**People’s Knowledge for Survival:**

**Grassroots Innovations for Sustainable**

**Natural Resource Management[[1]](#footnote-1)**

Anil K Gupta

The fundamental assumption behind most developmental approaches aimed at poverty alleviation is that poor people are too poor to be able to think and plan on their own. The result is that most interventions are designed externally either by the civil servants, technocrats or in some cases by NGOs. Despite so much discussion on participation, poor people have seldom been given the opportunity to articulate their own agenda and vision in which outsiders could participate at the terms that people determine. The entire participatory paradigm has served to emphasize participation of people in plans or programmes that we, the outsiders design. Not only is the space for articulation limited, but even when people solved their problems through their own ingenuity, there was seldom an institutional window available to recognize, respect and reward the creativity and innovation underlying the solution by the people.

In high risk environments such as drought prone areas, flood prone regions, hill areas and forest regions, both the market forces as well as public systems are quite weak. The markets are weak because people have limited purchasing power. And the state support system is weak because population density is low, number of votes are fewer and the political and economic patronage the constituents can provide cannot counter balance the support provided from well endowed, irrigated regions or urban areas. Given such a situation, poor people have to be very inventive to survive. Their coping strategies have not always been successful in tiding over the crisis. If that was the case, they would not been so disadvantaged in meeting their basic needs, educating their children and generating sustainable employment opportunities. After all, it is the drought prone regions and other disadvantaged regions mentioned above where literacy is the lowest and male emigration the highest. Consequently, the proportion of women headed or managed households is also high. The weak public systems and markets find it all the more difficult to deal with such households compounding the socio-economic stress.

Despite such a constraining environment, there are signs of hope. And these signs indicate tremendous potential that exists for turning around the economy and ecological balance in these regions by building upon what people already know.

About a decade ago, questions of these kind arose in our mind and led to the emergence of the Honey Bee network, which by now has acquired global presence in about 75 countries. The basic thrust of our work is to build upon what people know and do well. In other words, instead of identifying only the problem that people have, we make solutions developed by the people as the point of departure. It has two positive consequences for our own selves,

(i) it generates humility because these solutions have been generated without any contributions from us or other outsiders, (ii) it also generates respect for the experimental and inventive ethic of the people, who with so little could achieve so much; what would be their potential in solving problems if the existing constraints could be relaxed!

Honey Bee is a metaphor indicating ethical as well as professional values which most of us seldom profess or practice. A honey bee does two things which we, intellectuals often don’t do, (i) it collects pollen from the flowers and flowers don’t complain, and (ii) it connects flower to flower pollination. When we collect knowledge of farmers or indigenous people, I am not sure whether they don’t complain. Similarly, by communicating only in English or French, or a similar global language, there is no way we can enable people to people communication. In the Honey Bee network, we have decided to correct both the biases. We make it a matter of principle to always credit whatever knowledge we collect from them and to share, fairly and reasonably, any benefit arising out of the knowledge or value addition in the same. Similarly, we also have insisted that this knowledge be shared in vernacular languages so that people to people communication can take place.

Honey Bee, in that sense, is like a knowledge centre which pools the solutions developed by people across the world in different sectors and links, not just the people, but also the formal and informal science. It is obvious that people cannot find solutions for all problems. At the same time, the solutions they find need not always be optimal. So, there remains a scope for value addition and improvement in efficiency and effectiveness. But it is definite that a strategy of development which does not build upon on what people know and do well cannot be ethically very sound and professionally very accountable or efficient.

**Alternatives to development: from grassroots to global**

SRISTI, a global NGO set up few years ago, provided organizational support to the Honey Bee network around the world. It is important to stress that our database on local innovations has been developed through methods and approaches that people can use around the world without much difficulty. We neither use nor approve of any of the so called Rapid Rural Appraisal (RRA) or Participatory Rural Appraisal (PRA) methods. These methods create a cast of mind which legitimizes short cut approach to learning and often leads to exploitative mode of relationship with people. We believe that learning has to be mutual, patient and in categories that people use for defining their world view. What we have done therefore is very simple. We take help of students during their summer vacation and ask them to look for odd balls in the villages. These odd balls are the farmers who try to experiment and do things differently. Many of them end up solving the problem in a very creative and innovative manner. But the unusual thing about these innovations is that they remain localized sometimes unknown to other farmers in the same village. Lack of diffusion cannot be considered as a reflection on the validity of these innovations. What kind of innovations these are? We have come across technological, socio-cultural, institutional and educational innovations contributing to the conservation of local resources and generation of additional income or reduction or prevention of possible losses. Farmers have developed unique solutions for controlling pests or diseases in crops and livestock, conserving soil and water, farm implements, various kinds of cards for performing farm operations, storing grains, conserving land races and local breeds of live­stock, conserving aquatic and terrestrial biodiversity, etc. Some of these innovations combine the sacred with the secular consciousness. For instance, Rehmatbhai is a Muslim healer of the livestock and is respected so much by the Hindu pastoralists and the livestock keepers in the dry region of Gujarat, that they call him Gopal Bapa. This is the name given to Lord Krishna - a Hindu God who was known for taking care of cattle. It is this blending of sacred con­sciousness with secular beliefs that is reflective of survival strategies in many parts of the world.

Let me give few more examples of the innovations as well as the institutional context of the process. In Kutch there is a large grass land called as Bunni comprising saline flat soils. No cultivation is done in this area which incidentally is Asia s largest pasture. People have developed a very ingenious way of conserving fresh water in the sub-soil system called as virda. What farmers do is to take square blocks of wood, generally the branches of Prosopis spp., and make a square frame of the same. After the rains when the salts have leeched down, they dig a well of 20-25 feet deep and line it with wooden frames having a layer of grass in between. These frames prevent soil from caving in and the grass lining filters the water which moves into the well from the surrounding soil. These wells are filled up with the soil during rainy season, but when water is required, the soil is taken out and the water oozes in from side ways. Since the specific gravity of fresh water is less than the saline water, it floats on the saline ground water. For at least two-three months after opening the virda, water remains drinkable. Later it becomes saline. This is a technique which has provided answer to the problem of drinking water for human and livestock use for centuries in this area. Perhaps, this technique is of use in other arid environments as well. Incidentally, there is not any technology developed by modern science with comparable efficiency and low cost. There is also no mechanism available today for people to people transfer of such technologies and ideas.

Amritbhai Agrawat is an artisan, making farm implements, based in village Pikhor of district Junagadh, Gujarat. He had developed several innovative farm implements such as wheat sowing box and groundnut digger. Most sowing equipments have the lowest portion through which the seeds fall on the ground in the shape of a pipe. The metering devices are located in the seed box. In the dry regions with strong winds, lodging can be a problem in irrigated fields. Amrtibhai devised a box which is now used for many crops which spreads the seeds in a strip. While the seed rate remains constant, the distance between the seeds is increased so that they don’t fall one over another. With better root growth there is a more efficient nutrient uptake and also the crop does not lodge. In addition, if there is a water stress in between, the crop is able to better with stand because of stronger root network. Similarly, the groundnut digger was designed with the help of a blade hoe having the flexibility to change the distance between the two rows as well as modify the depth to which hoe enters into the soil to uproot the groundnut pods.

Amrutbhai had an idea about solving another problem that has remained unsolved for centuries. In most tropical plain lands, farmers have to carry the farm yard manure with a cart to a point in the field. After pouring the manure out in the field, farmers have to scatter the manure in the field by lifting a basket full on head from one place to another. It consumes lot of labour and time. He thought if a modification could be made in the design of the bullock cart, farmer could easily tilt the cart and distribute the manure slowly and slowly, single handedly in the entire field. He discussed the idea with us and articulated the risks. This was a fit idea worthy of support by a Venture Capital Fund (VCF). But as is well known, there is no VCF for a small and scattered innovations. We have banks but no VCF. SRISTI realized the gap and with the support of an IDRC grant decided to experiment with the idea of VCF. A proposal was prepared and reviewed with two of the acknowledged peers. And eventually the cart has been developed through a small risk taking venture of Amrutbhai and SRISTI. Large number of other ideas and inventions remain undeveloped or inadequately developed for want of a VCF support.

In the Honey Bee database, we have a large number of examples of use of local materials to solve plant protection problems. Farmers have found new uses of existing plant biodiversity to control the pest and disease problems in the crops. For instance, ‘naffatia’ (*Ipomeae fistulosa*) is a plant often used for fencing purposes. Animals don’t eat it and there are not many other uses popularly known of this plant. It is toxic in nature and in some places, the branches have been dried and used for making baskets for storing seeds or grains. During 1973, when there was a steep oil price hike, many farmers started looking for substitutes for chemical pesticides. And thus new inventions took place in the field of non-chemical pest control. Later, when many pests became resistant to pesticide and a tread mill effect started being felt, the farmers’ search for alternatives became widespread. In one such area where farmers were tired of using chemical pesticides, a school teacher namely Gamel Singh thought of using the extract of naffatia as a herbal pesticide. There are many tales of about how the idea of using this plant for controlling this pest originated. According to one view, in a farm, some farm workers were taking tea. For some reason, one of the farm workers had to go out for a short while. His wife covered his tea with the leaf of naffatia. When the worker came back and took the tea, he developed toxic symptoms. He had to be taken to the doctor and survived with great difficulty. An idea was born that if the leaves were so toxic that by merely covering the cup of tea with it, it became toxic, then why couldn’t it be used as a herbal pesticide.

Subsequently, we have done research on it and found it quite effective against not only some of the pests but also against certain microbial and fungal cultures. In another case, a tribal person viz: Bhogilal Rajwadia in Bharuch district devised an unique method of pest control. What he did was to take help of 8-10 farmers or laborers who stood in a line. They took the leaves of a creeper (*Combretum ovalifolium*) and put these in a shoulder bag. The people moved in the windward direction after catching blister beetle from the air and crushing it with the leaves already collected. The combined effect of insect and leaf extract seemed to produce some signals which repelled the insects. Such a heuristic of combining plant and insect extract doesn’t exist in modern science. Similarly, there are large number of other plant extracts (other than neem )which have been developed by the farmers and which could help in making crop cultivation in marginal regions more profitable. Most countries do not have a fast track approach for developing or registering herbal pesticide. If there can be a special fund for supporting formal research on farmers innovations in public or private sector labs, a whole range of sustainable technologies which are cost effective could be developed. These technologies may help transform agriculture not only in developing countries but also in economically developed Biodiversity wise poor European and North American countries. These innovations may help in transferring technologies from south to south and south to north.

Indigenous innovations are equally widespread in the livestock sector. Though relatively speaking there is much higher preponderance of the traditional knowledge in livestock sector compared to the contemporary innovations. Apparently the reason is that the livestock health system is much weaker than human health system and therefore people had to evolve their own coping strategies. One of the common problems is yoke gall in new bullocks when trained for the first time to carry the yoke on their shoulders. Apart from the pain it causes to the bullock, there is a considerable economic loss because of lost draft power. Rahmatbhai alias Gopal Bapa found a local plant called as Zipta (Cordia spp.) whose extract mixed with saliva of bullocks seem to provide relief from yoke gall within a week or ten days.

In another case, some times the calf dies within the womb of the cow and if not taken out could endanger the life of cow itself. There are local veterinary surgeons who can do a surgery and take calf out without hurting the womb.

This knowledge base has tremendous opportunity for generating cross cultural and regional linkages. For instance, pastoralists in Mongolia used a home made lick out of onion leaves with wheat germ, sodium bicarbonate and dried milk for the animals. It was found that this lick was very rich in selenium. The deficiency of this element could cause the young calves to die prematurely apart from causing other problems. While discussing the idea of HB network with Akwasasne people in Canada, it was discovered that they were facing a problem in the livestock which was traced to the deficiency of selenium. This is what the potential of Honey Bee network is. A practice in Mongolia documented by a professor in Scotland, published in Honey Bee becomes available to indigenous peoples in Canada and generates a possibility of solving local problems.

Neither market nor existing national or international channels will be able to connect the knowledge nodes around the world in order to empower the local communities and individuals who generate local solutions for applications in different parts of the world.

**Rewarding Creativity: Incentives for experimentation, value addition, networking and dissemination**

The intellectual Property Rights of local communities and individuals have been usurped by the national and international corporations and professionals without any regulation or restriction. So much so that discipline of ethnobotany celebrated the extraction. Not only the contributions of knowledge by the individuals or communities were not acknowledged but also when profits were generated through value addition, nothing ever was shared with the people. To give a few examples of the unfair extraction, about seventy per cent of the plant derived human drugs are used for the same purpose for which native people discovered their use. What the modern science did was to improve the method of extraction or develop a synthetic analogue of the compound. The basic R&D had been done by the people. And yet no incentive ever flowed back to the people. Another example of how local biodiversity conserved by the people contributed to the enormous commercial gain to the corporate sector is that of a tomato variety. The collection of selection number 832 of tomato land race from a local community in Peru cost US Department of Agriculture a sum of US $ 21. This selection after being research upon for ten years helped in changing the solid content from 4.5 to 6 per cent in commercial varieties of tomato. This increased the profit of ketchup industry by over $ 80 millions in ten years, not a penny of which ever went to the people.

It is not as if the usurpation of local knowledge takes place only through multinational corporations or foreign companies. The national ayurvedic companies in India exploited the tribal people no differently compared to the multinational corporation such as Proctor and Gamble. Therefore, there is a definite need for correcting the unfair and unjust system of extracting local knowledge from people for corporate benefit. But it should be noted that many local communities do not necessarily seek material rewards for specific individuals who are custodian of enormous knowledge. Should that, however, be a reason for keeping people poor? There is no other reason why regions of high biodiversity should be inhabited by the poorest community. If the ethical values of these communities and innovative individuals militate against accumulation of material wealth, then it surely doesn’t give us a license for accumulating wealth in an unfair manner.

At present any innovation once published comes in public domain and becomes non-patentable unless one applies within a year. At the same time, people to people networking requires dissemination of ideas in different languages of the world to promote literal learning and experimentation. To balance these twin goals of secrecy for Intellectual Property Right protection and dissemination for people to people networking can be resolved by setting up an international registry of innovations. This registry, just like the ISBN number of books, should provide cheap and quick way of limited protection for each innovation. Later with the help of an international fund for promotion of sustainable technologies and value addition in local innovations, more detailed patent applications can be filed on behalf of the individuals as well as communities. It is up to the communities or individual innovators to decide whether they would like any gains from the commercialization of those innovations to be appropriated for their collective or individual benefit, or not.

The SRISTI model of empowerment and sustainable technology development implies a possibility of improving income and livelihoods of knowledge rich economically poor communities and individuals through documentation, value addition and experimentation and local innovations.

The concept of a *Knowledge Centre* being promoted by IFAD could be one vehicle through which these goals could be pursued and operationalised as given below:

a.To trigger a multi-channel, multi-node and multi-level network of individuals, institutions and social movements engaged in generating solutions to the problem of hunger and poverty,

b.To operationalize various articles of International Convention to Combat Desertification, particularly Article 16(b), Article 18, Article 19 and 20(c & d), Article 25-3(a), Article 26, etc., in order to network existing information channels so as to make innovative solutions accessible to people in a manner that they can use these and share feedback/feed forward.

c.To generate reciprocity amongst providers and receivers of information so that incentives for problem solvers to network with knowledge centre continue to grow.

d.To develop and operationalise an international fund for recognizing, respecting and rewarding creativity and innovation at grassroots level and ensuring sustainable use of natural resources, protection of basic human rights, gender equality, and ethical discourse and conduct of business.

e.To network with existing efforts all over the globe with similar goals such as International Foundation for Science, Sweden (IFS), Society for Research and Initiatives for Sustainable Technologies and Institutions (SRISTI), Honey Bee network for indigenous innovations, Tranet, ISEE, IASCP, CIKARD etc.

 f. To mobilize volunteers from the private and public sectors, the third sector and even religious organizations to generate and support local trust funds to be managed by communities trying to augment innovative solutions developed by them or others.

g.To set up a venture capital fund for small innovations which may support innovators directly or may underwrite risk or provide bank guarantees for similar funds to be set up in different parts of the world for augmenting peoples capacity to solve their own problems.

h.To fulfill an ethical obligation towards poor people by ensuring, (i) all the information concerning any programme or project is made available in local language to the peoples representatives at local level before designing and implementing the same, (ii) sharing of information during the course of project implementation and respecting the right of people to information and, (iii) protecting the intellectual property and cultural heritage rights of local communities.

If we have to generate sustainable technologies and institutional solutions for preventing land degradation, conservation of biodiversity and generation of income employment opportunities then we will have to recognize that discourse on development must take place in re-defined categories with enhanced role for civil society actors. The poor people should never be considered resource poor because then it would imply that they are poor even in the knowledge resource. We should recognize that language of discourse does generate a habit of thought and a way of looking at the problems or opportunities. Knowledge of people is an important resource and a framework which denies that is neither legitimate nor ethically sound.

Similarly, a framework of development which treats people as victims and helpless clients of official delivery systems would never be able to generate a preparedness amongst professionals to participate in the plants of local communities and innovative individuals. Time has come when we the outsiders should learn how to participate in peoples plans and not vice versa. Finally, technology development is a process which requires re-thinking in the formal institutions dominated by chemical intensive approaches and high powered machines. For most of the marginal communities living in fragile environments, standardized solutions as developed for green revolution regions will not work. The organisational arrangements which generate incentive for scientists to work with the people to develop technologies with limited potential for diffusion generally don’t exist. There is a great deal of restructuring required in the international and national research organisations if technology development and diffusion process has to become relevant and meaningful for marginal environments and disadvantaged communities. Honey Bee network with its limited resources and experiences has demonstrated that such a transformation is indeed feasible.

1. Presented at the IFAD’s International Conference on Hunger & Poverty in Brussels during November 16-23, 1995 [↑](#footnote-ref-1)