Inclusive innovations for poverty alleviation: Creative ideas of the poor, for the poor[1]

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For many poor people, innovation is imperative. When you have access to very limited financial or physical resources, there is little else that you can leverage except your mind, imagination, experimental ethic and an urge to cope with the stress creatively. It is unfortunate that many developmental thinkers saw a fortune in the savings of the poor. The so called bottom of the pyramid framework stressed on selling things to poor. It never focused attention on what poor people are rich in, that is their innovative ability. Unless we buy something that poor people produce, how will money go from our pocket to their pocket. The very framework of globalization needs to be reversed. In g2G model, the reverse globalization has been attempted by creating global markets for grassroots innovation based products and services. Why have innovations have become so important in all domains and at all levels? Why do support organizations at different levels still feel diffident in supporting creativity and innovations at grassroots. Is it possible that dissent, defiance and diversity lying at the root of creative eco systems prevent bureaucratic and hierarchical organizations to be flexible and innovative enough to recognize the creativity of others.

In this paper, I first describe the emerging models of innovations. Then I show how Honey Bee Network helps in designing platforms that can harness the passion of creative people and align it with the larger social purpose of alleviating poverty. Finally, the lessons are drawn for developmental organizations to become more flexible, friendly and frugal in building upon the ideas of common people.

Part One: Emerging models of innovation

There are many creative ways of solving problems which do not necessarily become innovative. For a method, material, or use/application to be innovative, there should be not only some novelty but also utility. If we dichotomize each dimension, we can have old or new method, old or new material, and old or new application. At least one of the three should be new for a solution to be innovative. How do people generate innovative solutions and whether it is necessary that a solution must scale for it to be socially recognized and supported? Many of us have motivations to do something which we feel is a good thing to do. We have many creative ideas but we are not sure about them. So we don't do anything. We just ruminate, dither or vacillate and never take an initiative. Question of emergence of innovation does not arise. But when there is a trigger that helps us overcome our inertia, convert our motivations into initiative, we move towards an innovative solutions [Sinha, 2009]. The facilitative or inhibitory factors determine the smoothness or ruggedness of the journey. The feedback from the users or potential users may reinforce motivation or cause depression which may or may not always fuel further effort and more creativity. One thing can be said without any doubt that innovators have no patience with a problem. Unlike majority of us who have learned to live with a problem unsolved indefinitely, the innovators have less patience quotient. Their restlessness is their asset. Our inertia is our burden.

Let me illustrate some of the ways in which innovations have emerged in informal but also formal sectors. Saidullah, a 75 year old mechanic and a honey seller wanted to cross a river but had no money to hire a boat. Going across was important. He decided to make his cycle an amphibious

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one. Now he could move on the road and in the water. It took us more than 20 years after he invented this cycle to discover him. But, despite its obvious utility in inundated regions due to floods or excessive rains, the administration in eastern India where floods often come or in Pakistan which witnessed huge floods last year, was not moved. The solution did not scale. Private entrepreneurs did not find much incentive. The emergency relief people did not see the merit of the cycle in situations where boat may be scarce or need more people. Even for vending around islands or on the periphery of a lake, its potential was not exploited. Did it cease to be an innovation therefore? The editor of FORBES magazine last year wrote to Honey Bee Network and suggested use of Honey Bee approach to source the content for the January 2011 issue from the readers. Taking this cycle as an example, the editor asked the readers to suggest other innovations they would like to see on the cover of the magazine. A journalistic tradition of designing contents from within the editorial staff was broken. An innovation in journalism was triggered by an innovation in transportation. Ideas from one domain can go to other domains, far removed in nature. An entrepreneur saw a groundnut digger on NIF's website [www.nifindia.org] and was motivated to convert it into a sea beach cleaner – a very interesting sweep of imagination. The process was similar. A sieve would lift the pods or the debris, stir it to drop the sand or the soil and help in cleaning the beach or collecting the pods. Likewise, a hundred dollar windmill made of bamboo in Assam by Mehtar Hussain and Mushtaq Ahmed for irrigating small farm was modified in Gujarat with more strength to pump brine water to make salt in about 1200 dollars. The affordability frontier is pushed by grassroots green innovations essentially because innovators have not much material resources to waste. Herbal solutions for agriculture, animal care, human health and processed food convert traditional knowledge as such or after pooling the same from different regions into innovative products and services. The process of pooling traditional solutions to generate contemporary innovations in the form of new formulations is itself an innovation.

There are many models which have emerged over the years which may be of interest to any individual or institution wanting to create or support innovation based poverty alleviation model.

a. *Empathetic innovation*: The motivation for developing an innovation can be to solve one's own problem or somebody else's problem. If someone else is disadvantaged, then this consideration can be borne out of empathy or *samvedana.* When Khemjibhai developed a device for transferring load of weight on head [such as water pot] to the shoulders through *pani hari,* he did it because some neighbourhood labourer women came to him complaining a pain in the neck on carrying heavy loads. Similarly, Virenkumar Sinha developed a pollution control device to reduce the sound and the smoke pollution by the diesel generator so that children in the school opposite his workshop were not disturbed.

b. *Community innovations*: Faced with a collective problem, people get together to solve it creatively through a common property institutional innovation. SRISTI [Society for Research and Initiatives for Sustainable Technologies and Institutions, www.sristi.org] has developed a database of indigenous CPR institutions to illustrate the creativity communities show in solving different problems of managing natural resources through boundary and resource allocation rules. While operating these rules, there are likely to be conflicts and thus the conflict resolution rules emerge. These three kinds of rules are embedded in governance and management contexts. Innovations can arise in any of the rule set without any help from outside. In addition to the institutional innovation, communities can also respond to the technological challenges. Whether it is making sound by a large number of people to scare the locusts away or it is to grow favourite food crops of the wildlife in separate plots to disincentivise them to damage the cultivated crops, there are a large number of such community innovations based as these are on traditional knowledge.

c. *Inverted model of innovations*: It is generally assumed that innovators require some

specific skills to innovate. Nothing could be farther from truth. Undoubtedly, skills can empower a person to attempt more complicated experiments, some of which may be innovative. But, those lacking skills can also imagine innovative solutions without necessarily having the ability to implement them. Feasibility is often used as a weapon to kill the desirability. Once one liberates oneself from this constraint, a lot of creative ideas follow. Children have been mobilised through IGNITE competition of NIF preceded by idea competitions during Shodhyatras to submit innovative ideas. Those found interesting and unique are then taken up for fabrication with the help of engineering students or design firms. If implemented successfully, these are commercialised through small and large companies. The dominant paradigm of innovation never gave space for kids to invent in this manner. Since kids have not yet learnt the inertial art of living with problems unsolved, they have no hesitation in imagining beyond the boundaries. A very large number of socially useful solutions have come out in this manner. This, like other models, is a globally applicable model and has been tried in Malaysia, China and United Kingdom in addition to India.

d. *Niche based innovations*: Innovations evolve to solve problems of a specific region or a community constrained by agro ecological or socio ecological conditions. If these conditions do not cover large area or application domain, then the solutions become niche based. One should not blame an innovator not to work only on universalisable solutions. The scale therefore should not be come enemy of sustainability. The long tail model of innovation implies that a few innovations diffuse very widely but a large number of innovations diffuse in a very limited manner. If one were to focus on only widely diffusable innovations, the needs of small communities in specific valleys or mountains or deserts may remain unmet. In many parts of the world, lack of sensitivity of social planners to addressing such niche specific needs is leading to social conflicts, anger and alienation. Grassroots innovators may evolve such innovations in specific stress prone regions. The principles underlying these innovations may be diffusable but not the precepts. I have argued earlier that in dry regions which have high ecological heterogeneity, it may be prudent to transfer science to enable people to develop technologies on their own [Gupta, 1988]. This is not to say that people on their own cannot develop such solutions.

e. *Survival innovations*: Many times local people may solve problems innovatively but not know that they have done so. When an outsider spots such solutions and calls them innovation, the local community and the innovator may realize it afterwards. Anonymity may emerge from humility but also sometimes from the stinginess of society in acknowledging such valuable contributions. Every six months, Honey Bee Network and SRISTI with the help of NIF and other partners organize Shodhyatras [learning walks] in different parts of the country to respect and recognize such survival innovations on the way. We also organize competitions for biodiversity knowledge and other ideas among school children. Recipe competitions are organized among women with a focus on such recipes which have at least one uncultivated species as an ingredient. Through biodiversity and recipe competitions, a very large variety of knowledge associated with the diversity also manifests. Village Knowledge Registers are being developed to help communities track the evolution of the knowledge system so that building blocks of future innovations become available democratically in an open and accessible manner. Survival innovations emerge through various triggers. In the event of a crisis [drought, flood, pest epidemic or any other calamity], people have to find ways of surviving sub-optimally or optimally. After oil price hike in 1973, we noticed that many farmers started search for non-chemical means of pest control and fertilization due to steep price rise. Similarly, many architectural innovations emerged in earthquake prone regions with the result that modern construction failed to keep the structures intact when many traditional structures survived. Uncultivated foods, fodders

and other sources of nutrition for human or animal purposes have been discovered often under periods of high stress.

f. *Analogic innovations*: Many times ideas in one context find application in another. That happens in the formal sector and also informal sector. Bhanjibhai saw old railway bridges built during British time almost a century ago having arches between the two pillars. He realised that disturbance caused by the movement of train might be deflected better through arches than straight line structures. He used this insight to design arch-shaped check dams for conserving water in the small rivulets. Another innovator saw a groundnut digger and collector developed by Yusuf in Rajasthan and used this design to develop sea beach cleaner. Large number of such examples exist even in the corporate world. The velcro was designed based on the pod of .... plant. Similarly, the surface properties of lotus leaf was used to design water resistant paint. The analogical insights can come from nature or other human made artifacts. The grassroots innovators being close to the ground are quite adept in mimicking natural forms and properties. The houses in Bangladesh built on stilts are a good example of survival innovations in which flood water is allowed to pass through the stilts.

g. *Energy Conservation and Augmentation Innovations:* Many green innovations at grassroots are triggered by a strong desire to conserve energy, use waste energy and augment energy by better design. A large number of innovations in Honey Bee database reflect this concern. For instance, Jyoti in Arku valley realized that heat from the cooking stove was wasted from around the vessel and was lost in the atmosphere. She designed a shelf about a foot and half above the stove made of bamboo slings. She kept paddy plants with panicles on it to get heated. She intitutively discovered that the rate at which the husk and rise grain expand are different. Therefore, the thrashing of rice became easier after heating up. Drudgery was reduced and human energy was saved. Over and above this, they hang the seed bag which is fumigated and thus saved from the stored grain pests. In Meghalaya, we discovered four storey system of energy harnessing. On the first shelf above the wood stove, they kept wood used for making trolleys. The heating cured the wood and made it stronger. On the second shelf, fuel wood was kept to dry because this region receives the world's largest rainfall. On the third shelf, vegetables, meat, etc., are kept for drying and the fourth is for seedbags. Such a concern for using waste energy is not witnessed in our own kitchen. Imagine if all the kitchens of the world are re-designed to save and use the flue gases.

A large number of water turbines have been designed by the villagers to generate energy. One of the most remarkable innovations is a 120 dollars windmill. Two brothers, Mushtaq Ahmed and Mehtar Hussain developed this bamboo windmill to run a hand pump to irrigate small paddy fields. This windmill was then adapted for pumping brine water to make salt. The salt workers are some of the poorest people in this region. Eventually after several modifications an iron windmill about 25 – 30 feet height has been developed costing him about 1400 dollars, transforming the lives of salt workers. Biomass gasifiers using slow velocity sewage to run turbines, compressing biogas to run two wheelers, etc., are many other examples of creating use of energy.

h. *Innovations through pooling of traditional knowledge:* One of the interesting models evolved in SRISTI is based on creating new formulation by pooling / blending traditional technologies from different regions. Over the years, people evolve solutions which serve their local purpose though not necessarily in the most efficient manner. However, when such solutions are pooled, a novelty is achieved. When pooled solutions become more efficient and effective, then an innovation takes place. Large number of herbal innovations for agriculture, veterinary care and human use have been developed in this manner. Some of these have been licensed to small and medium companies generating benefits which are

shared with the knowledge providers transparently. The benefit sharing model, of course, does not restrict itself to only monetary benefits. Both monetary and non-monetary benefits are valuable targeted at individual and/or communities in the short and the long term.

Part two: Platforms for pooling and redistributing knowledge, innovation and practices

Honey Bee Network has developed several platforms for connecting formal and informal science. NIF has entered into Memorandum of Understanding with Council of Scientific and Industrial Research [CSIR] and Indian Council of Medical Research [ICMR] to validate and value add in local knowledge and innovations. The agreement with Future Group is intended to provide large scale distribution and marketing channel for grassroots innovation based products. An informal agreement has been achieved with a large number of intellectual property firms to provide *pro bono* support to the grassroots innovators. Recently, SRISTI created a platform viz., techpedia.in which has pooled more than 100,000 projects developed by 350,000 students from over 500 colleges and institutions. This unique platform enables final year technology students to first define the problems of micro, small and medium enterprises and then try to solve it. The students are also encouraged to take the problems from informal sector and add value to them. In addition, the challenges about the unsolved problems of rural communities are posed to the students for being addressed as a part of final year project. Given the limitation of financial and human resources, SRISTI has not been able to build a team to scale it up and provide a whole range of support services to the young technology students. A platform like this can perform following functions:

a. Reduction in transaction costs: For an innovator, investor or an entrepreneur to find each other is not easy. An innovation platform reduces the *ex-ante* and *ex-post* transaction costs of finding information, negotiating and arriving at an agreement, enforcing its implementation and resolving any conflicts. The entrepreneurial opportunities will expand manifold if such platforms become available in multimedia and multi language format.

b. Tracking the innovation implementation: An illiterate person should be able to use spoken-web and search information and find it in the format that he or she wishes. The problems posed by a community can be tracked using ERP and workflow kind of functionalities available in open source. With a network of more than 800 million cell phones in India, a huge outreach of ideas can be achieved.

c. Inclusion through new partnerships: Honey Bee Network has triggered discussions with postal department as well as railway department to reach the masses. The dissemination of sustainable solutions is as important as scouting and spawning of new ideas.

d. Virtual incubation and mentoring: The platform also makes it possible for online support for IP protection, incubation and support for prototyping or product development in the laboratory and mentoring the entire process.

e. Multi stakeholder participation in building value chain: For an idea to become product and from product to an utility, one needs support of designers, fabricators, distributed manufacturers and supply chain managers. Both the young students or grassroots innovators cannot afford to get all of these actors together to take their ideas from grassroots to global [g2G].

The g2G model implies that global markets must be explored for grassroots ideas. Unlike the concept of 'fortune at the bottom of pyramid', here the idea is not to sell products and services of large corporations to poor people, but take the products and services designed by knowledge-rich, economically poor people to global platforms. A reverse globalization is need of the hour. SRISTI has developed experimental platforms for cultural, educational, institutional and biodiversity based

innovations. NIF has built an IGNITE platform for scouting and supporting ideas and innovations by children. The youngest child, Chris Ananth, who got award last year at the hand of former President of India, Dr. A.P.J.Abdul Kalam was from class one. In the absence of platform, there is no way we would have been able to discover him.

Part three: Flexible, Friendly and Frugal Developmental Organizations

If one looks at the history of Honey Bee Network and various policy, procedural and institutional innovations attempted during last quarter century, several lessons become obvious:

1. Why do we still have so few grassroots innovations on the web? In a journey, those who join are important but those who don't join also convey an important message. Despite millions, rather billions of dollar spent by various aid agencies from European countries, why should green innovations developed by the people themselves be so scanty. Does not it say something about the context in which so called participatory approaches are used by these agencies. To a great extent, the disease of neglect towards people's own knowledge system originated in western institutions, World Bank, Latin American, African and Asian Development Bank and then it has spread various national systems.
2. Is there any other way in which sustainable development can be achieved without building upon people's creativity and innovative spirit? There are certain externally generated solutions which can have a great positive effect on the life of the masses. But, if these solutions blend with the local resources, skills, values and cultures, the impact can be much larger. The fact that large number of activities in which women and men are involved in some of the economically poorest regions have not undergone a technological change for thousands of years shows unambiguously that something fundamental is flawed. Civilized societies cannot justify that they are not aware or that they are not accountable to the poorest people in various societies. So much of strife and social tensions including violence in different parts of the world can be traced to the disparity and disconnectedness at grassroots level, particularly in high risk environments.
3. When there is not a great deal that has been developed in modern management science to design institutions to manage natural resources at community level, how do we explain the neglect of indigenous institutions? In many parts of the world including the Alps region, many institutions evolved hundreds of years ago still help in coordinating the expectation of people and managing the resources in sustainable manner. But, when one looks at public policy and aid strategies, one would find scanty resources being allocated for the purpose, if at all. Crafting institutions is not the solution. Grafting is. There is no place where there is an institutional vacuum. Feeble or strong, implicit or explicit, moral or market based, rules exist for regulating collective behaviour for managing natural resources. One has to blend new rules or processes on the bedrock of existing institutions.
4. Why has modern science neglected the informal science so much? It is obvious that crops, animals and other non-farm resources used by the economically poor people have registered the slowest scientific and technologic change, if at all. This neglect has continued despite rhetoric, full of claims to the contrary embellished in various policy documents. It is not for nothing that CG system [inefficient and costly as it is] is facing difficulties in raising resources to run its unaffordable and unviable system. Even the national systems have not paid due attention to the local knowledge and resource systems. In medicine, systems biology approach has been neglected. In forest, sustainable extraction protocols have not been developed for most of the species. In agriculture, the linkage between soil, plant and animal and human health has been almost completely neglected. There are far too many systematic gaps in our understanding to be dismissed as by chance or incidentally.
5. Why is it that micro finance is accepted, accommodated and amplified in public policy all over the world but micro venture finance is not? Isn't it strange that despite the recognition of the need of micro venture fund or micro venture innovation promotion fund way back in

1997 at the International Conference on Creativity and Innovation at Grassroots held at IIMA, it took another six years to create a micro venture innovation fund at NIF in 2003 with the help of SIDBI. Still, this concept has not been globally replicated. No aid agency, Swiss included have really appreciated the need for risk capital for product development and subsequently dissemination through commercial or social markets. If risk capital is so critical for scaling up innovations in biotechnology, information technology, pharmaceutical sector, etc., how can it not be important for grassroots innovations and knowledge system.

6. Why has creation of public goods be neglected vis-a-vis market driven solutions? Very few agencies, except IDRC, Canada have paid attention to creation of public goods in various fields impacting social life. SDC did play an important role in improving livestock productivity through blending of Swiss brown breed with local breed in Kerala. Similarly, in 80's, it did support my work aimed at influencing credit policy for drought prone regions. But, these are exceptions. The major thrust of various aid agencies has not been to build capacity in using science and technology to validate and valorize people's own knowledge, institutions and expectations either met through local or external innovations or not met so far.

There are many more lessons one can draw from our experience of last few decades. We believe that [i] scale should not be enemy of sustainability, [ii] mind on the margin are not marginal minds, [iii] Maslowian model of hierarchy of needs does not explain why so many disadvantaged and economically-poor people, not sure of their next day food are able to experiment and innovate and create public goods by pursuing the most enlightened spiritual needs, [iv] the Honey Bee Network demystifies the expert power, democratizes the knowledge generation and dissemination and builds upon people's own unaided ideas and innovations. It is replicable and the results in China and Malaysia demonstrate its wide applicability and [v] g2G model has a future and will reveal a more humane, morally defensible and ecologically sustainable framework of globalization.

Honey Bee Network welcomes volunteers and hopes that platforms, passion, purpose and process can be aligned to use grassroots innovations for poverty alleviation.