ek unsuni aawaaj: curious, creative, collaborative and compassionate India
(Lok Gyan Manthan Kendra: people's knowledge churning centre)

When the creative common people of a society have to struggle to get recognition, then a sustainable and inclusive future is unlikely. It is not for just recognising such people that Honey Bee Network emerged more than two decades ago. It was also to make our lives more frugal, sustainable and in sync with nature that learning from the spirit of common people became imperative.

Argument for protecting knowledge rights of creative communities and individuals more than 25years ago was a minority voice in the din of globalization that was to follow. Neither the Convention on Biological Diversity (the Earth Summit, CBD) was in place nor WTO induced TRIPS (trade-related aspects of intellectual property rights]) was there. Here was a newsletter advocating just that. The resources for the Network have remained meagre and so also for the institution which backed it up mainly, that is SRISTI. There are several other volunteers who have made a major contribution to the growth of this idea but all of them have worked with very minimalist resource backup. Off shoots of Society for Research and Initiatives for Sustainable Technologies and Institutions [SRISTI] have grown in the form of Gujarat Grassroots Innovations Augmentation Network [GIAN] and National Innovation Foundation (NIF). NIF has become an institute of Department of Science and Technology, GOI and thus is assured of reasonable support in future. SRISTI does not take any financial support from the Institutions it spawned as a matter of principle.

SRISTI since its formal inception in 1993 has been trying to trigger an informal revolution with in the country but also in many other countries to respect, recognize and reward knowledge rich-economically poor people. Creating new role models in society is a slow but very sustainable process if it begins at the doorstep of centenarians, traditional knowledge holders and grassroots innovators. Shodhyatras, organised every summer and winter during last thirteen years, involving walk over 4500 kms have taught us a great deal more about how creative and compassionate India deals with the idea of making India a knowledge society[1]. In due course, India might make affordable, accessible and accountable solutions available to common problems not just for disadvantaged people in the country but rather worldwide.

Challenges ahead:

1.0) Creating a Green campus to make the idea of creative India come alive for children, adults, policy makers and leaders of developing world

A distributed campus with simplicity writ large on every aspect of it will hopefully trigger a system of distributed knowledge management. While there will have to be a central campus, there should also be Community Platform for Innovation and Knowledge (CPIK) in inner city of Ahmadabad hopefully in collaboration with Ahmedabad Municipal Corporation and in other parts of the country. Eventually, such centres may be set up in different parts of the world as well. Idea would be to engage with creative communities and provide them access to fabrication, research

[1] There is also a course on Shodhyatra at IIMA which is one of the most sought after course though I accept only 25 students. Every year students are taken to Himalayas to learn from within, each other, nature and from common people.

and creative skill development opportunities. An innovative society cannot endure without a very wide network of experimental and innovation sites where children, adults from formal and informal sectors can work together regardless of class or other cultural identities.
The SRISTI Campus may house laboratory, learning centre, library, fabrication workshop, creativity workshop, archives of traditional knowledge, multi-media multi language innovative content production centre, visiting scholar residency, or gyan-vigyan ashram, community radio station, international centre of excellence for building capacity in setting up national grassroots innovation systems in third world,

1.1 Innovators in residence programme: Presence of the creative person can inspire, instigate and illuminate the lives of many around. During the co-learning camps, even corporate executives can register, at much higher fees about the art of frugal design or engineering or heuristics for solving problems, creating visions and achieving results. The innovators will be invited from different fields such as technological, educational, common property institutions, cultural and business for social inclusion. Videotapes of the encounters will be maintained which in due course will create a kind of youtube/TED of learning from creative minds at the grassroots.

1.2 An online university for inclusive innovations for sustainable development akin to the current project of GRIID [Grassroots Innovations for Inclusive Development] [http://www.sristi.org/cms/?q=en/node/1771] is planned. The distributed membership of the faculty will have teachers from the top universities around the world willing to engage with grassroots communities. In due course, doctoral programme may be started in collaboration with various mainstream universities.

1.3 g2G [Grassroots to Global]

As mentioned in the GRIID project, the existing model of globalisation needs to be reversed, at least, partly. While the scope will always exist for consumption of externally produced or sourced goods or services at local community level, the research proposed here may lead to an alternative conceptualisation of future of globalisation. This may happen through following initiatives:

1.3.1 The grassroots producers, innovators and some of whom will become entrepreneurs, may be,by themselves or through supporting mediating organisations create space in the global market for their products and services (it is happening to some extent in the area of crafts, handicrafts, handlooms, but not happening enough in food, artefacts, herbal products, architecture, wall murals, etc.,).

1.3.2 *Creating space for grassroots entrepreneurial knowledge based products in global markets can modify the dominant adverse effects of globalisation.* The e-commerce platform, the courier and packaging industry may have to be integrated in the supply chain so that a global consumer can source locally produced knowledge based goods (nutraceuticals, traditional foods, innovative craft, cloth or any other locally manufacturable goods, etc.). The research will have to be done to create such supply chains that can accommodate high degree of variability in the product, channel of transportation, nature and process of consumption and finally the disposal. At the same time, the transaction costs for the knowledge producers and grassroots entrepreneurs as well as buyers will have to be kept extremely low.Idea is that a locally famous/expert pickle/processed food making lady will be contacted when some body places an order for her

speciality displayed on website, with right container and supply it to the buyer, hygienically. The lady has beocme an entreprenur. Local food has been put on global plate and reverse globalization has set in place.

1.3.3 *Expanding space for grassroots innovations in global mind and markets*: The Honey Bee Network experience was used by Department of Scientific and Industrial Research (DSIR), Government of India to build capacity in Asian and Pacific countries [Malaysia, Philippines, Sri Lanka, China, Indonesia, Vietnam] through engagement of SRISTI as knowledge partner with APCTT. The experience of workshops in various countries in the region shows that the desire to*expand space for grassroots innovations in global mind and markets* is being felt in large number of countries in different parts of the world. Malaysian Science and Technology Minister visited NIF and SRISTI recently and has shown interest in signing a MOU with NIF. Earlier, thePresident of Tianjin University of Finance and Economics had visited SRISTI and shown interest in cementing the ties between both the partners.

1.3.4 *The initiatives for creating a portal for pooling and sharing open source grassroots innovations* will further demonstrate that tremendous impact can be made on creating the self- designed opportunities for local communities through local language interface. Today, any search on web for such technologies would not reveal even a few hundred examples. We could take it to few thousands within a couple of years. The global pool of grassroots innovations thus can be another means of denting the dominance of the conventional globalisation process. It is now agreed world over that mass-sourced or crowd-sourced ideas and innovations will be a turning point in the history of technology at different level.

1.3.5 *Democratising Innovations, knowledge and application skills:* The experience of commercialising more than a dozen value added products developed in a very small natural product lab of SRISTI indicates another possibility of democratising innovations and innovation based products for sustainable agriculture and other means of livelihood. During 2007 – 11, a few companies have been able to commercialise some of the natural products based on technologies developed by SRISTI lab by pooling people's knowledge. The potential is much more. The benefits of this commercialisation have been shared in advance with some members of the knowledge providing communities and individuals and with some after the receipt of the royalty. But more importantly, the range of open source innovations and TK practices shared with communities in different parts of the country and the world is much wider and profuse. It is this pool, which has truly built up the social capital of the Honey Bee Network. This is a tremendously buoyant area of experimentation. We need intensive action research to develop models of market and knowledge based

approaches to poverty alleviation. *SRISTI wishes to make the world's largest repository of open source green innovations and tk in as many internatioanl and national langauges as possible.* At the same time, this data base will be accessible to local communities to develop in a distributed manner their own solutions for sustainble resource mangement and livelihood.

2.0 Expanding the scope and substance of AASTIIK((Academy for Augmenting Sustainable Technological Inventions, Innovations and Traditional Knowledge) is crucial future step.

2.1 Fellowships through AASTIIK, academy to build capacity of creative people, young researchers and activists and emerging leaders in engaging with creative margins of the society in a mutually accountable and transparent manner.

2.2 Bringing out local language version of Honey Bee newsletter in remaining 20 plus languages but also in many other languages of the developing world, Spanish, Swahili, Zulu, Chinese etc. Indian leadership in knowledge economy will not be achieved only through cyber low value adding projects.

2.3 Making www.techpedia.in a viable platform for young students and technology youth to share, collaborate and learn to generate technology based entrepreneurial solutions.

2.4 Create a whole chain, supply chain and distribution network with Green *Shashwat* stores around the world selling green products with income going back to the people whose knowledge made those products possible.

2.5 Creating Global GIAN foundation to help creative people worldwide and set up ccparglobal prizes for grassroots innovations and young tech pioneers

3.0 Sadbhav-SRISTI-Sanshodhan Lab (SSSL) for natural products and sustainable resource management: Enlarging the SSSL to have may be 500 to 1000 Ph.Ds dedicated to add value to local knowledge of marginal communities in India but also from other economically poor countries. Indian mode of development can not be a parochial model, it has to follow *Vasudev Kutumbkum* spirit.

3.1 The SSSL focuses on adding value to people's knowledge related to human, animal and agricultural knowledge systems.

3.2 The lab also works on microbial diversity. The work on microbial diversity a sindicator of soil eco-system health was starte dway back in 1993when we did not have lab but we 750 collected soil samples from all over gujarat. We could analyse only 60 with the help of IISc, Bangalore. That work was resumed in GEF project in early ninties when we collected soil smaples from Jessore and Balaram sanctuaries in north Gujarat. Later, we started colelcting soil samples during shodh yatras and we call them now microbial memories of our walk. Several useful cultures have been isolated from these which are effective against many pathogenic cultures. In due course these cultures might generate cost effective solutions for many microbial infections.

3.3 The lab has received support from Indian Council of Medical Research and Department of Science and Technology through NIF. But a great deal remains to be done. Unless we can add value to thousand of tk practices we have received and share back with the knowledge providers the benefits therefrom or at least low cost affordable solution, lab would not have served the key purpose.

3.4 Ideally, every knowledge provider should get a report on the validty or otherwise of the knowledge provided by him or her so that society becomes much more knowledge intensive then what it is.

4.0 ICT educational and institutional aplications for inclusive development

4.1 open source database have been initiated by sristi in following domains: technological solutions for day to day problems faced by farmers and others, institutional innovations dealing with management of common property resources from about 30 countries (sristi.org/cpri), cultural creativity (sristi.org/cultural), open source educational softwares, stories of women centenarians, videos and photos of shodhyatra, etc.,

4.2 we also are trying to develop an online multi media multi-language collaborative paltform for product design, problem solving and learning from each other.

4.3 to promote open source software applications for knowledge based economic development, sristi intends to develop a library of solutions which will help groups like ours and also clocal communities

4.4 using railways (http://sristi.org/anilg/comments.php?post_blog_id=219) and postal services for scouting and dissemination will require on line erp solutions to track thousands of ideas which may be submitted every day,

5.0 Key initiatives for transforming national innovation systems from grassroots perspective:

Dissemination:

1. The old axiom, seeing is believing still holds true. Today, a large number of organisations have facilities for field trials and demonstrations. But the convergence is missing. In the mobile telephony, different channels such as television, internet, phone and other services like GPS, etc., are getting integrated. The results are visible. But, in agriculture, the extension centres of one public institution won't let various other institutions to showcase innovative solutions to the farmers problems at their research and extension farm. There is a case for convergence in these facilities as well. The commitment should not be to the turf but to the delivery of solutions to people.

   In each district, there should be a District Innovation Gallery or Forum where various innovations can be showcased. KVKs [Krishi Vigyan Kendra] can be the site of such exhibitions.

2. Public media has almost given up showcasing the public interest innovations regularly. There ought to be regular slots on All India Radio and Door Darshan for sharing information on innovation so that in the regions where no other channel reaches, the message of Decade of Innovation declared by Hon'ble President reaches with a very practical and operational content.

   A regular programme, if not every day, at least every week at prime time for sharing the information about innovative experiments being done around the country is necessary to create the right mindset and celebrate the Decade of Innovation.

3. We should mobilize the support of one lac post offices and even larger number of postmen to scout and disseminate innovations in every nook and corner of the

country by involving NIF and Honey Bee Network. This will help map the creative mind of the country and also create awareness about existing innovations.

Mobilising postal network for scouting and dissemination will create a foolproof presence of the National Innovation System in every village of the country.

4. More than four crore people travel by Indian Railways every day. In the long distance train, there is an opportunity to offer courses for skill development and also reinforce the concept of life long learning. At the same time, dissemination of ideas about innovation and scouting of the same can also be done through idea boxes at various stations and in trains. In the short distance train, idea competitions can generate lot of interest and people can sms their solutions to various challenges and submit ideas for other innovations. The mindset has to be changed. We have to shed the habit of living with problems unsolved indefinitely.

   Minds on move through Indian railways are likely to be more receptive for continuing education, skill development, scouting and dissemination of ideas, innovations and outstanding traditional knowledge practices. This will create traction for innovations on day to day basis and strategies will be dynamically positioned, retailored and delivered involving users/commuters in design and delivery.

5. Reaching students in municipal and government schools to harness the creativity of young ideators and inventors. Within four years of IGNITE competition by NIF, the entries increased from a few hundred to over 2000 from 160 districts in 2010. However, most of these were from CBSE schools or Navodaya Vidyalayas. If Ministry of HRD is brought on board, one can involve municipal and government schools in a big way. The science exhibitions predominantly have demonstration of known concepts though there are always a few innovative ideas. Perhaps one can reach mass level students through state education boards and Navodaya Vidyalaya system.

   Harnessing the ideas of young inventors, innovators and ideators from schools in each block of the country will lay the foundation for developing future leaders of innovation movement in the country.

6. SRISTI's initiative of pooling technology projects by over 350,000 final year technology students from over 500 colleges has led to the techpedia.in platform having over 100,000 projects. Gujarat Technical University in collaboration with this initiative has decided to create Navsarjan Sankul [Innovation Clusters] by mapping colleges to the MSME clusters. Ironically, minimum number of, say chemical engineering students are enrolled in colleges around heavy concentration of chemical industry. There is a great deal of rethinking required in linking higher education with the needs of small scale industry and grassroots communities. In the next three to six months, techpedia.in would have another 50,000 projects besides the top five from each college of Gujarat. There is a need to replicate this model in each state. Rajasthan Technical University has already written to us for similar linkage. Efforts are on in other states also. Scouting of projects and dissemination of innovations will also promote greater connectedness to the societal problems. The originality and innovation quotient of the technology projects may have inevitably and irreversibly gone up because doing something, which has already been done, is

not going to be easy. The cost and speed at which innovations have started emerging is unimaginable. This is a good illustration of MLM and Gandhian engineering.

Scaling up the techpedia.in as a national portal through public-private and civil society partnership is inevitable to trigger a distributed inclusive model of innovations.

Testing/Calibration/Validation and Value addition:

7. The support system for validation and value addition needs to be augmented by obliging every public R&D institution to set aside resources for testing, calibrating and value addition in the ideas and innovations of grassroots startups and innovators.

   There should be a national fund for testing and validation of innovative technologies by individuals at public testing facilities. This will speed up the mind to market journey for innovations from formal and informal sectors.

8. The ITI and Polytechnics besides other technical colleges should provide their facilities under a national programme for distributed innovation management under NInC [National Innovation Council] for fabrication and other value addition to the grassroots innovators and other individual innovators.

   There should be establishment of, first in each district college or polytechnic and later in each block, a fab lab to promote decentralized community fabrication centres for prototyping innovative products and farm machinery. Similar facilities may have to be created for herbal extraction in tribal areas.

9. There should be a dedicated young innovator fund at platforms like techpedia.in to encourage technology students in engineering, agriculture, medicine, pharmacy, biotechnology, etc., to set up at least 10,000 startups in 2012. We should double these numbers every year if we have to usher in knowledge and innovation based entrepreneurial revolution.

   A need for dedicated startup promotion fund at techpedia.in or at any other platform to encourage students to set up innovative technology based enterprises.

10. The students in technical institutions should be encouraged to join hands with the startups so that the initial costs of startups goes down and the students get real life experience. For the student startups, we should have at par placement opportunities for them upto two years so that if their enterprise does not take off, they can come back for their employment.

    The tie up between startups and the students must be encouraged and in some cases engineered to nourish the eco system for innovation.

11. Members of various science and technology academies should be encouraged to mentor the startups from technical point of view. Similarly, the industry associations should mentor such startups and students working with them or on their own

ideas. SRISTI has taken an initiative to map the MSMEs with the engineering colleges in collaboration with technical universities. Once this takes off, the connect between the projects of more than 15 lac technology students and small-scale industry and informal sector will get cemented.

National Mentor Network to be strengthened for mentoring startups in different parts of the country for proprietary or open source social technologies.

Education:

12. Incorporation of lessons on innovation journey of common people in the textbooks will go a long way in moulding the minds. It is ironic that there is not a single such lesson in any of the textbooks as yet.

    NCERT, AICTE and UGC ought to be persuaded to accord due place to innovations in the existing textbooks if additional books are difficult to introduce to begin with. Online multi language, multimedia resources also should be generated for the purpose.

13. The educational system in medical, pharmacy, agriculture, biotechnology and other fields of technology education in addition to engineering have to incorporate the project work on persistent unsolved problems of common people. Honey Bee Network has made a list of several such problems, which should be posed, to the students in different streams to challenge them for generating solutions.

    Attractive challenge awards must be introduced to incentivise the engagement of bright minds with social problems. An inventory of pending social problems for different regions must be posed to regional technical institutions for a time bound resolution.

India is poised to become an inclusive society through social, technological, educational, cultural and institutional innovations. We have nothing much but only our conventional mindset to lose. Grassroots to Global (g2G) will trigger a new role for India to spread the genius at grassroots for people in other developing countries as well.

Four proposals submitted to National InnovationCouncil are enclosed in Annexure two. These include the ideas about involving railways and postal services in scouting and dissemination of innovations. A note on techpedia.in is added to illustrate how tech youth can be mobilised for national reconstruction. Fionally a list of grassroots chaamnges is given so that our society does not live with these problems unsolved any more.

Annexure: one

AASTIIK: Grassroots Green Innovations Network – India

Honey Bee Network has provided a democratic, authentic and ethical platform for grassroots innovators and traditional knowledge holders from different parts of India and many other countries in the world for the last sixteen years. SRISTI provides a back up support. We are trying to set up an academy viz., AASTIIK (Academy for Augmenting Sustainable Technological Inventions, Innovations and Traditional Knowledge) and a portal indiainnovates.com to provide conceptual, institutional and on- line support to distributed network of knowledge rich-economically poor innovators and traditional knowledge holders. A global virtual incubator to provide similar support to grassroots innovators in third world countries, i.e. Global-GIAN (Grassroots Innovation Augmentation Network) will follow. While in India National Innovation Foundation has been set up to provide such a support, *we still have to develop a platform for innovators to do action-research on each others' creative processes and thus enrich the respective repertoire.* The proposed project of setting up AASTIIK and a portal, indiainnovates.com aims at the following overall mission

Setting up AASTIIK:

Despite all claims about participatory research and action, seldom have we provided opportunity to creative innovators and traditional knowledge holders to do research themselves as well as in partnership or by hiring formal researchers. The institutional scientists have often paid lip service to the cause of collegial partnership with the local communities and people. An evidence of this problem is that almost no research council in developed or developing country requires local knowledge providers in villages to be acknowledged by their name and address. Most institutions do not insist on their prior informed consent, although situation is changing in some of the developed countries but in developing countries, the lack of accountability is almost universal. The issue of local communities and innovators being enabled to hire institutional scientists and fire them, if they don't deliver is in the realm of speculation. Honey Bee Network, started twenty-three years ago tried to reverse this logic. There were four principles, which we learn from the life of honeybee.

a. Just as flowers don't complain when their nectar or pollen are taken away, people should not complain when their knowledge is documented by outsiders. They should be acknowledged by their name and address and their intellectual property rights should be respected.

b. The bees perform a very important function of cross-pollination thereby enriching diversity and keeping the nature's cycle on. Unless we communicate in local languages and in a manner that people can understand, people to people linkages will not be established. We should ensure that opportunities for people to people learning are given first priority in any social knowledge exchange.

c. Whenever any wealth is generated by disseminating the knowledge through commercial or non-commercial channel after adding value or without it, a fair share should go back to the people whose knowledge is made that wealth possible.

d. Before disseminating people's knowledge or bringing it in public domain, their prior informed consent should be taken.

When we tried to institutionalize these norms, we faced lot of problems. The network is a voluntary structure and therefore there was no way an ethic could be imposed. It had to be realized from within. That process became stronger with passage of time. The gravity of the matter can be gauged from the fact that 99 per cent of the ethno biological studies do not acknowledge the knowledge providers by their name and address, the researchers do not share their consultancy income or royalty from the publications with the people whose knowledge they documented in good faith. The generosity of the people has been exploited by outsiders, often without intention to do so. I say so because many professionals have been guided by the norms of the profession. The profession of ethno biology did not unfortunately evolve relevant norms till recently nor did it try to enforce the same. Imagine how would one feel if in a meeting on some research topic, a secretary documents the minutes and publishes the same as an author. That is what most scholars did. This unethical practice had to change. What is important to note is that the pursuit of Honey Bee Network for ethical, accountable and democratic discourse on people's knowledge and creativity started much before Convention on Biological Diversity (CBD) was signed or TRIPS (Trade-Related Aspects of Intellectual Property Rights) came into force.

While Honey Bee Network is growing, it does not have its own independent financial base. SRISTI has provided the back up support to the network through various projects from time to time. Some support is provided by NIF after 2003-04. The proposed project of setting up AASTIIK and a portal, indiainnovates.com aims at following overall mission:

> *To enable creative and innovative people at the grassroots, who have solved a technological problem without any external help to learn from other innovators, analyze the scientific limits of their innovation, learn to transcend these limits with the help of other innovators and scientists, and finally develop value added products and services which can solve societal problems in a sustainable manner and generate economic and non-economic incentives for innovators as well as other stakeholders.*

This will require a virtual and a physical support structure to provide various services to the innovators particularly to analyze the knowledge systems, heuristics of innovations and mechanisms of building value chains for commercial and non-commercialisable technological innovations. This knowledge base

will help other innovators to enrich their repertoire and possibly develop more successful innovations in future. The research studies by the innovators and formally trained academics would be shared in local languages using multimedia format. The Academy has to empower creative people in directing their individual and collective quests for solving problems faced in every day life in firms, farms and households. The Academy may use indiainnovates.com portal and recruit fellows to achieve its objectives. It will recognize that women's knowledge systems have received much less attention even in the Honey Bee Network compared to the men's innovations. It will also try to develop an endowment to sustain these activities in future so that creative people can contribute in transforming Indian society and eventually the world around it. A proposal has to be developed for a global GIAN to provide product development and incubation support to meritorious innovations from around the world so that global pool of green technologies developed by people expands and the quality of life of common people improves without impairing the environment, gender balance and community structures.

Impacts so far:

Honey Bee Network, SRISTI and IIMA have helped in setting up of National Innovation Foundation (NIF) in March 2000 by Department of Science and Technology, Government of India. NIF has mobilized more than 150,000 innovations and traditional knowledge practices from over 550 districts of India. Nothing of this kind has ever been attempted, to the best of our knowledge, anywhere else in the world. Hon'ble President of India, earlier Dr A P J Abdul Kalam and now President PratibhaDevisinghPatil give away the biennial awards of NIF. The Ignite awards for creative children are announced on Oct 15, every year, Dr Kalam's birthday celebrated as Children Creativity and Innovation Day by NIF. These awards are given by Dr Kalam soon after. In a way, the national mood is slowly changing.

After having established GIAN-Gujarat in 1997 as a follow up of the International Conference on Creativity and Innovation at Grassroots held at IIMA, SRISTI continued its efforts to scale up the initiative. After establishing NIF, one more GIAN was set up in Jaipur and NIF cell in northeast and again cell in Jammu and Kashmir. A national micro venture fund was set up by Small Scale Industries Development Bank of India (SIDBI) at NIF in October 2003 with initial capital base of about one million dollar valid for ten years

The challenges ahead:

The Justification for the Academy: It is obvious that grassroots innovation movement at such a large scale cannot be sustained without very active participation of the civil society actors and volunteers from other segments of society. Once these volunteers are found out, one has to sustain their interests, involvement and commitment towards the cause. The private sector has to provide the crucial market linkage, which most grassroots innovators cannot establish on their own. For developing innovations and traditional knowledge into commercial and non-commercial products, value addition and research and development have to be done. More than 90 per cent scientific human resources exist in the public

sector R&D institutions in the country. A memorandum of understanding between Council of Scientific and Industrial Research (CSIR) and NIF has enabled institutional research on people's knowledge. However, the scale is quite small. Similar MOU has been signed between NIF and ICMR (Indian Council of Medical Research). Unless we incubate several thousands technologies at a time, a few hundred would not mature for the market. And then, a dozen or so winners might emerge, which may generate enough revenue for sustaining the knowledge and value chain. In addition to the market-based diffusion, social diffusion of open source, public domain technological innovations is no less important. A Technology Acquisition Fund has been set up at NIF to acquire the rights of certain technologies for pooling to develop new product innovations to be licensed at no cost or low cost to large number of small scale or tiny enterprises. Even with this fund, the problem will not be solved unless we have a virtual incubator with distributed mentoring arrangements that can provide hand holding support and linkages with formal R&D, design and market systems.

Once such an incubator is designed (say, at indiainnovates.com), one will have to provide insights about the way creative people think, act, share and reflect on their creativity and innovations. Individual mentors may be experts in the specific subjects but may not have sufficient knowledge of the thought processes of the creative people and their social networks. Thus, the need for the Academy (AASTIIK) to replicate Indian experience in Africa and other countries besides strengthening the coverage within India. NIF, SRISTI and GIAN are far too closely involved in action. Their proximity to the ground may be a constraint in looking at the big picture and also the inter-relationships among different factors responsible for an innovation to emerge and succeed (or fail).

Objectives of AASTIIK:

1. To empower grassroots innovators and outstanding traditional knowledge holders to pursue action research about the heuristics used by creative people.

   The Academy will involve innovators and knowledge holders in recruitment of fellows, development of work plan, implementation, monitoring and evaluation of various activities.

2. To strengthen the process of diffusion of certain innovations and overcome the factors that inhibit the same. Once the enabling factors are identified, the institutional arrangements will have to be designed and tailored to location and sector specific constraints.

   Several innovator fellows will be encouraged to take up study on diffusion in their own areas with the help of research assistants and develop case studies during the same period. In any

case, the specific individuals who do various studies may change but the commitment to complete the objective will remain.

3. To mobilise social capital accumulated by grassroots innovators for creating pressure for policy and institutional changes. The role of social networks, embedded in the cultural beliefs and institutions, in emergence and articulation of innovations has not been adequately studied. Long term societal changes are not possible without understanding such cultural processes and identifying room for manoeuvre in modifying these processes.

4. To study the role of trust, reciprocity and third party sanctions, three components of social capital in evolution of innovations, maturation or abandonment.

To organize Shodhyatras (learning walks) in different parts of the world to legitimize the need for learning from the grassroots communities and individual innovators keeping in sync with nature. The Shodhyatras (walk through the villages) twice a year in different parts of the country constitute an important process of engaging local communities and knowledge holders in the dialogue on socio-cultural institutions and networks. We have always argued that technologies are like "words", the institutions are like "grammar" and the culture is like "thesaurus". The biodiversity competition among children and women also help unravel the relationship between plants, people, culture and technologies in the socio-ecological context. The more important outcome of the study could be the unraveling the relationship between technology and institutions. Sometimes, innovations in the institutional realm compensate or constraint the potential of innovations in technological realm and vice versa. Likewise, the cultural context can explain why certain kinds of innovations or traditional knowledge evolve more often in a given region compared to another. The power of cultural symbols and institutions is recognised and given the stress under which secular goals of society have to be pursued, it is important that lessons from the congruence or lack of it among technology, institutions, culture and ecology are properly learnt. So far 26 Shodhyatras have been organized in different parts of the country traversing about 4500 kms., during last 13 years. The recent walks have been in insurgency prone regions such as Jammu and Kashmir and other places affected by naxalite movements in Chhatisgarh, Bihar, Andhra Pradesh and West Bengal besides in Assam and Meghalaya.

5. Innovation Insurgents: To develop a programme for mobilising young insurgents in tribal and other biodiversity rich regions for supporting the cause of creative and innovative people there. In several parts of the country well endowed in biological resources, the lack of economic and social development has led to large scale social unrest. Many of the insurgents are basically angry youth who have lost faith in the capacity of the system to respond to the valid and genuine aspirations of local communities. An Innovation Insurgents Programme may be initiated to mobilise the angry youth towards the cause of supporting creative and knowledge rich, economically poor people. The bio piracy and other kinds of exploitation of

knowledge and resources in these regions is unlikely to stop without active, non-violent, peaceful social networks of youth.

Workshops on traditional knowledge systems could be organised in insurgency prone regions of Jammu and Kashmir, Assam, Andhra Pradesh, Chatishgargh and Bihar/Orissa. Depending upon the outcome of the discussions, fellowships could be offered to those angry young people who want to channelise fire in their belly in support of peaceful advocacy of the rights of creative and innovative people in biodiversity rich economically poor regions.

6. To develop a distributed mentoring system at a portal (indiainnovates.com) to provide active online and offline incubation support to the grassroots innovators in close linkage with NIF, GIAN and Honey Bee Network collaborators.

The portal at this moment exists only as a website. Long term dream is to make it a single stop window on the innovative face of India and at the same time, help India become an incubator for global grassroots innovations. This will set in motion the g^2G (Grassroots to Global) model. Tremendous amount of resources relating to human expertise, technology development, testing, evaluation centres, volunteers who wish to form mentoring teams, investors, entrepreneurs, market researchers, business planners and strategic thinkers will have to be mobilised and made available on the portal. The back end team will have to develop open source softwares and provide logistics and coordination support to the mentors who register at the portal. Since most innovators will not have access to internet in the next few years, their feed back on various interventions by the mentors will have to be collected, translated and posted on different discussion boards. These boards could be open or closed depending upon the intellectual property rights issues involved.

7. There has to be a multimedia, multi language platform for incubating innovations and traditional knowledge into products and services so that a large pool of open source as well as protected technologies can emerge for low cost licensing to entrepreneurs in different parts of the world. The portal would involve users as innovators.

8. To pool local best practices to develop low cost affordable products. However, for large-scale impact on health, agriculture, food, water sectors, etc., one has to involve private sector as well as public sector R&D lab for a very large time bound engagement for developing products. If we wish to work with 5000 herbal leads out of 30 – 40000 worthwhile ideas in the database, one has to make a very massive investment to generate at least 50 solutions in about two years which can go to large scale clinical trials for meeting community health needs. Likewise, one ought to work on at least 5000 mechanical, electrical, food processing, and other technologies for fabricating solutions for wider licensing. The proof of the concept already exists. The challenge is to scale it up. More than 400 patents have been filed, four

have been granted in US, more than 40 in India and many more are in process. We have proposed a concept of '*Technology Commons'*(Sinha, 2009) in which imitation and incremental improvement for self-employment and localized applications is not restricted. But, for medium to large-scale commercial applications, a proper license has to be taken by the entrepreneur from the members of the *technology commons*.

Already about 12 technologies have been commercialized and made available with name and photo of the innovators in some cases on each bottle of herbal growth promoters for crops. In addition, there is an invitation to every consumer to contribute to the innovation database for eventual product development.

9. During various walks in hundreds of villages, the power of multimedia content on innovations comes out as extremely effective. One has to create teams of volunteers as well as professionals to follow up the curiosity so triggered to help it evolve into distributed, networked and polycentric movement of experimentation and innovation. It can link up with the effort to organize on-farm research on low cost solutions for improving productivity.

10. To develop case studies of evolution, erosion and/or assimilation of knowledge and wisdom of creative people in everyday life support structures.

11. To lobby for the emergence of an international intellectual property rights protection regime for traditional knowledge as well as for grassroots innovators at affordable transaction costs (http://www.tve.org/lifeonline/index.cfm?aid=1130; http://www.managingip.com/includes/magazine/PRINT.asp?SID=514059&ISS=16357&PUBID=34; http://www.wipo.int/tk/en/publications/769e_unep_tk.pdf)

The lobbying for international patent reforms, disclosure requirements and other interventions will continue. SRISTI may participate in the future inter governmental panel meetings at WIPO being an accredited institution. We may organise international competition on green grassroots innovations and use this competition to promote the cause of IPRs as well as open source solutions. Two earlier competitions were organised with the support of IFAD, Rome. We hope to find some sponsors for the future competitions.

12. To publish studies in different languages authored by grassroots innovators and formally trained scientists about the local knowledge systems providing material for adult as well as young curious creative learners.

In an earlier study 4500 traditional knowledge practices were translated in four languages viz., Tamil, Gujarati, Hindi and English.

13. To facilitate local, regional, and national thematic, regional and cross-sectoral meetings of the innovators to develop their own self-governing systems to transform social customs, institutions and culture to provide greater space for green innovations.

14. To set up international network of user-led workshops and agriculture research centers aimed at adding value to people's knowledge for participative product and service development and capacity building in Africa and other disadvantaged regions even in India.

The Consultative Group on International Agriculture Research (CGIAR) served a purpose in bringing about green revolution in primarily irrigated regions of the world. It also helped in improving productivity in collaboration with national research centers in dry regions. But, there is no network in the world, which focuses on exclusively adding value to people's knowledge, institutions and technologies. Idea is to have a network of labs and workshops where farmers and artisans can blend their knowledge with modern science and technology and develop and diffuse low cost sustainable solutions. User-led innovations are transforming even the industrial sector. These cannot be avoided in agriculture and livestock sector as well as non-farm sector.

15. To develop various models of material and non-material incentives for rewarding, respecting and recognising the creativity at grassroots (www.cid.harvard.edu/cidbiotec.../anil_gupta_paper.htm).

Experiment will be made on various non-material incentives such as opportunity for travel, meeting other innovators, guidance from the mentors, recognition through publication, etc., in addition to material incentives provided by NIF and SRISTI. This will have considerable impact on the horizontal networking among the innovators and vibrancy of the traditional knowledge systems.

Operational framework:

It is obvious that all the objectives of AASTIIK cannot be fulfilled only by the fellows (whether formal or informal sector scholars). A steering committee and a research advisory committee have to be renewed. Rigorous continuous evaluation of various interventions made in the past as well as attempted in the future will be an important part of the working culture. A network approach would be used for implementing various ideas rather than doing most of the things centrally. For instance, after early initiative of SRISTI, NIF institutionalised the concept of prior informed consent (PIC) by the innovators and TK holders. We need to evaluate the reasons for different kind of preferences by various knowledge holders. We should feedback the analysis to the knowledge providers and then see, whether they would like to modify their choices after learning about how others have made their choices. A preliminary analysis of more than 1000 such consent forms received at SRISTI showed that

large number of knowledge providers did not hesitate in permitting dissemination of their knowledge. That is how the society had evolved its cultural norms. But, if the unique knowledge is brought in public domain without sufficient discussion, the possibility of such knowledge holders, their communities and social networks getting due returns from the commercial exploitation of that knowledge will be remote. We must, however, accept that a very large part of benefit may actually come if the best practices of different region could be pooled to develop survival technologies. When these are disseminated by small-scale entrepreneurs, simultaneously and in non-exclusive manner in different regions, the livelihood conditions may improve. This is particularly true for women's knowledge, which evolves under a very constrained socio-cultural and ecological environment. There are a large number of initiatives around micro credit but there are hardly any initiatives around knowledge based micro ventures. SRISTI took initiative way back in 1993 to conceptualise this and then articulated it in 1997 when first GIAN was set up. The new dimension to be experimented through AASTIIK is the micro venture innovation promotion, development and financing fund, with focus on women groups.

While men cannot claim so much uniqueness in any activity, no two women ever cook a curry the same way, even in the same family. The stamp of their creativity is invariably put through the chemistry embodied in indigenous recipes for food, nutrition, medicine, etc. The fellows of AASTIIK will facilitate documentation of unique practices, pooling them, generating new products for different problem segments (for instance, different kinds of herbal hair oils suitable for different kinds of hairs in a given socio-ecological environment). The fund would make product development, testing, packaging, retailing, etc., possible so that knowledge-based enterprises become the prime mover for poverty alleviation.

Many times, innovators do right things for wrong reasons. There are several agricultural practices which are quite functional but in which the articulated reason is not right. For instance, years ago, in a north Indian village in Haryana State, a community practice was to grow coriander around chick pea field to reportedly repel or keep the pests away. However, it was learnt after research for several years that the actual mechanism of plant protection was different. What coriander did was to attract the predators of the pests. Being a plant with nectar rich flowers, the predators were attracted to the field. Thus, the pests were not repelled but they were actually controlled by inviting the predator. There are many such examples in our database. The Academy will encourage innovators to experiment and discover scientific basis of their own knowledge systems so that they could add value and pool best practices more easily (http://www.sristi.org/anilg/files/futures%20article.pdf). People to people transfer of technology may be limited sometimes by edaphic, climatic, or agronomic factors. But, diffusion of the science underlying technology is much more feasible (Gupta, 1989, http://www.sristi.org/papers/B19.htm). The Academy will help develop models for diffusion of science so that people would develop technologies (Gupta, 1987 http://www.sristi.org/papers/new/Organizing%20and%20managing.doc).

Similar solutions sometimes are found across different regions and sectors. The scientific basis of such practices can generate a robust people's science which may be much more democratic, sustainable and also blendable. The multi functional, frugal and modular designs are typical features of grassroots innovations. A motorcycle being used to plough the land as well as serve as a means of transport is a good example (http://news.bbc.co.uk/2/hi/science/nature/3403289.stm) or a simple foot pedal sprayer in which you walk and pump the air through the shoes rather than by moving the lever manually. What is noteworthy is that many of these innovations have been patented in US (No. 6,902,022 Tractor having a convertible front end and variable track width and related methods;No. 6,854,404 Adaptive agricultural machine; No. 6,543,091 Apparatus and methods for stripping cotton) through pro bono help of patent attorneys based in Boston.

The educational implication of our work is evident in the way it is influencing the pedagogy and the curriculum at IIMA itself (http://www.businessweek.com/magazine/content/01_27/b3739097.htm). A new course entitled Shodhyatra (journey on foot to explore from within and from grassroots) has been introduced for last about ten years. It is one of the most popular course in the Institute. Some of the impressions of the students convey the spirit of the course. The international attention to our work has been helpful in building new contacts with the like minded groups and individuals around the world since 2000[2];

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(http://www.feer.com/review_news/001018g2.html ; http://news.bbc.co.uk/1/hi/programmes/from_our_own_correspondent/1324892.stm - Karimbhai; http://news.bbc.co.uk/2/hi/programmes/from_our_own_correspondent/6279929.stm http://www.bbc.co.uk/worldservice/programmes/global_business.shtml

www.livemint.com/2007/11/08220728/An-IIM-prof8217s-innovation.html?atype=tp - 85k (An IIM Prof's innovation hive goes global - Home - livemint.com

9 Nov 2007 ... An IIM Prof's innovation hive goes global, Home. ... Gupta calls his effort an innovation-pedia, and he is aiming to make it a platform ...)

http://www.archive.org/details/AgroinnovationsPodcastAppropriateTechnologyWithProfessorAnilGupta

www.spiegel.de/wissenschaft/mensch/0,1518,545387-2,00.html (

Erfindungen in Indien: Gandhi derTechnik - Wissenschaft - SPIEGEL ...

19 Apr 2008 ... Von Thomas Häusler ... Unterwegsruft Gupta auf einem seiner dreiHandysimBüroderSristi an, einerNichtregierungsorganisation, ...)
http://www.zeit.de/zeit-wissen/2008/03/Indien-Erfindermarsch?page=all

http://www.chicagotribune.com/news/nationworld/chi-inventors_goeringaug06,1,3883320,print.story?ctrack=2&cset=true (August 06, 2007 - 13:00, India Nurturing Homegrown Ideas)

http://www.geo.de/GEO/kultur/gesellschaft/62169.html report of a shodh yatra in Geo, also published in April, '11 Geo India issue

The Academy will continue to create pressure for protection of IPRs of grassroots innovators and traditional knowledge holders at national and international level (Gupta, 2004, WIPO, Geneva http://www.un.org/News/Press/docs/2004/envdev752.doc.htm). Large number of papers at World Intellectual Property Organisation have drawn upon the work done by us at SRISTI and IIMA (http://www.wipo.int/search/en/query.html?st=11&charset=utf-8&qt=wipo+anil+gupta; http://www.wipo.int/tk/en/publications/769e_unep_tk.pdf).

The networking among the innovators on one hand and between innovators and the formal scientific institutions on the other will be an important on going activity. One particular focus, which we intend to pursue, is to create awareness among the technology students so that their project work could be linked to the problems of small scale sector as well as informal sector. If one per cent of the 10,00,000 technology students in the country addressed the real life problems, one could get 10,000 problems either completely or partially solved. In any case, if there was a portal on which all these project summaries could be displayed, then there can be a relay of projects. One student can bring a solution to a particular level in a specific institution and then another student elsewhere can take it forward next year for further development. SRISTI supported initiative Techpedia.in has already made the beginning in this direction. In a few years, that problem could get resolved. There is a tremendous inertia, insularity and sometimes just inefficiency in building such simple links. AASTIIK will make it difficult for leaders in the field of education, technology, science and other social spheres to remain insular to the knowledge and value systems at the grassroots level.

Asian Pacific Centre for Technology Transfer (APCTT), had sponsored small projects to address some of the concerns in India, Asia or other parts of the world in collaboration with SRISTI. For instance, SRISTI has been a knowledge partner in a capacity building project implemented by APCTT through a support from DSIR, Government of India. As a part of this, workshops were organized in China, Philippines, Malaysia, Indonesia, Sri Lanka and India having representatives from these countries and Iran and Vietnam. Similarly, InfoDev supported SRISTI to create the concept of an online and offline incubation platform for grassroots innovations in Brazil, China and India to create a global GIAN to incubate grassroots innovations into enterprises. A Twin Centre for Grassroots Innovations has been set up at Tianjin University of Finance and Economics and SRISTI.

Annexure two:

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http://www.deere.de/region_ii/media/publications/ebrochure.html?id=43fec8e9&page=18 , april, 2011

Proposal One:

Proposal on mobilizing and diffusing creative ideas through railways

Harnessing the minds of masses is necessary if the decade of innovation has to have a practical meaning for millions of people. It is estimated that at least 20 million people travel by train every day. Most trains, particularly for long distance also have public address system. In any case, establishing such systems in certain trains for this purpose may not be too difficult.

Purpose:

a. To disseminate a few creative ideas everyday to inspire and instigate the imagination of the commuters.
b. To provoke them to suggest new ideas for new products or services or improvement in existing products or services.
c. To encourage them to submit ideas on which they have already done some work and would like incubation support for the same if found suitable.
d. To document outstanding, functional traditional knowledge practices which might be well known in one context but may be innovative in another spatial or sectoral context.

Methodology:

I. Each station will have *new idea* and *improvement in existing idea* boxes. Posters on these boxes will invite the commuters to share their ideas along with their name, occupational background, education, permanent address, phone number, and email address if any.
II. Those who send their ideas through sms/email on a given toll free number would be sent the final selected ideas within 24 hrs., so that the credibility of the system gets built and more people get encouraged to send their ideas through sms/email. The paper ideas will get response within a month.
III. Announcements will be made in the train having PA system to encourage commuters to give their innovative ideas in the field of technology, services, or governance through various means such as idea boxes in the train as well as on the station, sms, email and post. A post box number will be created so that all the ideas are received, processed and results given within pre-defined time periods.
IV. It should also be possible to share the awarded ideas and the action thereon in the newspapers through monthly advertisements via DAVP. If number of ideas become too large, then the results will be announced every three or six months. The action taken on these ideas will also be shared. It is not necessary that all the awarded ideas will have to be acted upon by the NInC or affiliated bodies.
V. A panel of experts and innovators will be constituted in each region to process the ideas regionally as well as centrally as the case may be. The BPO units can be asked to input paper data quickly and put it on secure server for panel members to access and rank in a distributed manner. We can involve students from IITs and IIMs also in this process apart from the team of NIF for grassroots ideas.

VI. The decision of the jury will be final and no correspondence will be entertained with regard to the merit of the ideas. However, selected ideas considered worthy for awards or special mention will be shown on the web and disseminate it through mobiles to create wider awareness about the process. Annually, a stock will be taken as to how many ideas scouted in this process have been incubated and taken to the next stage. The effectiveness of the campaign will be judged by the outcomes of the incubation process. The awards for those ideas or innovations on which some proof of concept has already been developed, will be bigger than the awards for just the ideas.

VII. The intellectual property rights will be protected for the ideas that have been reduced to practice in one form or the other. Other ideas can be protected in the idea bank which can be created for the purpose.

VIII. All those ideas on which quick prior art reveals prior evidence, will not be considered any further. Only ideas found unique, distinctive, cost effective, and operational will be considered for the award. Utopian ideas such as linked to teleporting or perpetual motion machines will not be considered at all. The awards will vary for different categories such as [a] from informal, unorganised sector, the one with which NIF deals with, [b] students, school children (NIF includes them) and college students (which techpedia.in deals with); [c] individual professionals or trained minds or employees of private or public sector and [d] unattached individuals with some education but having access to modern institutions, resources, housewives (urban or rural attached to well off section or educated segment to be distinguished form grassroots informal who will come in segment 'a')

Budget

A. Detailed budget can be developed once the idea is approved and scale can be finalized. Whether we want to begin with only long distance trains or also include the short distance ones will be one of the decision points.

B. The items of budget include advertisements, posters, idea boxes, rental to railways, data entry and processing through panels of experts and students, award money, announcement for awards, incubation of ideas, prototype development, IPR protection, design input, testing, market research, and launch through third party entrepreneurs or by the idea generators themselves.

Outcomes:

The outcome will be a changed mindset, spread of optimistic outlook towards the state and its institutions and hopefully more inclusive products, services and governance structures. Much will depend upon the seriousness and thoroughness with which good ideas are taken forward in a transparent and accountable manner.

Proposal two:

Mobilising and diffusing innovations through post offices:

There are one lakh post offices in the country serving six lakh villages. There is no other universal credible system that can reach almost every nook and corner of the country. However, we have not harnessed the potential of this network in scouting as well as disseminating grassroots innovations and outstanding traditional knowledge practices.

Purpose:

a. To mount national campaign for scouting and disseminating innovations through post offices.
b. To set up bluetooth dissemination centres for open source content on innovations [it can be used for educational content also] for different social groups across space, sector and seasonal segments.
c. To reward the outstanding ideas from unorganized sector [farmers, artisans, school students, fishermen and women, local communities including labourers] as well as from the organized sector [teachers, grassroots level bureaucratic functionaries, others].
d. To develop post offices as hub of village knowledge management systems.

Methodology:

1. Posters for the purpose will be displayed in or outside each post office with a request to the postmaster / postman to spread the word around.
2. VCDs containing multimedia clips of the innovations and the challenges will be circulated to each post office to be lent to the local cable channels for dissemination of the ideas and the campaign.
3. Collection of ideas, innovations and traditional knowledge can be harnessed every quarter or half yearly with incentives to the post offices for all the ideas that are found acceptable and distinctive.
4. The processing of the ideas after receiving them can be done in two ways. At village level itself, village knowledge/innovation management committee can process and award locally the best ideas for local development. These ideas will also be pooled in a manner that ideas from the unorganized sector go to NIF while for the rest, alternative channels as discussed in the proposal on railways can be harnessed.
5. The process after this step will merge with the process outlined in the proposal on railways.

Budget:

The items will include incentives for postmasters and postmen in addition to what is mentioned in the railway proposal.

Proposal three:

Taking ideas and innovations forward through network of technology students [techpedia.in]

A knowledge-based society cannot afford to waste the intellectual output and potential of about a million technology students every year. Till techpedia.in came about through the efforts of SRISTI, we had no system of tracking either the problems or the solutions worked upon by the students. The assumption was that most of these projects were of academic interest and did not have much utility in practical terms. However, the review of more than 100,000 projects done by 350,000 students in 500 and odd institutions makes us far more optimistic than would have been the case in the absence of this evidence. The fact remains that linkage among the technology institutions, MSME clusters, informal sector in urban and rural areas, and tribal and other economically backward regions has been almost non-existent.

Purpose:

a. To pool all the completed projects by the undergraduate and postgraduate students either in synoptic or complete form every year in a common knowledge base.
b. To compile the synopsis of the proposed projects in the beginning of the session for mentoring, critical comments and improvement through peer and user feedback.
c. To put the problems of the MSME clusters, informal sector and extremely poverty stricken regions on the agenda of the students and incentivising them to take these up for time bound solutions.
d. To encourage students to scout the problems of the MSME and informal sector, parameterize them for eventual solution.
e. To promote inter-institutional cooperation among students of polytechnics and degree colleges/institutes in various fields of innovations to harness collaborative potential of young minds.
f. To invite technology students to take up nationally important grassroots innovation challenges for solution through relay efforts [different students to carry forward an idea till its eventual operationalisation].

Methodology:

SRISTI (Society for Research and Initiatives for Sustainable Technologies and Institutions), a voluntary organization, primarily through its own efforts and resources, has pooled the aforesaid projects. However, each project has to become a blog so that even when students have passed out, their ideas can be taken forward in the open innovation format. Wherever students and faculty guide want ideas to be incubated in closed loop through IP protection, such an option would also be available with NDA signed by respective mentors and other commentators. A small proposal has been submitted to DST through NIF for further development. However, the task is so big and opportunities are so many that a multi-institutional framework might be more sustainable.

I. Given the fact that most technical universities and many IITs and NITs have not yet started pooling all their projects at one place, enormous effort is required to pool these projects from various institutions.

II. The knowledge platform at which collaborative problem solving can be triggered and innovative approaches nurtured is under development. However, it will need a huge effort on an on-going basis to make a library of open source tools to encourage students to use latest tools in specific contexts as necessary.
III. Recent interactions with DRDO and space scientists have generated tremendous interest in using techpedia.in as a distributed platform for modular problem solving. There will be high redundancy so that 500 students work on a specific module of a large strategic problem than at least 50 interesting heuristics might be generated. The success of the project will be evaluated not only in terms of the final solution, but also in terms of generating innovative ways of attempting solutions.
IV. The national mentor network will have members of engineering academy and other senior colleagues from industry and academia. The match making between mentors and the student teams working on strategic problems would need considerable skill, effort and patience. Such a model has never been tried at large scale. Some problems are bound to arise. Unless mentors are kept engaged, they might lose interest. The speed with which students team work also depends upon the faculty guidance and institutional culture. The process will take time to mature and stabilize. But if we don't start imperfectly, we may never achieve it.
V. Following the practice started by Gujarat Technical University [GTU], one can provide three credits for identifying the problems and defining various parameters during summer. Four credits can then be provided for solving it in the final year. It is understood that student teams may not be able to solve most of the problems completely. The effort, approach and innovativeness of imagination should all be taken note of and appropriately incentivised and rewarded.
VI. In many cases, inter-university centres with state of the art facilities may need to be created for facilitating the access of bright students from weak institutions to the same. Three existing centres in the field of atomic energy, astro physics and astronomy and accelerator are providing outstanding support to 100s of colleges and institutions. We need dozens of such centres in different advanced fields. Recently, in the meeting of Vice Chancellors organized by MHRD, this idea was appreciated by all those present. The innovative approaches to solve any problem must not suffer on account of lack of local physical or human resources.
VII. The system of tracking projects, inputs from potential users, intermittent interactions between student teams and users, particularly from informal or MSME sector will have to be developed.
VIII. For all eligible cases, arrangements will have to be made to file patents and provide small product development and business development grant and risk capital respectively. It is expected that at least 10000 patents per year should be filed based on student technologies. At least half of these should be supported for incubation if students or third party entrepreneurs wish to take these forward. The IP and product development funding windows at techpedia.in will have to be managed through a consortium of IP firms and mentors. In due course, students will learn to make the first draft so that firms can focus on more important aspects of protection. Workshops to train students and faculty in doing prior art search will be useful to push the frontier of innovativeness and originality. In due course, this should become a course in every institution.
IX. Given the demand from IT sector, lot of engineers and science postgraduates drift towards IT sector. As innovations get demanded and utilized from different sectors, the *brain drift* can be minimized. The technological feed forward from sectoral and state innovation councils can also be put on the techpedia.in for further resolution.
X. The platform can be advanced in the framework of public – private – civil society partnership. A small group can work together to make it robust and user friendly without compromising the youthfulness of the whole platform.

XI. Periodic review by an advisory group will help make mid course correction and ensure that the connect with creativity of people, students, mentors and industry remains smooth.

Budget:

Ideally six teams are required to manage techpedia.in which at present is being coordinated by one person with a team of student and IT volunteers at an extremely sub-optimal level. The top team will include IP, design, business development, research and communication leaders/champions led by Hiranmay who has helped in creating the portal so far. The second set of teams will be the executioners or implementors under each function. The third team will be field force including volunteers and partially paid students who would help in taking the ideas forward on the ground. The experience of industrial shodh yatras shows that even the definition of the problem is not easy for many of the MSME entrepreneurs or rural artisans and farmers [who have often learned to cope with the constraints].

The detailed budget for the teams, IT hardware and software, coordination and travel, workshops, content creation, incubation through virtual networks, linkage with mentors and other trouble shooting will be submitted once the broad framework has been approved. As mentioned earlier, a part of the support may be forthcoming from DST though no final decision has been taken as yet. However, given the task, a major initiative is called for to mobilize a million young technology minds. Later the students of law school and management institutes can also be networked.

Outcome:

The originality and innovation quotient of the country will go up immediately because doing what has been done already will become almost impossible. The inertia involved in living with certain technologies which are centuries or millennia old will also give way. In a young country, there is no escape from engagement with young minds. Techpedia.in is a viable, visible and vibrant demonstration of the possibility.

Proposal four:

Grassroots innovation challenges:

A large number of grassroots innovations and traditional knowledge practices have been scouted through the Honey Bee Network. And yet, many everyday life problems still remain unresolved. The list below gives an idea of some such unsolved problems which are in need of urgent solution. We have to parameterise the problems, contextualise them and then pose a national challenge to address them in a time bound manner. It is important to mention that the problems faced by women have often been given low priority even by the grassroots innovators, not to mention the formal R&D system.

Paddy Transplanters

Almost entire paddy is transplanted manually by women using a back bending posture which is painful and involves lot of drudgery. Many times, the labourers end up having fungal infections on their feet due to prolonged exposure to water.

We have a couple of conceptual transplanters available in our database like the ones developed by Photo Singh from UP and another one by Ranjit Mirig from Orissa. However, much design optimization needs to be done to improve the efficiency.

Foot-pedal Paddy Threshers

Conventionally paddy is threshed manually using hands or using bullocks by the people who cannot afford mechanized threshers. Both the methods are labour intensive.

Dharanidhar Mahato from West Bengal has developed a pedal operated paddy thresher, which needs optimization. The end product needs to suit the efficiency requirements of common farmers.

Potable Water Carrier for Women

For hundreds of years women have had to carry water pots on their heads and walk for many miles every day. This results in severe pain in their neck. Not much has been done in this regard.

Grassroots solutions available like Panihari of Khimjibhai Kanadia and water jacket of Madhav Savant need lot of ergonomic inputs.

Improving cooking stoves

Despite numerous improvements, millions of women use a stove made of three bricks or stones or just mud structures. A great deal of energy gets wasted because stoves have to be designed for different cooking styles, fuel stock and design of utensils.

Some of the existing stoves are: Jyoti Ravishankar (Karnataka, double jacketed stove, which heats water while cooking), Bharat Agrawat (Gujarat, three tier wood stove that makes better use of residual energy and flue gases), C Senthil Kumar (Tamil Nadu, stove with insulated brick lining to ensure proper burning), Ashok Thakur (Bihar, stoves using paddy husk as fuel, can be used on boats also), V Jayaprakash (Kerala, Incorporation of secondary burning

chamber to burn the un-burnt hydrocarbon coming out with the smoke/exhaust), and many others.

Transportation on hills

People in the mountains have to carry large quantity of firewood, fodder, food grains, etc., over steep slopes on their head or back. The strain is enormous. No low cost trolleys are available to negotiate stony path. These should be easy to take up and equally easy to bring down.

NIF threw up the challenge to engineering students, three of them (Balaji T. K., Kunal Kumar, Arun Roshan Ganesh) came up with their design of a hill trolley with triangular wheels. Later a young student of class five, Yathartha Saxena also designed a triangular wheel assembly based luggage carrier. The problem is acute and one needs to come out with a definitive solution soon.

Low cost water filters for use in villages

More than 60 per cent infections are supposed to be caused by water borne pathogens or impurities. We still have to develop location specific, low cost filters, which can address this problem in an affordable and accessible manner.

People have indigenously devised their own filtration units, like the one available in Dhemaji (where chiefly iron salts and sand get filtered, though not adequately). However, much remains to be done as there may be other unnecessary or harmful minerals present in the water, about which people may not be aware of. Much work has to be done in this regard for two objectives a) field screening of the water and b) low cost efficient filter for mass use. Mobile phone camera based algorithms have to be developed to scan and screen drinkability of water.

Low cost oil expeller

Many forest areas inhabited by tribals have a large number of non-edible oilseed trees. Majority of them use very inefficient method of oil extraction for fuel, health and light purposes. There is a need for manual and solar oil extractors.

Affordable herbal extractor/processor

Most of the tribal communities have some or the other tradition of making liquor. Unfortunately, the liquor contractors use their dependence on liquor for severe exploitation. One needs low cost fractional distillation systems so that communities can get high value for low amount of biomass. Likewise, hardly any *in-situ* value addition takes place in the medicinal plants. One needs to tweak the policy and provide affordable processing units to make it happen so that tribal regions don't remain as provider of raw materials. Lot of social discontent in these regions is linked to excessive exploitation by the contractors and the forest bureaucracy.

Sensors for soil mineral and nutrient mapping

The cost of nutrients, which are often used in an unbalanced way, has been increasing over a period of time. Farmers are neither getting proper return nor are they able to maintain soil health. One needs mobile sensor based mapping devices so that farmers can move towards precision agriculture and save the cost and improve the soil health.

Efficient toilets

In the absence of proper toilets, the leakage from the undecomposed human excreta leads to widespread contamination of drinking water system in hill areas and also other humid areas. One needs to develop terrain specific technologies which can be easily adapted with adequate protection.

Low cost efficient system for storage of vegetables and fruits

It is well known that as much as 25 per cent of vegetables and fruits get wasted because of improper storage. We need low cost stationary as well as mobile storage system for the purpose. Subsequently, we have to develop low cost processing and drying systems as well.

Arvindbhai from Gujarat has developed a cold storage using evaporation of water to keep the chamber cool. He has also conceptualized a vehicle with the same facility for transport of food material from source of production to the place of storage. In Manipur, Maniyar Sharma has developed a vegetable dryer using wood as a fuel. Both need considerable improvement and optimization.

Affordable use of renewable energy technologies

Low cost windmill, terrain induced energy generation [from shock absorbers], efficient hydro turbine for pumping water or generating electricity through irrigation canal network or small streams, etc., are required for distributed energy generation.

NIF database has a number of compressed air technologies in which further value addition is required. Also a number of solar based products like solar car, solar lanterns, solar bicycles, solar cookers, solar laminator, solar mosquito destroyers etc. A number of wind mills have also been developed and installed by grassroots innovators for different uses like pumping out water from the ground for irrigation (Mehtar and Mushtaq from Assam), energy generation (Dinesh Ashodia, Gujarat) or electricity for domestic use. Mansukhbhai Prajapati from Gujarat, Amrita Gupta from UP and a few others have developed evaporation based refrigerators.

Handloom innovation and diffusion

Almost every other household has dependence on handloom in large parts of northeast. A massive programme for improving efficiency both in supply chain and loom design is called for.

NIF has many innovations in this sector that require large-scale demonstration and local adaptation.