study in Venezuela (Diez-Ewald, 1997) which showed that 54 per cent children under 18 were anemic. Berlin and Markell (1997) observed that 93 per cent of Aguruna in Amazon region were infected with hookworm, 92 per cent with whipworm and 62 per cent with roundworm. There are numerous other studies of similar kind cited in the paper making the same point. Local knowledge, despite all the ingenuinity and experimental pursuits, failed to enable local communities in generating solutions to these persistent problems. The integration into market did not always lead to decline in traditional ecological knowledge, howsoever inadequate it might be to begin with. In fact, in some cases, (Guest 2002) the integration into market was reported to enhance the acquisition of local ecological knowledge. Therefore, the linkage with formal system of schooling, markets or other institutions need not be seen as disempowering or disabling in the context of strengthening of the local knowledge systems. Much depends upon the term at which the discourse takes place. The available studies do not point out unambiguously how well various efforts have been to enrich local knowledge through blend with modern science.

In Honey Bee Network we have many examples where the blending has been done by the grassroots innovators or traditional knowledge holders on their own. Prajapati in Rajkot is a potter and had made an earthen refrigerator to keep vegetables cool and preserve the milk for two days without using any electricity or other forms of energy. He used to make earthen plates for cooking traditional bread. Changes in the lifestyle were reducing the demand. He had heard about Teflon coated vessels. It occurred to him that he could coat Teflon of food quality on the cooking earthen plates. In the third Traditional Food Festival organized by SRISTI, NIF and GIAN at IIMA in December 2005, this plate sold like hot cakes. No matter, what the critics of blending formal and informal science may say, the grassroots innovators do not seek legitimacy of their efforts from our academic compulsions or constraints.

Ellen (2004) decries the attempt to divide the word into just two ways of thinking, whether scientific or the indigenous knowledge based societies. Despite the fact that in the 17th and 18th century, European naturalists and medical practitioners did not have any hesitation in assimilating knowledge from the colonized or contacted people, in the 20th century, the learning became difficult and in recent past almost impossible

except in a small group which celebrated such knowledge. The modern scheme of knowledge was not derived independent of the pre existing folk knowledge systems. Linnaeus drew on the traditional folk knowledge of the Lapps. Rumphius, of Dutch East India Company was a naturalist and explained various species in striking detail. While he believed, like Newton, in the so-called 'ancient' wisdom, astrology, spontaneous generation of living matter, etc., he also developed what was considered at that time, quite a scientific understanding of nature. Ellen brings out with striking evidence that Europeans had no qualms in understanding, codifying an assimilating local knowledge into scientific knowledge systems. There was, of course, no credit given to those who brought local knowledge to the attention of science. Drawing upon Pfaffenberger (1992) and Turnbull (2000) observes, "under high 'high modernism', science becomes the superior *a priori* standard by which all truths, including those derived from traditional teachings are measured, validated and valued" (2004: 418). The distinction between traditional and modern, or formal and informal may be thin. But, such distinctions cannot always be dismissed. The reason is very simple. In the informal knowledge system, the method of knowing, feeling and doing follows a very different logic than in the formal system. A doctor, for instance, can perform an excellent surgery and if patient dies after a while, he may still think that operation was successful. In the informal system, a healer does not even claim that he heals. He provides medicine and then believes often that some supernatural force or spirit is contributing to the healing process. In any case, he may not remain unaffected by the outcome of what he does. A doctor can go to a party after a case described above. This is not just true of a doctor but any professional or scholar could claim insularity from the outcome.

The science is not, Ellen quotes Turnbull (2000:6,14), "consistently rational, objective and produced according to the cannon of scientific methods", but is rather 'messy, contingent, unplanned and arational', a polycentric practice and conditional, 'assemblage of local knowledge. Paul Richards (1993) has referred to the constant improvisation by the farmers as a kind of performance in which cues may emanate from other farmers, nature, history or just spontaneous playfulness. What is counter intuitive for a scientist trained in one discipline may not be so for another person. This happens in physics and can also happen in folk knowledge systems. A cycle running in water and on road, as designed by Saidullah, honoured by NIF in January 2005 may appear counter intuitive to those who have never seen a pedal boat or a cycle in water. Ellen refers to Chaplin (2004) who gives an example of how adding hot water may make ice freeze faster may appear counter intuitive to most of us including most physicists (the so-called Mpemba effect), but ask an ice cream maker or someone who refills livestock trough in freezing condition, this might be quite obvious. One may not agree with Ellen that meaning is more secure in science than other kinds of knowledge. The indigenous or local institutions can fix the meanings for a very long period of time with very low entropy. Metaphors, in fact, help in minimizing the entropy. The problem arises when one tends to ascribe local knowledge a consistency which is impossible among so many variations of locals. In other words, the expectation that universalistic features of institutional science would somehow become apparent in indigenous or local knowledge is only partly true. There are indeed technologies whether for pest control, water lifting or solving other problems, which have a universalistic empirical reality. The applicability may obviously be local. Any modern car or watch can be repaired by using indigenous knowledge in certain situations. If the radiator of an automobile leaks on a highway

and the nearest workshop is tens of miles away, a simple soap as a sealant could work in plugging the leakage. This knowledge has not evolved either in the manufacturing plant of the car or in the automobile engineering research institutes. Is this knowledge traditional? Obviously not. Because neither the automobile nor the soap may have been around for more than few decades or centuries in a give region. Then what is indigenous or local about this knowledge? In my view, it is the tendency to generate solutions for a given problem intuitively using local or even exogenous materials without relying upon formal institutional knowledge, qualifies it to be a local or indigenous knowledge. Even in the formal science, there are local ways in which scientists deal with the errors in equipments or in certain other processes. When equipment does not work, the first thing an Indian might do is to give it a small pat or jerk. We believe that some loose connection might get in its place by shaking the device, a computer, a TV, or for that matter a transistor. And it works sometimes. Do companies like it? May be yes. They get so many less complaints. Local knowledge, therefore, might mask the inefficiency of the institutional knowledge systems. Different patients get different degrees of infection. And yet, the course of antibiotic does not distinguish the treatment plan on the basis of infection. In local knowledge systems, the treatment may often be tailored to the specific conditions of the patient. In modern medicine, this concept is now emerging as a modern discovery of the concept of 'personal medicine'. The learning between formal and informal can indeed be a two way street. The problem is that today the traffic from formal to informal is much heavier and often uncontrolled.

The Convention on Biological Diversity (CBD) and desertification both have specific provisions on need for protecting traditional knowledge.

Moddie (2004) recommends the notion of participatory epistemology for understanding indigenous knowledge. When empirical evidence for acupuncture emerges, he quotes Skolimowski (1994:176) to suggest that there might be something to the flow of energy on which acupuncture is actually based. If there are multiple ways of knowing the truth, could truth itself sometimes dance on its axis, i.e., there could be different ways of describing truth. Some of these ways become conjecture when one cannot make others see those ways. Local knowledge may have more abundant supply of such ways. But even the modern science has multiple interpretations co-existing without casting doubt on the ethics or efficiency of such contradictory positions to survive within the category of science. He argues that a proper evaluation of African and other indigenous knowledge systems must address the duality of ontological and epistemological dimensions of knowledge. The way one becomes, one tends to know. Huntington (2005) agrees that the problem arising out of incoherence in studies on traditional knowledge arises more on account of assumed universality of meanings than on account of legitimately different ways of understanding and explaining. Those who believe that traditional knowledge must necessarily be collective and passed on from generation to generation through cultural means may have as much to blame as those who believe that it emerges essentially through interaction with nature or through experimentation. None of these conditions need be true. Traditional knowledge of a blacksmith used while giving a temper to the sickle or the knife may have evolved through careful observation, experimentation, intuition, understanding of materials and development of some rules. This way may not be different from a scientific method except that the blacksmith may not be able to parameterize various steps in sharpening the knife or sickle. The

scientific knowledge is not opposite of traditional or local knowledge in all respects. It could never be. The distinction has been drawn or demolished by academics whose interest lies in academic boundaries and institutional structures. When one interacts with people and learns from them and shares with them one's own learning, the only issue is the ability to decipher each other's metaphor to understand the same thing from similar observations. When farmers develop a method of dusting road side dust or ash on the cumin plants likely to develop disease because of the dew, some characterize this practice as local knowledge (and thus less scientific) and others figure out that dust absorbs the moisture and prevents it to remain for longer period on the leaf, creating conditions for the disease to occur. The farmer may not have described the process because he did not know, how little, we scientists really know about the logic of their functional practices.

The local knowledge could be as reductionist as any institutional scientific approach and the holism could similarly be attempted in both the systems though with different degrees of accuracy or tenability of assumptions. A holistic worldview in a community context might include assumptions about the way animals think or behave which may be totally divorced from the way local scientists or technologists may think. And yet, outcome may be much better in some of the traditional knowledge systems than in the modern ones from the point of view of conservation.

In the forthcoming meeting of the Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore (April 24, 28, 2006). As discussed, the framework for protecting the traditional knowledge, prevent unauthorized intellectual property rights, enhance transparency, certainty and mutual respect between traditional communities and academic, commercial, governmental and educational organisations. Several suggestions have been made about the way future negotiations on the protection of traditional knowledge of indigenous community and others be pursued, such as (a) a binding international instrument which, would oblige contracting parties to apply the prescribed standards in their national law as an obligation law under international law. Alternatively, the existing legal instruments could be reinterpreted to enhance the desired protection of TK against misappropriation. (b) A non-binding normative international instrument: this could encourage different countries to operationalise certain standards in their national laws and in other administrative and non-legal processes and policies. It could also be a soft loan instrument such as, UNESCO Declarations on bioethics and human rights; the FAO International Undertaking on plant genetic resources and decisions of Conference of Parties of the CBD. (c) Strengthened coordination through guidelines or model laws. This can provide a framework for cooperation, coordination, convergence and mutual compatibility of national laws for the protection of TK and associated rights. (d) Coordination of national legislative developments. Idea is to ensure that countries which are already engaged in development of new laws and policies for the purpose share their experience with others so that 'best practices' become available to promote consistency and complimentarity different national laws. The Intergovernmental Committee defined the objective of protecting traditional knowledge to recognition of the holistic nature of traditional knowledge, promote respect for the dignity, cultural integrity and intellectual and spiritual values of the TK holders; meet the actual needs of the TK holders by being guided by the aspirations and expectations articulated by TK holders and reward the contributions made by them; promote conservation and preservation of

TK by providing incentives to the custodian of the knowledge systems, empower the TK holders in a manner that conventional intellectual property rights regimes support the protection of TK against misappropriation, and also effectively empower TK holders to assert their rights and authority over their knowledge; respect customary practices, norms, laws and understanding of traditional knowledge holders. It is also proposed that the protection of traditional knowledge should prevent its misappropriation and unfair commercial and non-commercial use, the access and benefit sharing should be regulated, encourage reward and protect tradition based creativity and innovation and enhance the internal sharing of traditional knowledge within the local community subject to their consent by incorporating such knowledge and initiatives in educational systems; the exchange of knowledge should be based on prior informed consent and should promote equitable benefit sharing in both monetary and non-monetary forms; the trade of authentic products should be encouraged so that traditional knowledge holders could pursue their economic development choices; the patent applicants should be required to disclose the source, country of origin of the resources and the evidence of compliance with Prior Informed Consent (PIC) and benefit sharing, adherence to ethical code of conduct and respect for cultural identity and expressions.

Overwalle (2005) suggests that among the positive protection route and the so-called defensive approach route, the latter might have no merit since it combines two different but important objectives i.e., the dissemination and prevention of unauthorized acquisition of IP rights. Different tools can be combined in a manner that IP and non-IP related tools can be combined. Author rightly critiques the notion that indigenous communities might not be concerned with the commercial exploitation of their knowledge.

Chambers, Corbett, Keller and Wood (2004) have suggested mapping of indigenous knowledge using geographical information system (GIS) tools so that local communities can link time and space in a specific sectoral context.

Polski (2005) looks at the available access and benefit-sharing framework and critiques the role of markets and conventional contractual arrangements for benefit sharing.

Thaman (2003) suggests incorporation of indigenous perspective in higher education as an imperative because (a) various vibrant indigenous cultures have their own views of the world which deserved recognition and acknowledgement, (b) the academic institutions should recognize the ownership and control of indigenous knowledge by indigenous people rather than academy and (c) the academic centers (in the context of specific studies) needed indigenous cultural knowledge to validate and legitimize their work. The post-modernist theorists do not accept superiority or any particular knowledge system in terms of its ability to represent reality. Different systems of knowledge might provide different perspectives, each one of which might be valid and worthwhile on its own. He very strongly argues that transformation academic research programmes actually require the transformation of the personal politics of those involved in it. Because many times one's acquired worldview represents one's alienation from one's cultural roots, nature in pursuit of autonomy, which may distance one from the environment as well as other people. Examination of one's

own way of thinking might require reinterpreting the context in which knowledge systems evolve.

Hocking (2002) looks at the often-cited connection between indigenous knowledge and environmental protection. There is no doubt, author argues that 40,000 years of resource use by original inhabitants in Australia did not bring about as much change in the landscape, biodiversity and the knowledge systems as the 200 years of European rule. The author believes that given the scarcity of resources in some places the relationship between knowledge and conservation might give way and yet the probability of this connection being an important driver for conservation is quite high.

Briggs (2005) looks at the possibility of using indigenous knowledge for the development among the world's rural poor. The excessive emphasis on the empirical and practical aspects of the knowledge may have diluted the connection of indigenous knowledge with its context. The often-fragmentary uneven and mediated nature of indigenous knowledge leading to high differentiation within a community is ignored. The relationship between power and knowledge has not been systematically pursued. Local farmers, the author argues, "are nothing, if not pragmatic and utilitarian in how they assess and use knowledge". It is true that a farmer combines useful knowledge whether drawn from so-called western science or from local knowledge systems.

There is a merit in recognizing the dynamic interplay that exists between the contours of creativity within indigenous or traditional knowledge system and the influence of interaction with formalized science. It is not that the local knowledge becomes less local when it incorporates the elements of modernity. The modern also becomes local when it is contextualised in a local use system. For instance, when a farmer makes selection of an off type plant from an institutionally released plant variety, he develops a local adaptation by selecting that mutant. Thus, the road that connects local or indigenous knowledge with institutional science and knowledge systems is actually a two street. It is true that traffic form one side is much more than the other. But the trend may change.

Lertzman and Vredenburg (2005) recognize the merit of "two way learning and adaptation". If one wishes to share power, then one has to engage with the indigenous people in a manner that respects traditional protocols, authority and teachings. The ethical values that indigenous communities have evolved for sustainable resource use are an important building block of modern institutions. They therefore argue for a strong respect for indigenous institutions. However, what they ignore is the pluralism that must be considered as an inalienable feature of indigenous knowledge systems. The systems can be fragmented, out of sync with the changing environment and sometimes positively destructive. The opposite can also be true, in fact, is often true. The modern systems have put sustainability at much greater risk than the traditional systems. But it is also true that with increase in population, general health and education levels, the ability of traditional systems to sustain the economic and social aspirations may not be easy. Ellison and Badjeck (2004) critique the "uncritical, romanticized portrayal of community conservation may be as damaging to both environmental and rural poor as any state-led arrangements they seek to replace."

I agree that one should not romanticize any knowledge systems, indigenous or otherwise in terms of its ability to interpret and infer the implications for future by looking at the current resource use strategies.

Oguamanam

Indigenous knowledge has been used in this paper interchangeably with local knowledge, local technical knowledge, indigenous ecological knowledge, community knowledge and in some cases, even folkloric knowledge. There is no assumption made here that this knowledge system has a coherence of its own in the same way as the institutional science is supposed to have. In fact, the very effort to map local knowledge on institutional scientific parameters is to reduce the relative importance of both. Our contention is that local knowledge provides the possibility of creative and innovative exploration of resource use opportunities by people who are extremely physical and economic resource constrained. I am avoiding the use of the term, 'resource poor' for characterizing disadvantage rural people because I cannot argue that knowledge is not a resource or that people are poor even in this resource.

The sterile debate between the conception of science as being opposed or distinct from the formulations about the way world is in local knowledge, needs to be abandoned. Just as scientific systems accommodate use of local knowledge in refining the scientific principles, local knowledge systems can also use scientific principles for achieving the similar goals. It is this synergy between the local and the global, formal and the informal and indigenous and the exogenous that I wish to explore in this paper. No useful purpose will be served by arguing that indigenous knowledge systems need to be considered necessarily holistic when we know that fragmentation of life space has become almost an inevitable reality of human kind today. We do not even use the same criteria and indicators of normative preference in each life space. Therefore, when a group of farmers were asked more than a decade ago as to what would they do when their animals fall sick, their plants become diseased or they themselves suffer from a sickness. Majority of the farmers present had no hesitation in admitting that they would use different criteria for using local solutions or so-called modern solutions in each case.

Knowledge systems by definition are evolutionary in nature. Just as human migrations have been at the core of civilisational growth, the cross fertilization of ideas, languages and the looks of people have provided evidence for cultural and socio-ecological diversity. The great migration, which took place thousands of years ago may not recur very soon. But if climatic changes did ever result in similar migrations once again, there will be no doubt that churning of knowledge systems would take place in a crucible of creativity as well as discontinuity. Unfortunately, given asymmetry of power and resources, certain kinds of creativity tend to get much greater institutional attention and support than other kind of creativity. This in fact, is the crux of the paper. How do we define the rules of the game which will mediate the exchange of knowledge, institutions, technology and cultural belief systems between different social segments. We are aware that many people for whom we argue, cannot read what we write about them. Hence the need for more ethical, authentic and participatory dialogue between outside researchers and traditional knowledge holders or the custodians of indigenous knowledge systems.

The dialogue between institutional scientists and the local knowledge experts can take place through several channels and cultural processes. One can take the local knowledge out of its institutional context and test it in modern laboratories and develop value added products. These products can be protected through the application of modern intellectual property rights systems, wealth can be generated and shared among various stakeholders in an equitable manner. In this framework, the mutual informed consent would form the basis of dialogue and generation of synergy. However, in many cases, this channel may not be open. There could be many reasons such as lack of ability among the local communities to interpret various choices and make informed judgments. Another channel could be through the mediating institutions. These could be formal NGOs or informal farmer or artisonal associations. The question here would be about the extent to which such mediators can command the trust of institutional scientists or resource managers and the trust of the informal institutions or knowledge holders.

One challenge, which has been under appreciated in the studies on indigenous knowledge is the overlap between private, community and public domain of knowledge. Transition from one to another or blend of one with another generates complex obligations on the part of outsiders who wish to access this knowledge and then share the benefits. The property rights on the resources vis-à-vis the property rights on the knowledge can even further complicate the knowledge context. For instance, an individual healer may have knowledge about a particular tree species which grows only in his garden. Or, his knowledge may pertain to a tree species which grows in the common forests of the village or on public lands. The entitlement of community which conserves the common forests or public lands in the benefits if any, arising out of economic or non-economic diffusion of the value added knowledge has not been even accepted, much less operationalised.

Similarly, a community may have a knowledge about a particular resource use but the ability or the skill to practice it and tailor it to the specific conditions may not exist equally well among all the community members. There may be individual experts who not only know more but they also have the much greater skill in using what they know with or without the attendant cultural beliefs and rituals.

Given this asymmetry in the distribution of knowledge and ability to practice it, the goal of recognizing, respecting and rewarding the knowledge holders and conserving the knowledge and associated resource base cannot be pursued fairly without differentiating the incentives based on variability in knowledge and practice interaction.

Many societies recognize the need for differentiated incentives and therefore provide a cultural legitimacy for greater flexibility in the way monetary and non-monetary incentives are provided to individual or community knowledge holders or practitioners. The portfolio of incentives may or may not be balanced in most of the cases with the exact distribution of excellence in knowledge and practice. But, the prevalent systems are not that weak. that they cannot discriminate between an innovator and outstanding traditional knowledge holder vis-à-vis the average knowledge holder who has neither the extraordinary knowledge nor the skill to practice. When these asymmetries and attendant implications for benefit sharing are

discussed, certain assumptions about traditional and /or indigenous knowledge systems need to be made clear.

Not all knowledge that a community has is collective in nature or is carried from generation to generation (in changed or unchanged form). Much of the local or indigenous knowledge has benefited from the flow of information, resources, skills and perspectives over a period of time. Before India began to appreciate the utility of red chillies, it managed with black pepper or other such spices. The knowledge systems grew rapidly after the introduction of the chillies from Latin America to India through Europe. Once introduced, chilly became the basis for production of further local knowledge of pickles and other applications. For how long a knowledge system should persist to be called indigenous, traditional or local. Perhaps, it is not always the duration for which a particular bit of knowledge exists which matters more that the process through which knowledge evolves.

It is in this context that many contemporary innovations developed by grassroots level individuals or communities without any outside help are included by the Honey Bee Network members as a part of local creativity deserving recognition, respect and reward. The institutional arrangements for calibrating these innovations are very helpful to build bridges between the formal and informal knowledge systems. Disregarding the reservation some people may have about the value or legitimacy of documenting knowledge, innovations and practices, the system of monetary and non-monetary reward has generated a viable model of knowledge based approach to poverty alleviation, employment generation through entrepreneurship – social as well as economic.

NIF set up in February 2000 by Department of Science and Technology, Government of India on the basis of Honey Bee Network experience and SRISTI's institutional backing up, embodies the above approach of scouting, documenting, valorizing, protecting and disseminating local knowledge, and innovation practices.

It is not my suggestion that indigenous knowledge systems can be promoted only by following one particular model, even if it has succeeded in developing an outstanding benchmark of thousands of innovations and traditional knowledge examples from hundreds of districts in India. What is important in our experience is the faith that traditional knowledge holders and grassroot innovators have put in a formal institutional system based on an informal philosophy embodied in Honey Bee Network.

The local knowledge systems need not be holistic always. After all, fragmentation of life spaces invariably creates legitimacy for fragmentation of resource boundaries. Livelihood compulsions force people to focus on specific resources for generating income for day-to-day survival. Reductionism is often the only way the expertise or extraordinary skill evolves in an individual for solving a particular set of problems. Markets obviously pay more to such people who have extra skills. The consumers respect such experts who provide health livelihood or other services or advice. It is nobody's argument that skills or resources which are not valued by market are not important or do not deserve attention. On the contrary I strongly believe that precisely because of market failure and in many cases failure of the state too, the need for non-market initiatives and institutions arises. But for such support, lot of local

minor crops, varieties, old animal breeds, indigenous tree species will be lost because the contemporary market cannot generate incentives for their conservation. The right of the future generation to these biodiverse resources, some of which may have extraordinary medicinal or other properties has to be recognized. The state, market, civil society organizations and individual activists may not always coordinate their interests and intentions. Their actions may be even more difficult to coordinate. Under such circumstances, one needs to explore ways in which the connection between knowing, feeling and doing gets established more organically. Perhaps the education system can play a very important role by providing examples of indigenous institutions, technology and knowledge systems and ethical values, which help in conservation of resources and augmentation of human choices.

The ethical basis of research relationship between external experts and local communities and individual knowledge holders/innovators has not been adequately articulated and much less codified. Some of the strongest critics of biopiracy very seldom acknowledge local knowledge holders in their writings or take their PIC before using their knowledge for commercial or non-commercial purpose. University Grants Commission in India and in many other countries does not require a Ph.D student to ensure that all the knowledge collected from the local communities has been shared with them in local language after taking their PIC. And this is much more serious problem in developing countries where the norms of accountability are still not very strong.

How do we evolve an institutional culture in which the discourse on indigenous knowledge is invariably accompanied by the best ethical practices in the entire knowledge chain from scouting to benefit sharing. I suggest six considerations that may be taken into account by those who believe that creativity counts, knowledge matters, innovations transform and incentives inspire.

a. Local communities/individual grassroot innovators may be accorded same respect that is due to any other research partner from formal institutions. The oral communications must be acknowledged with name and identity unless requested otherwise. Unlike the prevalent guidelines of most research councils, local knowledge holders should not be compulsorily considered anonymous in the so-called interest of saving their privacy.
b. The same principles of intellectual property rights protection must apply to the creativity and innovation at the grassroots as are applicable to the institutional technological innovations. However, it is true that all elements of traditional knowledge systems may not lend themselves to protection by existing IPR systems. Therefore, till such systems evolve, researchers must follow the norms of confidentiality and PIC. They should not bring hitherto unpublished traditional knowledge in public domain unless specifically requested by the knowledge holders or providers or both.
c. Unless some reciprocity is planned or institutionally organised, knowledge should not be documented or archived. While such collection may serve the interests of future generation, it is also true that it generates a feeling of short changed or exploitation or unfair treatment among the knowledge providers. Just as institutional resources are mobilized for documentation, the same resources must also be mobilized for sharing benefits, pooling of

best practices to generate new choices or expand existing repertoire of survival strategies and for blending formal and informal science.

d. The incorporation of sustainable and viable technological practices along with their institutional contexts in the educational system may be encouraged so that future leaders of society recognize the need for treating local knowledge systems with as much respect and policy and institutional support as necessary.

e. The ethics of knowledge extraction and resource conservation may be looked at from its implication for sustainability of resources. Those indigenous knowledge practices, which are known to have detrimental effect on the environment, must be critiqued with the same unequivocal attitude as one would deal with unfounded or untenable hypothesis in contemporary research.

f. The conservation of resources including biodiversity and associated knowledge systems by keeping people poor cannot be a viable, ethical and sustainable alternative for future. If local communities or traditional knowledge holders have remained poor because of their superior conservation ethics, they cannot be punished by denying them the opportunities of economic development, because of the fear that they might not conserve the resources once they became better off. The 'is' should not become 'ought'. The challenge is to identify such a mix of incentives that help local communities improve their economic and social conditions and at the same time preserve the environment and the relevant knowledge systems which may hold the key for solution of many future problems.

If only knowledge was sufficient driver of socio-economic change, then one would not bother whether it is accompanied by any feeling or not. But we know that knowing is not enough. One ought to feel the need for connecting knowledge with its application empirically or conceptually or even philosophically to desirable social ends. But, would feelings be sufficient if there was no action. Indigenous knowledge systems generally provide a way of connecting a way of knowing, a way of feeling and also a way of doing. How can anybody refuse the need to learn this lesson from the repertoire of our traditional wisdom?

Bibliography

Allison, Edward H and Badjeck, M.-C. 2004. "Livelihoods, Local Knowledge and the Integration of Economic Development and Conservation Concerns in the Lower Tana River Basin. "*Hydrobiologia.* Vol. 527. 19-23.

Brush, S. B. 1993. "Indigenous Knowledge of Biological Resources and Intellectual Property Rights: The Role of Anthropology". California. American Anthropological Association. 653-686. 2/9/2000..

Chambers, Kimberlee J; Corbett, J.; Keller, C. P., and Wood, C. J. B. 2004. "Indigenous Knowledge, Mapping, and GIS: A Diffusion of Innovation Perspective. "*Cartographica.* Vol. 39, No-3. 19-31.

Ellen, Roy. 2004. "From Ethno-Science to Science, or What the Indigenous Knowledge Debate Tells Us about How Scientists Define Their Project. "*Journal of Cognition and Culture.* Vol. 4, No-3. 409-450.

Fred-Mensah, B. K. 2004. "Local Pathways to Global Development: Marking Five Years of the World Bank Indigenous Knowledge for Development Programme". Knowledge and Learning Group. 1-62. .

Godoy, Ricardo; Reyes-Garcia, V.; Byron, E.; Leonard, W. R., and Vadez, V. 2005. "The Effect of Market Economies on the Well-Being of Indigenous Peoples and on Their Use of Renewable Natural Resources. " *Annual Review of Anthropology.* Vol. 34. 121-138.

Hellier, Augustine; Newton, A. C., and Gaona, S. O. 1999. "Use of Indigenous Knowledge for Rapidly Assessing Trends in Biodiversity: A Case Study from Chiapas, Mexico. "*Biodiversity and Conservation.* Vol. 8. 869-889.

Hocking, Barbara Ann. 2002. "Placing Indigenous Rights to Self-Determination in an Ecological Context. "*Ratio Juris.* Vol. 15, No. 2. (June). 159-185.

Huntington, Henry P. 2005. "We Dance Around in a Ring and Suppose Academic Engagement with Traditional Knowledge. "*Arctic Anthropology.* Vol. 42, No. 1. 29-32.

Khanna B.M. 1967. "A Study of the Indigenous System of Veterinary Medicine as Practised by the Farmers of Hissar I Block,". Hissar. Department of Extension Education, College of Veterinary Medicine, Punjab Agricultural University. Document: p.1-99. A Thesis Submitted to Punjab Agricultural University in Partial Fulfilment of the Requirement for the Degree of Master of Science (Vet.Med.& A.H) in Extension Education. .

Lertzman, David A and Vredenburg, H. 2005. "Indigenous Peoples, Resource Extraction and Sustainable Development: An Ethical Approach. "*Journal of Business Ethics.* Vol. 56. 239-254.

Mauro, Francesco and Hardison, P. D. 2000. "Traditional Knowledge of

Indigenous and Local Communities: International Debate and Policy Initiatives. "*Ecological Applications.* Vol. 10, No. 5. (October). 1263-1269.

Mead, Margaret. 1973. "Changing Styles of Anthropological Work. "*Annual Review of Anthropology.* Vol. 2. 1-26.

Moodie, T. 2004. "Re-Evaluating the Idea of Indigenous Knowledge: Implications of Anti-Dualism in African Philosophy and Theology". 1-14. African Renewal, African Renaissance: New Perspectives on Africa's Past and Africa's Present. Annual Conference 26-28 November 2004, University of Western Australia.

Newhouse, David. 2004. "Indigenous Knowledge in a Multicultural World. "*Native Studies Review.* Vol. 15, No. 2. 139-154.

Oguamanam, Chidi. 2004. "Localizing Intellectual Property in the Globalization Epoch: The Integration of Indigenous Knowledge. "*Indian Journal of Global Legal Studies.* Vol. 11, No2. 135-169.

Overwalle, Geertrui Van. 2005. "Protecting and Sharing Biodiversity and Traditional Knowledge: Holder and User Tools. "*Ecological Economics.* Vol. 53. 585-607.

Polski, Margaret. 2005. "The Institutional Economics of Biodiversity, Biological Materials, and Bioprospecting. "*Ecological Economics.* Vol.53. 543-557.

Semali, Ladislaus. 1999. "Community as Classroom: Dilemmas of Valuing African Indigenous Literacy in Education. "*International Review of Education.* Vol. 45, No. 3/4. 305-319.

Thaman, Helu Konai, “Decolonizing Pacific Studies: Indigenous Perspectives, Knowledge and Wisdom in Higher Education, *The Contemporary Pacific, Volume 15, Number I, Spring 2003, I-17, University of Hawaii Press*