

Compensating Local Communities for Conserving Biodiversity: How Much, Who Will, How and When

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Large number of local communities across the world have shared unhesitatingly their knowledge about local biodiversity and its different uses with outsiders including researchers, corporations, gene collectors and of course, activists. Many continue to share despite knowing that by withholding this knowledge they could receive pecuniary advantage. As if sharing was not enough, large number of herbalists do not even accept any compensation when offered. In some cases they have cultural and spiritual taboos against receiving compensation because of the fear that effectiveness of their knowledge would cease if they received any payment for it.

Some insist on a transfer payment or some kind of offering to be made to birds, dogs, other animals or just to nature if the given remedy worked successfully. There are cases when the scale of offering is proportional to the capacity of the person being helped and not the degree of help. In such a case the people are not opposed to charging for their services. It is just that they are not charging for themselves. The cultures that put restrictions on being materially compensated may in fact have mechanisms of compensation but favoring nature and the other sentient beings.

It is in this backdrop of ethical and ecological concerns of local communities and herbalists that we have to discuss the issue of recognizing, respecting, and rewarding the contribution of local communities. The challenge becomes even more difficult when we realize that many of these communities do not have access to some of the basic needs and are quite impoverished. Several factors have contributed to this linkage between greater biodiversity and poverty (Gupta 1991a, 1991b, 1993). A global initiative, SRISTI (Society for Research and Initiatives for Sustainable Technologies and Institutions) takes note of the following factors:

(a) The biodiversity is high in these areas, primarily due to diversity in soil, climate and other physical and social structures.

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(b) The 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.

(c) The regions of high diversity also have very poor public infrastructure (just 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 from different parts of the world).

(d) The low demand for ecological and technological skills of these communities characterizes them as 'unskilled' labor pool fit for being a part of the urban slums, squatters or other similar work force. Once the knowledge system is devalued, the cultural and social decline follows. The tenuous relationship with the nature is ruptured. The 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 short term seems possible only through eco-degrading strategies.

Not only is the mean income of these areas low, but the variability in income is very high. This makes these areas most vulnerable to over exploitation. These households would have such varieties of crops which are vulnerable to environmental and market fluctuations leading to generation of very low surplus. The livestock breeds though are well adapted to the environment, suffer huge loss due to drought or disease epidemics. The fluctuations in the non-farm sector also similarly impair the capability of household adjustment. In fact most of the households with such portfolios would have deficits in their budget(Gupta, 1981,1983, 1989). Their dependence on other social groups and informal institutions like moneylenders or traders is enormous. Their vulnerability often acquires highly exploitative forms dividing them into different sub-groups of mutually conflicting identities. Collective action, for economic purposes, among such people is at times extremely difficult. For cultural and social purposes, they have perhaps one of the strongest indigenous institutional infrastructure. Their tacit knowledge base is rich and often includes confluence of self- abnegating images. There are, however, exceptions, particularly among artisans and pastoralists. Such groups may have a stronger self image and are also less vulnerable in regions where some demand for their products exists. The risks spread over space, sector and season or time also need to be appraised carefully to understand the evolution of institutional or individual solutions. Many of them are very creative and innovative. Their relation with nature is the strongest because they are most dependent on it.

This economic class is perhaps the most crucial to the preservation of biodiversity and to the focus of this paper. This class tends to live in areas of both economic poverty and bio-diverse riches. In order to alleviate their financial burden, several resource degrading as well as resource augmenting strategies evolve. Male emigration to cities and other developed regions due to limited employment opportunities leads to a situation where a large number of household are headed or managed by women. Despite their greater affinity with nature, they may be forced to contribute to degradation of environment. This is compounded by the energy and other livelihood needs of various local communities including the not so poor ones. In volumetric terms, the commercial extractors may inflict even more damage. This over-exploitation of natural resources coupled with the indifference of state and markets and lack of value adding technological alternatives are cause of the high income variance. Thus, a solution must be found which eliminates poverty, preserves biological richness, and rewards local communities for their indigenous knowledge, creativity and contemporary as well as traditional innovations. Conservation must become more economically attractive than the economic benefits of over-exploitation.

Given the fact that majority of the poor people occupying least income niches in urban or developed areas hail from drought prone areas, forest regions and hill areas cannot just be a matter of chance. There is a very systematic pattern in the movement of people from biodiversity rich, economically poor regions. In a world where such an ethics has no value, the only way markets deal with these people is by classifying them as 'unskilled' labor. Some of the official plan documents have in fact gone to the extent of suggesting that one should

not try too much to stem the migration of people out of the less developed regions, lest the supply of cheap labor for infrastructural project becomes difficult.

Much against the conventional understanding, however, poor people are poor indeed, but not so poor that they cannot even think. For them, the knowledge gained through experimentation and innovation is a matter of life and death given the uncertainties of nature. Furthermore, this knowledge has immense value to all of mankind.

After GATT and Rio treaty, sensitivity on the subject has certainly increased. It is being realized that biodiversity cannot be prospected or used without making the conserving communities and innovative individuals the stake holders in any plan for adding value to the resource. This realization has been articulated in FAO undertaking on plant genetic resources through a recommendation of international gene fund in the name of Farmers' Rights. This would be administered by an international civil service for distributing so generated resources to various governments for conservation purposes. The Rio treaty provides under Article 8J, a condition for involvement and approval of local communities conserving biodiversity ensuring in the process an equitable sharing of benefits. Article 15.5 requires prior informed consent, though of course, enforceable only in the countries which have a law requiring such a consent. Neither the concept of farmers' rights under FAO undertaking nor RIO treaty or GATT treaty provide specific mechanisms for achieving the goal of compensating local communities. FAO undertaking in fact is highly misleading. It celebrates the contribution of the farmers but provides for no direct incentives to those who conserve the genetic diversity.

Conservation and preservation of diversity must be attacked on two fronts: 1) the resources themselves must be conserved and 2) the indigenous knowledge about the resources must be fostered and preserved. In order to accomplish these objectives, some sort of compensation system must be devised to reward local communities for their contributions to mankind. It is submitted in this paper that given the past record of most governments having very weak commitments to make the machinery of government accountable to local disadvantaged communities, entrusting the task of routing compensation from national or international funds through the same machinery will be counter productive. Whether NGOs will serve the purpose depends to a great extent on their ethical position and accountability to local communities. This is one area where values of provider, receiver and the intermediaries would inevitably require reconciliation. Here again, the transaction costs [2] of fair agreements may be minimized more through faith and transparency than just through laws. Though legal framework is necessary to enable enforcement of respective rights in any exchange. It cannot be sufficient.

Part one: Conservation Of Knowledge: Role of networks, NGOs and IPRs

When one thinks of conservation, instinctively the focus is on preserving natural resources. However, it is equally vital to conserve the knowledge about the resources. Knowledge may be produced and reproduced through both cultural and social and in some cases even individual innovations. Some of these innovations have been carried forward from one generation to another and thus become part of what is popularly called as traditional wisdom (Varma and Singh, 1969, Richards, 1985, Gupta,1980, Warren, 1988). But the spirit of experimentation may decline at certain point of time in history but it can never die completely. Because survival without innovation will be nearly impossible in difficult

----- [2]. If we spend more on at least one component of Ex Ante transaction costs i.e. negotiation and drawing up an agreement, then it is possible that total transaction costs as well as Ex Post transaction costs on monitoring, enforcement and redrawing agreements can come down substantially(Gupta and Prakash, 1993). The time and effort spent in searching and sharing information during negotiation with local communities will generate transparency and help create trust-the conditions which help minimize the transaction costs further. This process will also meet the requirement of Art. 15.5 of Prior Informed Consent of not just contracting parties i.e. governments but also communities providing biodiversity related information. conditions (Gupta, 1990). How do we discover these innovations, build upon them, generate experimentation and help the transition of experimentation into enterprise through support of markets as well as self design institutions.

The Danger to Localized Knowledge

Erosion of knowledge is a much more serious problem than the erosion of natural resources. We can probably reverse the declining productivity of natural resources like soil through watershed projects or other resource conservation strategies. However, erosion of knowledge can not be easily reversed once lost. The regeneration of resources and knowledge associated with these resources have to be seen in a single as well as multiple generation framework.

Consider first the single generation situation. The ideal sustainable situation occurs when both resources and knowledge have been conserved, but what happens when one or the other is eroded.

When the resources are conserved and the knowledge becomes eroded (as in the case of state-controlled conservation of resources through parks or sanctuaries keeping people out of the resource), the sustainability of the system becomes endangered. If knowledge is eroded, the erosion of resource can't be far behind.

When the knowledge is conserved but the resources are eroded, the sustainability of the system is more likely if local knowledge is incorporated in strategies of regeneration. The knowledge will also be eroded, however, if it is not used.

The least sustainable single generation situation occurs when both the resources and the knowledge become eroded. This is so because the knowledge may only be available in old book shops or waste paper markets, or pavement stores. The folk knowledge once eroded may be almost impossible to reconstruct or rejuvenate. Erosion of knowledge was never so rapid as in our generation because of declining inter-generational communication.

As bleak as the single generational picture is, consider now, the multi-generational situation. Again, the ideal situation occurs when both knowledge and resources have been conserved.

The situation where knowledge has eroded and resources have been conserved is not a likely scenario. This is so because a resource cannot be sustained over generation without drawing upon local knowledge at all. Under conditions of no human intervention or access, certain resources like forests may be conserved over generations without incorporating local knowledge. But with the increasing influence of human-made factors on the survivability of forests through acid rains, global warming, and erosion of upper catchments etc., as well as increasing population pressures, we doubt such a situation could occur.

The case of erosion of resources and the conservation of knowledge over several generations leads to a possibility of sustainability if knowledge has been documented through efforts like the Honey Bee network and is available to people, regeneration of resources is possible within a long time frame.

The worst case of all occurs when both knowledge and resources have become eroded over several generations. Only rare repositories of knowledge may exist among some bypassed communities.

Whether the analysis is performed in a single or multiple generational setting, the key is the same. The conservation of knowledge is as important as the conservation of resources, if not more so. Thus, any system of conservation should be directed not only at rewarding communities for the conservation of resources, but also at rewarding them for the valuable knowledge they hold, create and recreate.

In the context of the biologically rich, low-mean/high-variability income areas discussed earlier, emphasis is placed on providing short-term relief, employment, and other means of subsistence in high-risk environments in order to alleviate poverty. The economic stress on the community erodes their self-respect and dignity. The will of the people to struggle and innovate gets subdued. Both the resource and, the knowledge around this resource get eroded.

Documentation of Local Innovations: Networking: The Case of Honey Bee

In order to stem knowledge and resource erosion, the Honey Bee network, a global voluntary initiative was launched five years ago. Its purpose is to network the people and the activists engaged in eco-restoration and reconstruction of knowledge about precious ecological, technological, and institutional systems used by other people.

This network aims at identifying the innovators (individuals or groups) who have tried to break out of existing technological and institutional constraints through their own imagination and effort. What is remarkable about these innovations is the fact that most of these require very low external inputs, are extremely eco-friendly and improve productivity at very low cost.

It is necessary to note here that organizations of creative people, which take the form of networks or informal cooperatives or just loose associations, would generate a very different kind of pressure on society for sustainable development. The spirit of excellence, critical peer group appraisal, competitiveness and entrepreneurship so vital for self reliant development, may emerge only in the networks of local 'experts', innovators and experimenters. It is true that every farmer or artisan does experiment. But not every one is equally creative and not in the same resource-related fields. The transition of the developmental paradigm from 'people as victim's perspective to that of the people as potential victor's is the answer. Former may generate patronizing and externally driven initiatives where as latter may spur endogenous initiatives by people themselves.

Honey Bee network newsletter is brought out in five languages in India (Hindi, Gujarati, Malayalam, Tamil, and Oriya) and Zonkha in Bhutan so that dialogue with the people takes place in their own language. The creative people of one place should be able to communicate with similar people elsewhere to trigger mutual imagination and fertilize respective recipes for sustainable natural resource management. The Honey Bee network is headquartered at

SRISTI (Society for Research and Initiatives for Sustainable Technologies and Institutions c/o Prof Anil K Gupta, Indian Institute of Management, Ahmedabad),an autonomous NGO.

It is realized that the technological innovations cannot survive without institutional innovations and support structures. Hence we have been documenting the ecological institutions which have been evolved by the people to manage knowledge and resources as common property.

Honey Bee insists that two principles are followed without fail: one) whatever we learn from people must be shared with them in their language, and two) every innovation must be sourced to individuals/communities with name and address to protect the intellectual property rights of the people.

It is possible to take the current global debate on biodiversity and peasant knowledge beyond rhetoric. Our network extends into 71 countries at present. Some of the colleagues have started similar documentation in their respective regions. Offers have been received from Nepal, Sri Lanka, Uganda, Paraguay and Mali for local language versions.

Honeybee also appeals to fellow researchers, activists and planners in other developing countries to identify native wisdom both to inspire and also to provoke the young minds to explore. In every country a very strong oral tradition of knowledge generation, validation, scrutiny and diffusion exists. Honeybee strongly believes that boundaries between formal and informal knowledge systems may often be false. The informal system may have formal rules waiting to be discovered. The formal system may have informal beliefs, accidents, or conjectures providing impetus for further enquiry.

Honey Bee has already collected more than fourteen hundred innovative practices predominantly from dry regions to prove that disadvantaged people may lack financial and economic resources, but are very rich in knowledge resource. That is the reason we consider the term 'resource poor farmer' as one of the most inappropriate and demeaning contributions from the West. If knowledge is a resource and if some people are rich in this knowledge, why should they be called resource poor? At the same time, we realize that the market may not be pricing peoples' knowledge properly today. It should be remembered that out of 114 plant derived drugs, more than 70 per cent are used for the same purpose for which the native people discovered their use (Farnsworth, 1988). This proves that basic research linking cause and effect had been done successfully by the people in majority of the cases. Modern science and technology could supplement the efforts of the people, improve the efficiency of the extraction of the active ingredient or synthesize analog of the same, thereby improving effectiveness.

The scope for linking scientific search by the scientists and the farmers is enormous. We are beginning to realize that peoples' knowledge system need not always be considered informal just because the rules of the formal system fail to explain innovations in another system. The soil classification system developed by the people is far more complex and comprehensive than the USDA classification systems. Likewise, the hazards of pesticides residues and associated adverse effects on the human as well as entire ecological system are well known. In the second issue of Honeybee out of ninety four practices thirty four dealt with indigenous low external input ways of plant protection. Some of these practices could extend the frontiers of science. For instance, some farmers cut thirty to forty days old sorghum plants or Calotropis plants and put these in the irrigation channel so as to control or minimize termite

attack in light dry soils. Perhaps hydrocyanide present in sorghum and similar other toxic elements in Calotropis contributed towards this effect. There are a large number of other plants of pesticidal importance found in arid and semi arid regions, hill areas and flood prone regions which can provide sustainable alternatives to highly toxic chemical pesticides.

It is possible that private corporations may not have much interest in the development and diffusion of such alternatives which pass control of knowledge into the hands of people. However, an informed, educated and experimenting client always spurs better market innovations as is evident from the experience of computer industry. Therefore, we do not see that there is a basic contradiction between the knowledge systems of people and the evolution of market rules to strengthen and build upon it. However, such a model of market would be highly decentralized, competitive, open and participative.

Honeybee in that sense is an effort to mould markets of ideas and innovations but in favor of sustainable development of high risk environments. The key objectives of SRISTI thus are to strengthen the capacity of grassroots level innovators and inventors engaged in conserving biodiversity to (a) protect their intellectual property rights, (b) experiment to add value to their knowledge (c) evolve entrepreneurial ability to generate returns from this knowledge and (d) enrich their cultural and institutional basis of dealing with nature.

Of course no long term change in the field of sustainable natural resource management can be achieved if the local children do not develop values and a worldview which is in line with the sustainable life style. Thus education programs and activities are essential to perpetuating reform.

Part Four: Rewarding creativity of the farmers, tribals and pastoralists : towards an effective sue generis and IPR system

The issue thus is: how do we go about compensating or rewarding indigenous or local communities for their valuable knowledge and conservation contribution. For the first time that the communities and individuals who conserved biodiversity despite remaining poor have a chance of overcoming their poverty by being compensated for their traditional as well as contemporary creativity. Even more promising possibility is that this can happen without any need for patronizing protection from the state (which kept them poor and illiterate for so long). That is not the only promise. We could even hope that the polity of this country for once could get out of the hands of self seeking rent extracting class of non-competitive, non-creative and non-inventive industrial, trading, professional and farming elite. The game thus is very clear. Those who have faith in the inventive capabilities of the economically poor but intellectually rich communities and individuals would like to exploit the opportunity offered by GATT and Rio agreement. On the other hand, there are those who still live under the illusion that a patronizing and protective regime is what poor are looking forward to.

Those who are opposing the protection of intellectual property rights are doing so perhaps because they have no confidence left whatsoever in the native genius. Their argument seems to be very simple, "since we have never won in past in any global struggle, what is the guarantee that we will in future when odds are against us". A mentality of failure, cynicism and defeatism is unlikely to generate any hope even with best of the circumstances and all odds favouring us.

GATT provides that patents are available for, "for any inventions, whether products or processes, in all fields of technology, provided that they are new, involve an inventive step and are capable of industrial application". Indigenous knowledge which is not known to a biotechnology or drug company or a company interested in producing herbal pesticides or veterinary drug is patentable. The same plant can not be used by some one else for the same purpose for commercial purpose. Congressional Research Service of US Congress went into this question recently(Axt, Corn, Lee and Ackerman, 1993, henceforth, The Report) and noted an increasing awareness that plant and animal species in the tropical rain forests and elsewhere were disappearing at an accelerating rate due to human activities destroying or affect----- 3.Axt, Josephine R., M. Lynne Corn, Margaret Lee and David M Ackerman, 1993, Biotechnology, Indigenous Peoples, and Intellectual Property Rights, CRS Report For Congress, Washington: Congressional Research Service, Library Of Congress in their habitat. The Report further noted the resurgence of interest among pharmaceutical companies and government research agencies in screening plant and animal species for medicinal properties useful in treating various diseases (biodiversity screening). The Report stressed that the destruction of habitat had "proven fatal not only to the numerous plant and animal species but also to many indigenous peoples dependent upon that habitat, and continues to threaten many that still exist".

Botanists are reported in The Report, to be searching for nearly extinct varieties of wheat in the Ukraine and Turkey so as to locate genes resistant to a new type of aphid which attacks wheat. The purpose ultimately seems to be to produce crop varieties which withstand the pest. Today, just three plant species -- corn, wheat, and rice - - supply about 60% of the world's total food needs.

The search for local germ plasm or new plant sources for deriving herbal pesticides, veterinary drugs, or other products is done globally by multi-national corporations as well as national and inter-organizational associations. Among the issues that must be addressed in bio-prospecting are:

a) Whether those who want to access this kind of biodiversity have the capability of doing so on their own (INBio felt otherwise and thus entered into a deal with Merck) ?

b) Whether the external organization can access the same material or knowledge about it from other sources? In many cases the knowledge may be available from other sources though not the entire material. In such a case, the bargaining position of the provider is weakened compared to the one holding a monopoly.

c) Even in the cases of monopoly, whether the external organization could have accessed the material through alternative legal or illegal routes? Any material obtained without due process of law, transparency, and prior informed consent of the communities and the national institutions designated for the purpose, should not be granted patents. Where a local community supplies local knowledge or natural resources from their region, they should be entitled to a share in the value addition. The reason for this is that the people dependent on this resource could suffer losses in several ways, for example, their access to plants, sites, or habitats could be reduced when outsiders find some new uses for the same. It seems ironic that because the people shared their knowledge, they could lose access to the habitats which helped them generate the knowledge in the first place. They could also suffer losses because the plants which they conserved have been selectively harvested (through so called `scientific

forestry'), thus, disturbing the ecological balance thereby endangering their life support system.

d) Even if the scientific knowledge exists in some developing countries, it may not be possible for that nation to commercialize the products based on biodiversity prospecting. The skill and capital trade-offs thus have to be made recognizing the respective strengths of the different partners.

e) Should patents be granted on plant products traditionally used by third-world people if specific improvements have been brought about. The case of Neem is interesting. Neem's use as a source of pesticide could not and has not been patented. Among the three of the important patents (for derivative uses) for the use of Neem are, one for extracting a purer form of azhadirichtin, a second for a more storage stable form, and a third for the use of this compound for cancer treatment. None of these forms of the compound were reported to be similar to the ones found in nature. Also, the use was different from the ones known hitherto. Since these patents do not inhibit use of this compound by anyone extracted through any other method of more or less purity or stability, compensation to the local communities is not due for such inventions. The fact that this lead was given by people who had used this plant and compound for pesticidal purposes is beyond doubt. Thus, the case for compensation can be made. But compensation to whom? In all such cases of patents on a specific improvement in well known recipes or botanicals, a cess or tax should be levied for a global, regional or national funds for research and development grants to people dependent upon the source plant. Global fund because this plant, for instance Neem, is found in many countries and the knowledge about its use may have been discovered in each of this country.

The Rio treaty suggests that free access to germ plasm should continue despite whatever mechanisms are created for compensating communities responsible for the protection of such plasm [4]. In fact some have argued that the national sovereignty granted under the Rio treaty does not grant property rights to nations over the germ plasm that they have. It is difficult, however, to see how this resource can be considered different from a coal or a petrol reserve in so far as sovereignty is considered. Unlawfully acquired germ plasm for developing varieties or drugs would not confer property rights superior to those of the original providers. This implies need for regulations in developed countries requiring full disclosure by any corporation seeking patent protection on a plant based drug or any other natural product. The disclosure should provide that the source material has been rightfully and lawfully acquired. 'Rightful' acquisition would involve moral as well as ethical issues in access to biodiversity. For instance even if a local community has not asked for any

----- [4.] Rio, Art 15.2 price for sharing the material or the knowledge about it, is the corporation bound by an ethical conduct to set up trust funds and other forms of reciprocity for local communities? Is it incumbent upon it to ensure that the superior ethics of local communities reaming poor despite conserving biological diversity and the knowledge around it does not become a reason for perpetuating their poverty, and thus endangering the survival of diversity itself ? The 'lawful' acquisition will imply that prior informed consent and approval and involvement of local communities and creative individuals has been ensured provided that the biodiversity donor country has laws requiring such a consent and approval. If a country does not have any such laws, as for instance India, then acquiring any material will be lawful or legal but may not be rightful. -----

The Rio treaty thus provides for compensation in the form of providing countries (i.e. which provide genetic resources) an access to and transfer of technology which makes use of those resources, including technology protected by patents and other intellectual property rights at mutually agreed term [5]. This should happen through involvement and approval of these communities ensuring an equitable sharing of the benefits. Article 15.5 requires Prior Informed Consent (PIC) to be obtained from the contracting parties for obtaining access to genetic material or associated knowledge in countries which have enacted legislation requiring PIC.

The Farmers' Rights under FAO undertaking on Plant Genetic resources do not go as far. The concept of international gene fund under this promoted by the scientists like Dr. Swaminathan through FAO as well as Keystone Dialogue delivers nothing to farmers. It is really shame that a fund is supposed to be created in the name of farmers from which only governments and their bureaucracies will gain. I and my colleagues in SRISTI, of course, do not agree with this concept at all. To us, any arrangement which does not ensure improved access of the Biodiversity conserving communities to additional revenues to be used at their terms through their institutions is not acceptable.

Steps to be taken for creating environment for compensation:

1. Data Base Development

Any system to grant protection to breeders, farmers, tribal communities and other associations of people, companies (national

----- 5. Rio, Art.16.3. This is one of the most controvesial clauses of the treaty. It created cosiderable anxiety among the corporate leaders in the west, who, of course, did not want to share their technological advantage with the third world. The latter claimed that much of the biotechnological advance depended upon raw material, i.e., biodiversity which southern countries provided. or international) can not work without an adequate data base which provides information not only of national origin but also international origin about newness, non-obviousness and distinctiveness in case of plant varieties or inventiveness and utility in case of products. -----

a) Novelty Search and Data Base Development:

For any registration system to work (we are assuming that patenting of plant and animal varieties is not being considered at this stage in most developing countries though the same is going on in developed countries already) extensive novelty search will be inevitable. The Patent Cooperation Treaty has one such arrangement in which an International search should be completed with in 90 days (rule 42). The International Patent Documentation Centre at Vienna provides this service at a nominal cost. But proper search in any international patent office costs a great deal of money. India will need to develop this facility as efficiently as possible.

However, World Intellectual Property Right Organization (WIPO) offers complimentary help to third world innovators only when forwarded by they respective national patent offices. But in last few years, WIPO has handled only about 600 cases of this kind per year. It is obvious that for millions of local creative innovators (many of whom are illiterate and economically disadvantaged) and communities, approaching WIPO will be difficult. There

has to be a Third World Centre For Patent Information and Assistance with network of NGOs to enable grassroots innovators in securing search facilities and later lodging their claims. SRISTI has offered to be a hub of such a network.

b) Data base On Local varieties, Land races, Wild plants and plant products used for sustainable performance of agriculture

Almost all agricultural universities, research institutes and botany departments of general universities and other related institutions dealing with germ plasm in India lack access to any computerized data base of what they or others possess. Personal inquiries have revealed that in most crops, the decline in the collection of germ plasm in the last few years has been very rapid. Major reason reported for such a situation was shortage of funds with agricultural universities for maintaining germ plasm through regular grow out. The need for urgent computerization of this information can not be overemphasized. It is nearly impossible to achieve that goal with in the given administrative constraints and staff problems apart from infrastructural limitations. And yet any data base so developed will have to be maintained by the same institutions.

Hence we need the following kind of strategic alliance of institutions having competence in this regard: NGO/s which have competence in plant genetics and breeding, Management of information and computerization and which have already developed data bases could be entrusted with this responsibility under the guidance of a steering committee of competent scientists of national council of agricultural research, agricultural universities, management institutes, eminent scientific institutes or labs, and even private sector. The data base has to be developed with in time bound manner. This should have been one of the top priorities under Global Environmental facility (GEF) but the GEF is acquiring similar characteristics as that of World Bank.

The next problem will be evolution of a scheme under which agricultural universities and institutes would be enabled to maintain existing germ plasm banks in situ as well as ex situ. It may be noted that national centers like National Bureau of Plant Genetic Resources (NBPGR) and National Centre for Animal Genetic Resources (NBAGR) in India even today have only a fraction of what individual breeders have in their collections particularly for crops and animal breeds that appear less important today (like minor millets or yaks). And put together, they may have even lesser germ plasm than what communities have in their possession in many developing countries.

The financial resource constraints prevent most breeders to rejuvenate their germ plasm every year. But there are no financial incentives for the communities to conserve these resources any way.

2. What should be cataloged?

We should not restrict the protection only to land races, varieties, hybrids or semi wild plants. Wild plants but with specific functions in domesticated agriculture in the form of green manuring, mulch, herbal pesticides, veterinary medicines, stress fodder or feed, nutrient supplement for livestock, anti-oxidants compounds, etc., should also be provided protection and thus documented in the data base. Plant Variety Act being brought before Indian parliament soon does not have this provision. The UPOV has also not recognized the importance of this dimension of knowledge system and biodiversity.

3. What can thus be protected

Plant Breeders' Rights are generally granted for any plant variety which is clearly distinguishable by one or more functional characteristics which is stable and homogeneous. This provision prevents the protection to heterogeneous populations of many of cross pollinated and multi line self pollinated land races. Also, insistence on homogeneity may serve the interest of hybrid seed industry but may restrict the scope of the innovations with regard to multi-line varieties which may have better protection against pests and diseases and which may draw nutrients from different depths of soil and permit soil microbial diversity also to grow.

The origin of the new variety may be artificial or natural- the latter term to include the materials identified in a natural or cultivated state. This provides opportunity for local selections by individual farmers and communities to be certified as varieties. The certificates may of course be transferred like a personal property.

4. Who can do it

Plant breeders, farmers, tribal or non tribal communities, village panchayats, NGOs representing individual inventors of specific non- obvious and new features/ utilities of plants and public institutions in possession of material derived from nature or farmers.

In cases where the original providers are known and can be traced in terms of villages or households, and in cases in which the plants are grown in restricted areas (i.e. few hundred hectares or a few villages), the communities represented by panchayats, local conservation committees, cultural caste panchayats or traditional tribal councils etc., can also register land races and become eligible for royalties that may become available through value addition. In the case of sacred groves, temple forests or village forests, the communities which maintain those groves would be eligible for such registration.

For plants grown on public lands but for which knowledge exists among local communities or herbalist individuals or specific farmers, the plant variety act should register the unique knowledge in the name of such individuals.

In cases where many people know a specific use of a specific plant wild or cultivated thus providing it a distinctive characterization, the rights should be treated as trust rights belonging to communities inhabiting a region in which plants grow. It is important to draw attention to some conflicts which American Indian tribes (e.g. Zuni) have raised about outsider commercial seed industries using their name to authenticate blue corn maintained by them. The seed company concerned has made no change in this variety except giving it a brand name. It is alleged that it has claimed to have acquired it from some tribal but not inhabiting Zuni region. Such a move if approved will rob local communities of all their rights because one could always find an individual who could assign rights for a community asset, in this case a local variety, to outsiders for an individual pecuniary advantage. Trust funds in the name of community structures could be an answer. But the provisions should exist for special privileges for those who actually conserve these land races or varieties as distinct from those who just know about it. Otherwise there would be no incentive for those who actually conserve land races.

In cases in which the plants grow very widely for instance *Calotropis gigantea* (akra) but some uses are restricted to a locality (though other uses may be widely known), protection for that use should be given to the concerned individuals, groups thereof or the regional Biodiversity conservation trust funds to be constituted for the purpose or a combination thereof.

For plants which are widespread and their uses are also widely known, the rights should belong to state Biodiversity Conservation Trust fund to be set up at national level. This fund will receive any royalty that may accrue from commercialization of such knowledge. It is to be noted that just like an information which is known to the members of a large firm but not to the society at large is considered eligible for registration under variety act, similarly knowledge which is known to a community but not to the rest of the world should be eligible for the purpose. In Queensland, Australia, an act was apparently passed by the local legislature on April 16, 1993 declaring local genetic wealth a state property making it obligatory for any international organization to seek legal rights before using local diversity. It happened when a Japanese company drew upon local diversity and developed commercializable product.

Thus the protection under the act should accrue to communities, groups thereof, local individuals, or association thereof represented by NGOs like SRISTI or village elected councils, etc. I am not in favor of creating new structures at village level since the transaction costs

The Seeds Act will need to be modified to include plants used for other agricultural purposes as well.

5. Changes in the Gene Banks :

a) The passport information sheets of the gene banks do not generally include the name and addresses of the providers or the community conserving local land races. Since many times the germ plasm is collected from local markets, the longitude and latitude is given for the region without identifying the communities conserving the land races. It should be obligatory for gene banks to include such information. Without this information, proprietary claims will become difficult to sustain.

b) The future collections should also record the measures used by the local community for conserving the specific land race so that if it was under danger of erosion due to economic or other reasons, mechanisms could be developed for urgent incentives for conservation.

c) The national gene bank collections should be monitored in terms of quality, accession, processes of exchange etc., by an independent watch dog committee so that long term interests of the country and communities can be well safeguarded. It is not to suggest that scientists concerned would not be safeguarding national interest on their own. Rather such a committee would ensure that gene banks get the support they deserve and provide services that society expects.

d) National gene banks should ensure that after drought or other such natural contingencies, if the seeds of local land races collected from a given region are lost, the same are restored to the community on a small scale so that natural diversity and in situ conservation continues

unhindered. This process will require close coordination by state departments of agriculture which will liaise with gene banks.

e) The development of national Information system on germ plasm and local diversity linked through electronic mail is an urgent necessity.

f) Consultative Group of International Agricultural Research Centres (CGIAR) resolved in April 1992 that they would treat germ plasm provided to them as material held in trust for the world community. Whenever, they provided such material to organizations other than "appropriate government authorities in developing countries, they would do so under material transfer agreements and any national authority which received the material would be asked to follow similar procedures in passing it on to other organizations". These agreements would serve following purposes:

i) any useful genes discovered in the material could not be withheld from the country from which material originated nor could the centres be prevented from using such material or specific genes derived from it, for the benefit of developing countries.

ii) Accordingly, these agreements would require the users to negotiate with the Centres if the original material, essentially derived varieties (as per UPOV 1991) , or genes isolated from the material were to be protected and used commercially.

The CGIAR guidelines further noted that " in the case of Industrial country, the Centres could conceivably allow public or private institutions to gain from the rights to improved germ plasm under plant variety protection, provided the rights were gained through such a transparent fair procedure, and did not restrict further future use of the material by the Centre". In such cases any financial returns from such agreements would be passed on the international fund. Regrettable part of the story is that no CGIAR centre has yet approved the concept of material transfer agreements. In the absence of such an agreement, the concept is just a statement of intentions. Committee on Plant genetic Resources (CPGR) set up by FAO is seized of the matter but no consultation seems to be taking place with the relevant NGOs as well as People's institutions and organizations.

g) In the light of point `f', national gene bank need to develop Material Transfer Agreements so that any private or public agency- national or international, other than the government and its organs- signs an agreement about the terms of exchange, right of original providers in any profits and revenue accruing from commercialization of genes from the material provided. It is possible that gene bank would not be able to monitor how different users actually used the material.

For this I suggest another mechanism which has not been talked about in legal literature much so far. This should imply a need for any one depositing a variety or germ plasm with NBPGR or national gene bank , or registering the same with the Authority set up under Plant Variety Acts to disclose the source of the material and its parents. It should be stated that the material has been taken after fulfilling Material Transfer Agreements law fully and rightfully. It is possible that the parent lines may have been derived from sources which may be in public domain and unlawful possession of these lines (say by breeders who take the material with them while quitting their job with public sector research institutions for greener pastures) may be sought to be legitimized by registration under the Act.

h) Further, the NBPGR should also develop clear norms and guidelines suitable for post PBR regime for sharing the genetic material with CGIAR system, private sector and other countries.

6. Registration system

The registration system for plant varieties, and germ plasm used for breeding or extracting plant products would not require growing the sample and confirming its validity. Where as in the alternative system akin to patent regime, the growing out would be necessary. As studies have shown, the first one is more expeditious but may end up providing protection to varieties and lines which may not have the property claimed. There might be some litigation as a consequence of the same. On the other hand growing out process would take much more time, cost and manpower though would generate greater assurance in the mind of registering authority and hence potential consumers of this right.

In the short term, the first alternative is what developing countries may like to put in place. Since cost and infrastructure required for the second may take time to develop.

7. DUS: Distinctiveness, Uniformity and Stability

An issue which needs reiteration here is that we need to permit protection to diverse and heterozygous lines too so that genetic uniformity is not encouraged and reinforced through PBRs.

Secondly, we need to consider whether distinction needs to be established in terms of important characteristics or just functionally distinct one. I favour the second.

Should written description be considered sufficient or grow out be considered necessary. May be in the beginning grow out may be necessary for varieties used for breeding but the ones used for deriving products for agriculture, description may be considered sufficient. But grow out condition may not be applicable in many of the developing countries.

The practices documented by Honey bee and SRISTI network should be considered eligible for registration in the joint name [6] of SRISTI and the concerned farmers or communities where we can convince ourselves about the genuinity of innovation. The registration system should not discriminate on the basis of obviousness to a small group of farmers in a village or a taluka. The point to be noted is that the practice could not have been discovered or invented by a lay person with average knowledge in the field.

8. Essentially Derived variety (EDV)

The variety similar to an existing variety except one or two characters could generally be called as EDV. This provision has been misused for what some people call cosmetic breeding and hence needs caution. It may be desirable to distinguish the economically distinct from functionally distinct. For instance, variety may have little early flowering than an existing variety of similar kind but no economic significance of the same has been found as yet. It should be registered. The advantage may far outweigh than loss. The advantage is that information about such lines become known and thus breeders not just in India but also abroad may take this into account and may like to license the use. Further the breeder is encouraged to think ahead and not just address the problems of immediate future. The

disadvantage is that the registration authority will receive a large number of applications and thus its work load may increase. The burden of proof lies with the institution which challenges the new registration.

----- [6.] The joint name is suggested only because when legal disputes arise, SRISTI may be able to fight for the rights of the third world farmers more competently. The economic returns from any tripartite agreement should primarily accrue to the inventing community and/or individuals. -----

This again can be misused by lot of private small seed companies which without much research may submit applications of selections from publicly developed varieties. This problem to my mind can be addressed by the issue of insistence on disclosure of source of the lines. Unlawfully acquired lines will not be registered.

9. Farmers' Rights

A. It should be clearly understood that FAO provisions do not serve our purpose at all [7]. We suggest that we recognize four fold scheme of compensation (Gupta, 1990) :

a. Material- Specific b. Material -Non Specific c. Non Material- Specific d. Non Material-Non specific

a. Material- Specific: In cases in which specific individuals have contributed to conservation of land races or wild plants with specific economic and inventive uses, their rights to receive licensing fee or royalty must be recognized.

In case of (b) i.e. material -non specific i.e. community or a larger group, the compensation would flow to a group through trust funds, risk fund or insurance funds to encourage inventive communities to take more experimentation and perhaps progress on the path of entrepreneurship. Insurance funds should also ensure that communities or farmers growing land races get price advantage compared to the high yielding varieties.

There are several ways in which revenue can be generated for providing various incentives to individuals or collectives :

(i) a cess or tax on the sale of seeds using the given germ plasm conserved or contributed by the specific individual or community,

(ii) share in the turnover from commercializable plant derived product such as herbal pesticides, veterinary medicines, vegetative dyes, anti -oxidant compounds, nutritional supplements etc. ----- [7]. In the name of farmers who conserve the biodiversity, the proposal of international fund with no direct devolution of economic incentives to farmers is not legitimate at all. Such a fund will only be used for financing fat salaries of international bureaucrats. -----

(iii) A tax on the market arrivals in grain markets in green revolution regions or high yielding varieties of different crops (including various other cash crops) to be used for conserving diversity and providing incentives to communities and individuals conserving diversity.

(iv) license fee to be collected from public as well as private sector companies for using germ plasm still conserved by communities in backward regions even if available in national or international gene banks.

(v) the license fee could be supplemented by larger investments in infrastructural development in these regions particularly in education and other minimum needs,

There are several other ways in which the revenue can be generated. The important point to be understood is that people would not conserve biodiversity while remaining poor for too long.

It has also to be remembered that while farm leaders are opposing the IPR regime for farmers' and the scientists, they have no locus standi on the matter. The biodiversity is least in green revolution regions from which most of leaders come. The regions in which diversity is highest, would not get another chance for being compensated for their ongoing contribution to maintenance of diversity and associated knowledge system.

One can innovate in many ways to identify the precise areas and communities that are conserving rare germ plasm. The primary school children and teachers can be involved in country wide documentation of the biodiverse regions, races, wild plants of economic importance etc., in the form of a campaign led by some committed NGOs and professionals apart from community leaders. State department of agriculture and revenue staff can also be involved in urgent inventorisation of knowledge, materials and claimant communities and individuals.

farmers growing local varieties particularly under threat will need to be compensated for not shifting to high yielding varieties in selected areas. Mechanisms can be worked out for in situ conservation through the involvement of state agricultural universities and other conservation bodies.

(c) the non material-specific rewards deal with honor and recognition of individuals and specific groups of people who have contributed most in conserving biodiversity.

(d) the non material and non specific instruments deal with changes in policies, curriculum at different levels, institutional norms for providing credit and other support systems. Banks would not consider financing a herd of local well bred Gir cows, or biodiverse farm at the same scale at which they would finance input intensive farm. Students are not taught anything inspiring about the contribution of communities which conserve biodiversity. On the other hand they are shown as backward.

B. A scheme needs to be developed for supporting all those panchayats which will undertake systematic cultivation of local land races in every season in large enough areas for enabling some seed exchange. Villages which have conserved local varieties like Jackrana variety of pearl millet or Khirchia of salt tolerant wheat need to be provided some funds for local development linked to the contribution these land races are making in breeding on an ongoing basis. This will give a signal to other communities as well. Funds under this scheme also may be allocated by an autonomous body rather than bureaucracy.

C: The Patent act must provide for recognition of indigenous innovations. Data base like that of SRISTI can provide a valuable beginning point. Scope can exist for defensive patents in

which certain innovations valid for larger social use can be patented not to prevent their diffusion but to prevent their being patented by some third party.

D: Three urgent changes are necessary as a consequence of Biodiversity Treaty for which appropriate laws will have to be enacted by various developing countries:

The prior Informed consent of the community and any other institution providing biodiversity must become compulsory by law.

The involvement and approval of conserving communities and individuals must become obligatory.

The economic incentives for people must be put in place for compensating innovators.

Summing Up:

Rewarding communities and individuals who conserve biodiversity poses one of the biggest challenge of our times. It is futile to expect that we will be able to conserve biodiversity by keeping people poor. It is neither ethically sound nor politically feasible. Social unrest in many regions rich in biodiversity shows that the patience of people ignored by markets and states is running out.

In this paper I have presented a framework in which precise interventions can be made at different levels to generate incentives for people to conserve diversity and yet aspire for similar opportunities for themselves and their children as applicable to rest of us. The framework has evolved out of collective thinking in SRISTI and in close consultation with many active members of Honey Bee network including individual herbalists like Karimbhai, Animal Healer Rehmatbhai, Artisan and farmer Amratbhai and many others who have taught us a different way of looking at compensation for creativity and innovation at grassroots level.

It has to be kept in mind that any arrangement for compensation that does not learn from the past attempts to devolve resources to poor people in disadvantaged regions is bound to fail. The state and markets have to be restructured with the help of grassroots oriented NGOs, peoples organizations and social movements.

People who refuse to price their knowledge and share it unhesitatingly with us have imposed an ethical and moral obligation on us. Our creativity in generating new alternatives overcoming bureaucratic and political barriers will prove whether we can sustain the spirit of communities and individuals conserving biodiversity.

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