

Grassroots to Global: Online Incubation of Grassroots Innovations¹

Anil K Gupta²

Large number of small enterprises provide greatest guarantee of democracy. In this age of acquisition and mergers, will small enterprises be viable unit of analysis in future. Knowledge networks of small producers, entrepreneurs, designers and marketeers could create as effective supply chains as some of the large corporations try to achieve. Polycentric development of entrepreneurial urge requires availability of autonomous spaces for individuals to try, experiment, fail and still persist. How has the interface between individual enterprise, society, markets, and state been managed historically? During the industrial revolution, several trends emerged, not all of which became the legacy for those who caught up late. The general model was that of competition, ruthlessness and allowing market forces fuller play. But there were exceptions.

In Lyon, a town in France famous for silk looms, there emerged an interesting model of networking. The demand for silk handloom fabrics even at that time was very fashion sensitive. The loom owners in Lyon knew that when demand for one particular design went up, the demand for others dipped. The owners had a very interesting custom when it came to train their children as apprentice. Generally, the owner would not keep his or her own ward as their own apprentice. They would request some other loom owners to train their children³. Thus, in the market place, they compete with each other, in knowledge or learning space, they cooperate with each other. Silicon valley reinvented this logic. In south Italy, small firm networks also discovered a variant of this model. Whenever a small firm bid for a large order, knowing fully well that fulfilling that order would be beyond its individual capacity, it relied on social network. Once the order was obtained, the concerned firm would invite others to join hands. Till the order was completed, other partners almost became the division of principal firm. After that, they started competing with each other. The competition and cooperation can alternate but also take place simultaneously in different life spaces.

Today, when there is an extraordinary need to spur the entrepreneurial revolution around the developing world, we have to invent a new model. This would link the grassroots ideas, innovations and institutions with global market players and other stakeholders in a way that globalisation acquires a new perspective.

So far the globalisation has meant generally squeezing of spaces for small innovators and entrepreneurs. It has been by and large a one-way street. The Honey Bee Network has been trying to reverse this process. It is trying to create a new ethics and institutional

¹ Keynote lecture delivered at MIT \$100K Global Startup Workshop in Trondheim, Norway on 28 March 2007

² K.L.Chair Professor of Entrepreneurship, IIMA and Executive Vice Chair, National Innovation Foundation (NIF), Ahmedabad

³ Prof. Paul Richards, personal communication, 1987

culture in which grassroots innovations developed by often uneducated or less educated or valorised to address global demands. Already the innovative products have reached five continents. But, a great deal remains to be done. The successful entrepreneurs can mentor the start-ups whether in formal or informal sector. However, the mechanism of mentoring small, scattered and disconnected innovators without access to much education, banking or communication systems is not easy. Distributed mentoring is a challenge that we have to meet, if Grassroots to Global (G²G) has to become an international reality. In other words, if triangle of linking innovation, investment and enterprise has to be formed across the world, then transaction costs of each actor will have to be reduced considerably using online platforms. Assume that a Norwegian entrepreneur selects an innovation from what I will show in a minute and wants to set up an enterprise in South Africa with investment from say, US, then a G²G model would have come about. Likewise, if entrepreneurs in developed countries can find application for innovation by grassroots innovators in third world, then a poverty alleviation model will emerge which would look at *poor as provider* of solutions.

Let me amplify this model: Honey Bee Network approach

From Catharsis to Creativity:

In 1986, when I returned from Bangladesh after a yearlong stay, I began to realise a strange but a severe guilt in my heart. It appeared to me that while I was getting recognition and rewards for the work I was doing with the people, much of the benefits had not flown back to the people themselves. I had shared various research findings of my studies with the people, all this while but nothing much had happened beyond that. Much of my work was still in English language. I had finished two more studies on Impoverishment in Drought Prone Regions and Learning to Unlearn: a study on participatory learning in a tribal region from the banker's perspective. It was clear that the people who had shared their knowledge with me and had contributed to my own personal and professional growth had not gained much directly or indirectly. I tried to argue with myself that I had lobbied for policy changes, had shared my findings with the knowledge providers, and had tried to be authentic and faithful to what I had learnt. However, the explanations did not exempt me from the guilt.

It is around this time that I wrote a small Review on Ethical Dilemma and Value Conflicts in Management Research. It became clear to me that the dilemma may not be original, the solution had to be. Around 1988-89, one day the thought of Honey Bee came to my mind while coming from office for lunch at home. As they say, there was a light afterwards. Honey Bee does what we intellectuals seldom do. It connects flower to flower through pollination. And flowers don't complain when their nectar is taken away. Since we do not often write in local language, the people to people connectivity is not possible when we take their knowledge, we often make them anonymous and become the author ourselves. Almost all of the ethnobiological work is illustrative of this attitude. There is obviously no chance of sharing any benefit with them.

Honey Bee Network evolved to overcome these asymmetries in knowledge, economy. Whatever we learn from people must be sourced to them. They should not become anonymous. We must share our knowledge with any third party only after their Prior Informed Consent (PIC). People should have a right to know what we did with their knowledge. They should also be able to learn from what we learn from other people through local language communication. If we get any consultancy, award or any other income through exchange or dissemination of the knowledge with or without value addition, a reasonable share should go back to the people.

A philosophy, a value, a social movement:

Honey Bee Network began to evolve and bring in large number of people in its fold at village level as well as at professional or institutional level. For some peculiar reasons, majority of the members were drawn not from NGOs but from NGIs (Non Governmental Individuals). It is natural that when a network grows, contestation around the ideology, belief systems, values espoused as well as practiced, is bound to arise. Some people disassociate because the constraints of accountability imposed by the philosophy appear too much. Sometimes, the network also loosens its links with people with whom compatibility of values becomes difficult. But the major energy comes through inclusion rather than exclusion. Over the last 19 years, the Honey Bee newsletter has been brought out for 18 years and in different languages. Currently there are six regional versions of the newsletter apart from the English version, which are managed by the core team of the Honey Bee collaborators in different states, namely – Tamil (*Num Vali Velanmai*), Kannada (*Hittalagida*), Gujarati (*Loksarvani*), Hindi (*Sujhbujh*), Malayalam (*Inikarshankan Samsarikkatte*), Oriya (*Ama Akha Pakha*) and Telugu Honey Bee. The Honey Bee collaborators provide major support to the network in maintaining and operationalizing the informal horizontal relationships. People to people learning is also facilitated through Shodh Yatras.

The Honey Bee philosophy operates through blending of the 7 Es, Excellence, Equity, Environment, Efficiency, Ethics, Empathy and Education. It is the ethical basis of the seven Es which has enabled the voluntary spirit of the network to build upon people's knowledge systems without impoverishing the knowledge holders for the last two decades. The network has achieved success to a large extent in connecting individual and communities around the world through local language interfaces, protecting their IPRs and ensuring equitable sharing of benefits in as fair and transparent manner as possible.

NIF has mobilised additional 50,000 innovations and traditional knowledge making the total database of more than 60,000 such practices from over 400 districts in last six years. Nothing at this scale has ever been achieved in the field of grassroots knowledge, innovations and practices. It has helped file 131 patents including six, which were filed by GIAN (www.gian.org) and SRISTI (www.sristi.org) in US. The US patents were filed with *pro bono* help of a Boston based law firm viz., THT and now called as KLNG. Similarly, all the patents in India have been filed with the *pro bono* help of IPR firms. Among all the stakeholders, the professional community dealing with intellectual property right protection has made the most voluntary contribution.

NIF has set up the Student Club for Augmentation of Innovations at Grassroots (SCAI) chapters in leading business and technical universities to provide technical and business assistance to the grassroots innovators. The Grassroots Innovation Design by Students (GRIDS) clubs try to encourage students of engineering, agriculture, pharmacy etc., to undertake any one of the following activities for incubating grassroots innovations such as a) Documentation, validation, market benchmarking of scouted innovations, b) Development of technical incubation plans and c) Undertaking prototype development or product development or testing and calibration.

About two dozen technologies have been licensed to small-scale entrepreneurs directly and through two GIAN centres and one GIAN cell. NIF has scaled up GIAN experience to set up GIAN north at Jaipur and GIAN cells at IIT Guwahati, SSIT, Tumkur and TCE, Madurai. The cell at Guwahati is managed by NIF directly and the others are supported by local host institutions. To strengthen the support for innovations, Small Scale Industrial Development Bank of India (SIDBI) joined hands with NIF after the Finance Minister made the announcement in the parliament to set up a Micro Venture Innovation Fund of about USD 1 million in October 2003. There is a great deal of discussion on micro finance but when have we heard the discussion on micro venture finance. The implication of this policy gap could be that policy planners and heads major international financial institutions have no idea of the creative potential that exists at grassroots level. Or they believe, naively I suppose, that these innovations could be scaled up without the support of risk capital.

What is remarkable about the licensing experience is that all the technologies have been transferred without having received a patent on any one of them. It is obvious that diffusion of technologies must take place through social as well as commercial channels. There is no doubt that diffusion through farmers and artisans own networks has been most effective in past. However, the media exposure has also made significant difference.

NIF has organised three award functions so far and the fourth one would be organised this year. Hon'ble President of India has given the awards in the last three functions⁴. When the head of the state honours grassroots innovators and traditional knowledge holders, a statement is made. When Dr.Kalam invited the awardees to the President's house and personally offered snacks to the elderly awardees, everybody was touched to the core. Never before had extremely common people pursuing uncommon distinctions imagined that they would receive such consideration from the President of one of the world's largest democracies.

Dr.Mashelkar, Chairperson, NIF has always believed that 'I' in India should really stand for 'Innovation'. Moved by the impact of the movement, he realised that the rising aspirations of the people will convert into frustrations if value was not added. Accordingly, an MOU was signed between NIF and CSIR (Council of Scientific and

⁴ President's a speech <http://presidentofindia.nic.in/scripts/sllatest1.jsp?id=969>
profiles <http://www.4award.nif.org.in/profile> <<http://www.4award.nif.org.in/profile>>

Industrial Research) in June 2004 to support research in four areas, viz., herbal, mechanical, food processing and nutraceuticals, and energy. A joint implementation committee, chaired by an eminent scientist, Dr.R.Kumar from Indian Institute of Sciences, Bangalore has been set up to manage and monitor the cooperation. Similar discussions have begun with Indian Council of Medical Research (ICMR) to add value to herbal knowledge. Out of more than 50,000 innovations and traditional knowledge, more than 30,000 deal with herbal applications for human as well as animal health. Unless value is added to the unique practices as such or after pooling the best ones, no benefits will accrue to the knowledge providers. Just to give an example of the international interest in commercialising grassroots innovations, in the last nine months, NIF received 166 inquiries from 33 countries for 54 technologies mobilized by the network. Many more enquiries have come from within the country. The idea is catching up. Some other small organisations have also tried to help few of the award winners of NIF without however, feeling constrained by the Honey Bee Network philosophy. In due course, it is expected that a larger social acceptance will emerge so that minimum ethical protocol will be followed while dealing with people's knowledge systems.

Shodh Yatra:

Every six months, we walk from village to village honouring local knowledge experts and grassroots innovators, young children who have extraordinary sensitivity about the biodiversity based knowledge systems and other change agents. Having walked for about 3200 kms., in eighteen Shodh Yatras (learning walks), every summer and every winter for last nine years, a great deal of cross pollination has taken place. We have been inspired by the innovations we came across. The multimedia multi language database carried on laptops and projected for wider viewing wherever electricity is available generates excitement among the local community members also. During the 16th Shodh Yatra in Kerala, in one of the roadside meetings when we were presenting the innovations, lot of people had gathered around. After half an hour, we stopped the presentation and asked people to share their insights about local creative people. There was a lull. People asked us to continue presentation and we would not. After a while, several people came forward and told us about fascinating innovations involving modification in steering arrangements for car to make it possible for handicapped people to drive, improvement in vanilla processing technique to raise the level of vaniline extraction, development of cardamom variety, etc. The seventeenth Shodh Yatra took place in Koraput region of Orissa – one of the poorest regions having knowledge rich people from May 9 – 16, 2006 (www.sristi.org) and 18th in western UP (December 25 – January 3, 2007). The 19th Shodh Yatra will take place in Anantnag district of Jammu and Kashmir during June 17 – 24, 2007. Those who wish to join should write back.

Having walked in Tamil Nadu, Kerala, Karnataka, Maharashtra, Gujarat, Rajasthan, Uttaranchal, Himachal Pradesh, Orissa, Uttar Pradesh, besides of course, different parts of Gujarat, we have learnt a lot. For last five years, a course has been introduced in IIMA (Indian Institute of Management, Ahmedabad) on the same subject encouraging students

to learn from within and common people. The learning can take place across the world. A Shodh Yatra is also planned in England⁵.

Cycles of Creativity

There is an increasing use of cycle in everyday life in Scandinavian countries. There are lot of variations that are available in the market which have made cycling popular. However, let me illustrate a few innovations, which have perhaps not yet become popular in Europe. If after my talk, I meet young entrepreneurs and innovators and also investors who make it happen, the G²G model would have come into action.

Kanak Das has designed a cycle (patent applied), which can harness the energy normally dissipated in the shock absorbing springs for propulsion. Therefore, when we cycle on an uneven road or a mountainous track, the bumps work for the rider. Such a cycle can eventually be modified into E-bicycles as Kanak Das has tried with limited success.

Saidullah and Charasia have developed slightly different designs of amphibious cycles which at very low cost provide entertainment, means of transport, exercise, research in water bodies, aquatic photography without much noise, etc.

Vikram Rathore has designed cycle based pump which works in shallow waters, Mansukhbhai has developed a cycle based sprayer, Prem Singh has attached a cell phone charger, Kamrudhin has converted cycle into a small workshop with grinding, cutting, drill, etc. All of these and many other innovations can have applications in developing world but in remote locations even in the developed world. The search for sustainable lifestyles will invariably situate cycle at the centre of our energy dynamics. A washing machine cum exercising machine designed by Remya Jose can be very functional substitute of exercising cycles.

The challenge is for designers to engage with such innovators scouted by Honey Bee Network members and supported by NIF, Society for Research and Initiatives for Sustainable Technologies and Institutions (SRISTI), Grassroots Innovation Augmentation Network (GIAN), etc. Same innovation can be adapted according to the user needs in different socio cultural conditions.

Let me illustrate how users can find new applications of existing technologies in a creative and innovative manner and thus expand G²G model.

Enhancing efficiency: Expanding applications

A professor from Boston wanted to do research on biodiversity on the top of tree canopies. She and her students had to make costly platforms for making observations in a quiet manner. When she looked at the tree climber designed by Appachan from Kerala at NIF's website (www.nifindia.org), she ordered four of such tree climbers at the cost of

⁵ http://news.bbc.co.uk/2/hi/programmes/from_our_own_correspondent/6279929.stm
http://www.bbc.co.uk/worldservice/programmes/global_business.shtml

about 60 – 70 USD each. Now she can do research more efficiently and with greater options. Kevin Davis used the same climber in Florida and found it very efficient for coconut harvesting. Mushtaq, a young innovator from Jammu and Kashmir has developed a tree climber, which costs hardly 5 – 6 USD. Indian advantage lies in sustainable, low cost and efficient technologies. These solutions are finding applications all over the world.

In most countries, cleaning the sea beaches is a problem for which efficient solutions may not exist. Dr.Raman, an entrepreneur saw a groundnut digger – separator at our website and contacted us to explore its licensing. After seeing field demonstration by Yusuf from Rajasthan through GIAN North, he was convinced that it could have another very interesting application. This was to clean the beaches. What this groundnut separator does is to scrape the soil, pick the pods left in the field after the harvest, stir the same on a sieve so that soil is dropped below and the pods are collected in the sieve. A new application for Indian as well as overseas markets was discovered by a user.

Involvement of users in developing technological modifications has been studied extensively in literature (von Hippel, 2005) but its applications in G²G model are only beginning to appear.

There is a patent filed by SRISTI in US with the help of a *pro bono* IPR firm, KLNG (Kirkpatrick & Lockhart Nicholson Graham, LLP) on behalf of Mansukhbhai. This is for a multi purpose motorcycle attachment so that one can use motorcycle for ploughing, inter culture, and other applications in vineyards, vegetable gardens and flower gardens where heavy machinery may not be needed or even feasible. This patent (No 6854404) makes it possible for G²G to happen if somebody can apply this technology in anticipated or unanticipated context. For instance, we often find airport authorities using 25 to 30 horsepower tractors for transporting baggage from airport to the delivery conveyor belts. A four to five horsepower motorcycle would be sufficient for the purpose. Energy saving has to drive the diffusion of such innovations.

Prem Singh has developed a very low cost cell phone based switch for electrical household appliances as well as pump sets in the field. Such switches exist in the western countries but at much higher costs. The result is that one does not find many applications of cell phone as a switching device. With the switch costing less than 50 USD, a farmer can switch on and off his pump sets whenever electrical supplies are received. It can also be useful for a busy executive who would like to have a hot water bath and/or a hot sandwich after reaching home. She can switch on these devices using her cell phone on the way to home. The smart homes about which we have heard so much can become an affordable reality. If someone has forgotten to switch off a water tap or gas, such devices can help stop.

There are large number of other innovations, which have applications all around the world. We have not exploited a new model, which looks at the fortune at the tip of the iceberg.

The popular model of Fortune at the Bottom of the Pyramid considers poor as consumers. It tries to find opportunities for the large corporations to sell things, even the ones the poor may not need. For instance, a one-rupee ice cream. But, the model that we talk about clearly recognises that poor are not at the bottom of all pyramids. They may be at the bottom of economic pyramid but at the same time, they may be at the top of innovation, ethics and values pyramid.

Unless we transform the models of thinking, we will not be able to develop new possibilities of G²G.

What next:

AASTIK, an Academy for Augmenting Sustainable Technological Inventions, innovations and Traditional Knowledge, has been recently set up by SRISTI, to promote research by the knowledge holders and grassroots innovators themselves with or without the support of professionals. The idea has been conceptualized with the belief that research about creativity and innovation is not the prerogative of only the institutional scientists; it can also be undertaken by the innovators themselves. The academy aims to provide the virtual platform to the innovators, academicians and scholars for presenting, harnessing and upgrading their knowledge pertaining to innovation, creativity, heuristics of traditional knowledge etc.

AASTIK may eventually evolve into an international centre of excellence for capacity building of scholars, local community leaders and innovators themselves and their organizations from around the world. Grassroots innovators (with the help of research fellows and other faculty members) will be imparting training to policy makers, NGO leaders and others interested in building similar networks.

The grassroots innovation movement in India is spreading rapidly. The National Register of Grassroots Innovations and Traditional Knowledge provides no legal protection as such though PIC does cover contractual protection. There is a need to modify the international IPR regime to make it more responsive towards the need of innovators and traditional knowledge holders in developing countries. Unless the transaction costs are reduced for people to disclose their knowledge, innovations and practices, why should they share their unique insights and experiences? At the same time many of the knowledge holders do share their innovative experiences because of their inherent generosity. Should those who share remain poor while others who are greedy become rich? How do we sustain the communitarian spirit without penalising the local innovators and traditional knowledge holders for putting faith in our institutions? Most international attempts in this regard have fallen short of the ethical and institutional requirements of transparency and accountability towards the knowledge holders.

To restore the confidence, we have to consider several policy measures at international and national level.

- a) *Globally distributed Network of mentors*: A web site for inviting volunteers was designed, viz. www.indiainnovates.com with the help of IIMA students some years ago. Idea was to assist the grassroots innovators in developing their products, designing these better, testing these for taking these not just to domestic markets but also in global markets. Already, technologies have been commercialised in USA, Singapore, and Pakistan. Grassroots to global seems a realizable dream. So far, all due to domestic resources.
- b) *Global-GIAN*: Brazil and China have joined hands with SRISTI to scale up Indian experience. Malaysia and S African science and technology departments are also in touch with us to explore how can Honey Bee Network experience is replicated there. The purpose is to reduce transaction costs of entrepreneurs and potential risk capital investors from around the world to join hands with the innovators. Each one of them may not find the other in the current disjointed system. It should eventually evolve into a virtual Incubator for green grassroots innovations.
- c) *International Register of innovations and traditional knowledge*: Since 1993, SRISTI has campaigned for INSTAR (International Network for Sustainable Technological Applications and Registration) but such a registry is yet to evolve. People in one part of the world may thus learn from creative people in another part. Such a registry could also provide a low transaction cost system clear the demand and supply of innovations, investment and entrepreneurial support. It can also be agreed under a new treaty likely to be negotiated at CBD/WIPO to provide a quick protection from bio-piracy.
- d) *Building Upon Women's knowledge*: One of the major gaps in our activities has been the inadequate number of innovations and traditional knowledge contributions by women. There are several reasons, which may have caused this gap, one important reason could be lack of women field workers. About 1.2 million self-help groups of women are believed to exist in the country Even if a small section of such women group can be reached, and be linked with the innovation movement, it would be highly beneficial. In every monthly meeting of SHGs, the traditional knowledge of women about agriculture, food processing, weaning foods, health, and livestock may be documented. By pooling the best practices, new products can be developed which can be taken to market with the help of investment from Micro Venture Innovation Fund. This will help in three ways (i) horizontal trading among the groups for products developed by them will lead to solidarity and social welfare, (ii) create market for such products in urban areas, additional income can be mobilized for the women and (iii) new knowledge based products may provide additional incentives for people to try other institutional approaches for adding value and generating incomes.
- e) *Inventors Association (Innovator led regional incubator)* : The horizontal networking among the innovators through their own associations is something very crucial to evolve a culture of cooperation. Later, these informal networks could be formalised in the form of an Inventors and Innovators Association to

provide institutional support to grassroots innovators located in villages and urban areas all over the country.

f) *International/National Technological Innovation Acquisition Fund*

Sometimes, an innovator may not have sufficient resources to scale up his/her innovations or inventions (in private, public or informal sector). Yet some of these innovations may need to be diffused for a larger social cause. For instance improvements in design of a kerosene stove which saves energy may be very vital for national interest but the concerned innovator (as is the case with most of the innovators with NIF who have improved stove design) may have neither the incentive nor the capacity or both, to diffuse the design among large number of small scale manufacturers. Creation of a National/International Technological Innovation Acquisition fund may be helpful to acquire the licensing rights of such innovations and inventions for eventual out licensing these at low or no cost to small scale manufacturers under technological up-gradation program. Ideally the rationale behind having a technology acquisition fund is to compensate those knowledge providers whose knowledge has potential for economic value addition. Later, this knowledge pool could be governed by open source philosophy so long as people meet their livelihood needs.

g) *Reforming Intellectual Property Information System:* the oral knowledge, which is not documented in public databases or is not reasonably accessible, should be protected and not considered as prior art. Once this knowledge of any society is assumed to be prior art, no compensation may be due from anyone who uses it for commercial purposes. Every patent applicant in developing as well as developed countries should be required to declare that the knowledge and or resources used in the application have been used *Lawfully* as well as *rightfully* (through prior informed consent). Similarly, there should be *First to Invent* system for small innovators instead of First to File. How can small dispersed, often illiterate grassroots innovators be expected to compete with large corporation in reaching the patent office first? There are a large number of other reforms that need to be brought about to blend the advantage of GPL use in open source technologies with the licensing system followed in conventional intellectual property right system.

h) *Collaboration with schools:* A very large effort is needed for supporting curiosity, commitment and collaboration among children. NIF has made some effort in this direction. Unless the spirit of creativity is unfolded at an early stage in life, it may become difficult for this trait to be developed at the adult stage.

i) *Linking Technology Students with problems and solutions of grassroots Innovators:* There are at least 400,000 technology students in India. Each one of them does one project in a year. There is no means to ensure that these projects are linked with innovations and traditional knowledge or problems which need to

be solved. Even if one per cent of these projects are based on innovations that have already been scouted and documented, and aim at improving and calibrating them, this would be a great achievement. There is a need to have a web based database that would have information on such projects. The portal should also have a segmented list of problems which needs urgent attention with particular focus on the problems of women and handicapped people. This would require provision of funds for running a portal and extending small support to the students managed by a committee of eminent scientists and technical experts.

- j) *Mobile and stationery multi-media–multi language Databases and exhibitions of innovations:* these will help immensely in overcoming three barriers that we have identified for learning at grassroots, that is literacy, language and localism. Multi-language multi media kiosks set up as *Gyan Manthan Kendra*(knowledge churning centre) will help in bridging the knowledge divide with in village or nearby places.
- k) *Dedicated Labs for adding value to traditional knowledge:* Diffusion of technologies with high social impact suffers a great deal as there are hardly any specific laboratory facilities for large scale demonstration of such technologies. There is a necessity to allocate separate space and fund for large scale demonstrations, viz., herbal pesticides, herbal veterinary medicine, small sprayers, ploughing devices, cycle based devices etc. A chain of dedicated labs devoted to value addition in biodiversity based innovations and traditional knowledge are needed to fill an important gap. In the first 16 years, we could not get 16 experiments done on grassroots innovations in public or private sector labs. We were expected to pay the same cost that large corporations are expected to pay. Things have begun to change in the last two years. We may develop decentralised common pool fabrication laboratories and testing centres for faster validation. This will particularly help the local innovators and artisans so that their knowledge can be blended and upgraded with modern tools and techniques to produce competitive technologies.
- l) *Innovation Insurgents:* . The idea is that those young people who are angry and are willing to destroy the existing icons of power and authority have a reason to feel angry. We have to accept their frustration as genuine and legitimate. It is true that violent means very seldom can achieve, if ever, positive results. Therefore, the power to destroy has to be transformed into power to create. I submit that the examples of grassroots innovations and traditional knowledge that we have collected from over 400 districts in India provide a basis for attempting this transformation. It will be naïve on my part to suggest that these insurgents will overnight take over the function of innovation augmentation or knowledge brokers and managers to build value chain around their indigenous technologies. The only resource in which poor people are rich is their knowledge (and institutions and values). Unless we build upon richness of nature and richness of their knowledge, the people on the margin will not become major actors in transforming the grim situation in these regions. The struggle of local

communities mainly in forest and other marginal regions have been around *jal, jungal, and jamin (water, forest and land)*. The '*jankari*' (*knowledge*) has not been generally a basis for struggle. In the emerging knowledge economy, the knowledge of people is the most precious resource. However, the rights of the people in this knowledge are not yet properly defined, or for that matter even recognized. I am only suggesting that there is a need to listen to the angry youth of our society who fortunately is not willing to be patient indefinitely with the continued injustice and exploitation. Their restlessness is the biggest asset that this initiative intends to build upon. The role of financial, R&D, market and design institutions is obvious in building value chain and providing back up support to the *innovation insurgents*

Ultimately, what is needed is a global movement in which providers of funds will consider their support as fees to be paid to learn from creativity and innovations at grassroots. Policy makers will have to be cajoled at international level to explain their continued indifference to the potential people have, to solve (even if sub-optimally) long pending problems. Though some times we need to challenge the young and the old to solve the problems, which even grassroots innovators have ignored. The modification in the design of pulley for drawing water is one such example. When we posed the problem of the static design of pulley, which had remained frozen for almost two thousand years, the innovators came out with many suggestions. Ultimately, Amrut bhai came out with an arrangement of a simple lever on the top of the pulley. It enabled women to leave rope whenever they were tired so that they could gasp for the breath. Once they had rested, they could start pulling water again. The bucket of water once pulled up would not slide down into the well as is the case with conventional pulleys unless one kept holding on to that. There are a large number of such problems which will have to be posed to the students as well as other innovators.

It has taken us a long time to reach this point. Others will have to take this movement forward. Building collective leadership is the greatest challenge since many individuals, devoted as they are and have been, have their own life goals to pursue. The network of innovators will have to take charge ultimately of this movement. Amen.

I am very clear that Honey Bee Network provides a viable framework for transforming the focus and force of globalisation. A recent initiative of bringing community/individual grassroots innovations from China, India and Brazil together is delivering some results. We hope that more and more young people, startup companies, investors and entrepreneurs will explore the untapped potential of G²G. The poor people will no more be the *sink* of our advice, assistance and help. Instead, they will become the *source* of solutions⁶.

⁶ Anil K Gupta, "From Sink to Source The Honey Bee Network Documents Indigenous Knowledge" and Innovations in India, Innovations, Summer 2006, MIT Press, 53-66