

## **Grassroot Innovations for Inclusive Development (GRIID PROJECT)**

### **Role of Grassroots Innovations in redefining national innovation systems for inclusive development : *expanding public domain, creating public goods***

#### **Part I Justification of the study**

##### **1. How the research is related to the development priorities of the country/ies concerned**

Inclusive or harmonious development is recognised as one of the most important goals of socio economic development in most of the developing countries whether India, China, Brazil or South Africa. There are several ways of conceptualising inclusion by: serving their needs through public interventions; drawing upon their skills and resources in developmental programmes; building their skills base so that they get absorbed in emerging private or public economic ventures; or by enabling them to take up entrepreneurial ventures.

Inclusion can thus take place by treating economically poor and disadvantaged people as (a) consumer of public policy of assistance and aid for basic needs, or (b) consumer of products at low cost made by large corporations [à la Prahalad] or state or other enterprises. Inclusion can also take place by (c) building their capacity to produce what they already know and do; and/or (d) enabling them to convert their innovations and outstanding traditional knowledge either as such, or by blending /bundling it with knowledge of others, into products marked by them or other enterprises. In addition, (e) linkage with modern institutions of R&D to receive technologies or products developed by the them or (f) adding value to their knowledge, innovation or practices for developing new products/services for eventual diffusion through commercial or non-commercial channels can also help inclusion. One of the most important means of expanding inclusion is to expand the public domain. How do local innovators alone or in groups, explore the potential of using either available knowledge and/or resources to generate new solutions for wider use has been a question that has intrigued us for over last two decades more thoroughly<sup>1</sup>. How social networks propel some to give up, and embolden others to overcome the same constraints through innovations or creative use of traditional knowledge needs to be understood better to expand people's choices. Most such individuals or communities do not try to restrict the diffusion of their innovations to their kith and kins but share their ideas widely with outsiders for promoting further innovation and diffusion, in almost an open source manner.

In this research project, instead of treating disadvantaged people as a 'sink' of assistance, aid or low cost externally manufactured products, they are treated as 'source' of ideas, innovations and unique traditional knowledge which can generate opportunities for livelihood as well as meeting larger societal needs. *Poor as Providers* is a concept that is contrary to the vision of treating them only as consumers. There is no doubt that not all disadvantaged people are creative or innovative so as to solve their problems on their own optimally or even sub-optimally. But some indeed are very creative. And for many of them, innovation is imperative.

Honey Bee Network has mobilised thousands of innovations and traditional knowledge practices from over 500 districts of the country. Many of these have been diffused with or without value addition or business development support in local languages through various media<sup>2</sup>. However, many challenges

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<sup>1</sup> This inquiry was formally begun in 1979-80 when a paper on *Communicating with Farmers* was written to link one way, or two way or no way, power with one way, two way or no way communication ( Gupta, 1980, IIPA mimeo)

<sup>2</sup> About 4500 practices and innovations are available in four languages, Hindi, Tamil, Gujarati and English at [www.sristi.org](http://www.sristi.org) under innovation database, supported by Department of Scientific and Industrial Research, Government of India. In addition, about 2000 published practices of Honey Bee newsletter (1989-2007, continuing) are also available at the same site. A

remain. A dream of India and other developing countries becoming knowledge intensive societies will not be fulfilled unless a large-scale knowledge mapping, analysis and augmentation through support of institutional science and technology takes place<sup>3</sup>.

## 2. Globalisation of GRI: some initiatives

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:

- 2.1 The grassroots producers, innovators and some of whom will become entrepreneurs, may be themselves or through supporting mediating organisations create space in the global market for their products and services.
- 2.2 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.)<sup>4</sup>. 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 cost for the knowledge producers and grassroots entrepreneurs as well as buyers will have to be kept extremely low. .

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database of 250 medicinal plants with their public domain uses is provided to help users adapt this knowledge for their own benefit. There are few sites in the country, if at all which provide so much evidence of peoples knowledge in local language as at this site. The information about nationally and regionally awarded innovations and traditional knowledge practices is given at [www.nifindia.org](http://www.nifindia.org). The information about incubation, intellectual property right protection, business development, value addition, etc., is available at the site of National Innovation Foundation (NIF) and also at the site of Grassroots Innovation Augmentation Network (GIAN), [www.gian.org](http://www.gian.org). The volunteers who have offered to mentor some of the innovations generally register at [www.indiainnovates.com](http://www.indiainnovates.com).

<sup>3</sup> How the research on the pattern of emergence of innovations or evolution of traditional knowledge can help in this regard can be illustrated by a macro policy recommendation. India provides 100 days of employment to 250 million people below the poverty line in a year. If these people spent 10 – 15 days in mapping the knowledge of people around them (say around 3 to 4 per head), one could map knowledge of a billion people besides recording the distribution of biodiversity, soil, local climate conditions (and changes therein as perceived by the communities), skills, etc. Once such a map has been made, the knowledge can be categorised, analysed and after prior art search, unique practices or innovations can be identified. Once prioritised, these innovations or tk practices can be taken up for diffusion through value addition *in situ* or *ex situ* or as such, and through commercial or open source non commercial channels. Likewise, the resources, which are abundantly available, can be valorised for generating local livelihoods through a mass scale decentralised entrepreneurship. The research on the way different bits of knowledge can be fused, blended, bundled, recombined with or without breaking them down, etc., will reveal many new ways of producing new knowledge and disseminating it. Such an exercise unfortunately does not follow from much of the literature on knowledge management or national innovations systems. Almost all studies on national innovations systems have ignored the innovations produced by the labourers, artisans, farmers and other members of the informal sector. It is this *gap* which current project may fill to a limited extent.

<sup>4</sup> While fair trade and other similar efforts have made a small dent in the dominant relationship between global consumer and local producer, a systematic effort to directly link the producer and consumer has not yet taken place. Most efforts are mediated by the NGOs or other private, public or cooperative organisations. The idea here is to conceptualise a distributed supply chain in which various kinds of ethnic foods, processed foods, herbal products, pickles of unusual ingredients such as cactus or other dry land, mountainous or forest herbs or other plants, cosmetics, etc., are made by households in different parts of the country. Assumption here is that a very large majority of people are supposed to possess valuable traditional or contemporary knowledge for which markets can be created. Once information about variety of local products or services is available on web based portal. The buyer would place an online order. The e-commerce enabled portal would transmit the specification of the products to the courier agency which will in turn contact the packaging industry, collect the right kind of package and procure the requested material from the household. Once the product is delivered, the amount gets credited to the account of the household. The cultural creativity can also be harnessed in the similar manner. The point is to move beyond employment and other means of income transfer to trigger entrepreneurial processes based on knowledge and innovations. This illustrates how a research finding can lead to new policy and action implication.

- 2.3 *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 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<sup>5</sup>.
- 2.4 *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.
- 2.5 *Democratising Innovations<sup>6</sup>, 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. In the last four months of 2007, just one company in one state has been able to commercialise about 200,000 dollars worth of natural products based on technologies developed by SRISTI lab by pooling people's knowledge. The benefits of this commercialisation have been shared in advance with some members of the knowledge providing communities and individuals. 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 and action research to develop models of market and knowledge based approaches to poverty alleviation.

Given these approaches, there is a good reason to believe that if we invest in not only research, but also in its dissemination through capacity building programmes at SRISTI, we could trigger worldwide search for practical innovation models, some of which might be even more effective than what SRISTI or other partners have done. Globalisation and its consequences so far have not been very helpful to the disadvantaged regions and people. But there is no inevitability of such consequences. As a part of the big picture, we would definitely like to work on multiple goals, some through the project and some on our own<sup>7</sup>. We can decide to delimit the scope of interventions pursued as a part of the project. The research

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<sup>5</sup> Recent requests from Ethiopia, indigenous people from Australia, science and technology officials from South Africa, China, Chile, Brazil, Uganda etc., convince us that with persistent efforts and further activation of AASTIIC (Academy for Augmenting Sustainable Technological Inventions, Innovations and traditional Knowledge) at SRISTI can indeed influence the very concept of globalisation. It is true, however, that such an impact may not take place within this project. But it will never take place if we did not start now. One could have used the same argument (in fact, many people did suggest that within the Government of India and at international level) twenty years ago when we started the Honey Bee Network.

<sup>6</sup> Also see the book by Eric von Hippel, on the similar subject, *Democratising Innovations*, MIT press, 2005

<sup>7</sup> The comparative research programme for China, India, Brazil and South Africa (CIBSA) may have to be developed in due course keeping in mind the peculiarities as well as historical process of evolution of research on grassroots innovations in each country. Unlike India, where the research has been pursued for more than two or three decades, in China and other countries, the scholar have paid attention to grassroots innovations in any systematic manner only recently. It is realised that a comparative research framework would enable not only generation but also cummulation of research insights over time. The human capacity for research also varies in different countries. In Brazil, the term, 'social technologies' has tended to include the cooperatives and other collective institutional innovations or initiatives. In China, there have been examples of grassroots innovators recognised for their contribution but there has not been much research on the process of evolution of individual and collective technological innovations. So is the case with South Africa where some effort was made by SRISTI to organise exchange of grassroots innovators, organisation of exhibitions and some effort to motivate policy makers to pay attention to such innovations. However, the traditional knowledge has received bold policy attention but grassroots innovations have

for policy changes requires policy experiments (Kelkar, 2007). SRISTI having proved the applicability of this model by way of setting up Grassroots Innovation Augmentation Network (GIAN), National Innovation Foundation (NIF) and MVIF (Micro Venture Innovation Fund) has learned a little bit about policy and institutional experiments. It has at least demonstrated the potential for further future breakthroughs.

Most studies on National Innovation Systems (NIS) have confused Institutional Research and Development as equivalent to the key building block of NIS. The very fact that a large number of innovations have emerged from informal system in India makes it evident that NIS framework needs basic revision. The establishment of Techno-premiership program (TePP) by DST, GOI after fifty years of independence shows that even the formal sector innovations by unattached individuals were not considered part of the NIS till recently.

The informal economy not only provides employment to the majority but also has the largest proportion people who suffer from various socio-economic disadvantages. The problems become more severe in economically depressed regions or where despite richness of natural resources, enough opportunities for value addition or reduction of drudgery or improvement of livelihoods opportunity have not emerged.

The term 'Bottom of the Pyramid' is really a very unfortunate one<sup>8</sup>. It seems to suggest that economically poor people are at the bottom of all pyramids, that is knowledge, ethics, institutions, or innovation pyramids. It does not direct our attention to the resources in which economically poor people are really rich. But having said that, let us note that NIS systems cannot generate innovations for inclusive development if the reliance is placed only on the formal sector. If such was not the case, why would farmers, artisans, labourers, local communities etc., have to evolve local solutions for so many problems which were neglected in the past and are still not being addressed adequately by the formal system. It does not also mean that we do not have to blend the formal and informal systems of innovations. By building the bridge between informal and formal sciences, several opportunities can be created that may have remained unexplored for the socio-economic development of poor people. In fact, Four Inventors of India workshop organised by Gupta (1998-2008) at IIMA establish the need for linking innovators in formal and informal sector. In that sense, focus on GRI can give whole new meaning to NIS studies and strategies.

### 3. Knowledge Gaps

This research project is bridging important gaps in the way we conceptualise the evolution of innovations in informal sector by formally untrained minds so to say (GRI). There are gaps in meeting needs of disadvantaged communities which formal system of S&T has not been able to address in cost effective and affordable manner so far. While GRI cannot provide solutions for all problems, they can indeed provide solutions for some problems. The conceptual basis or the heuristics underlying these innovations can sometimes extend the frontiers of science or improve the efficiency in the mainstream larger technological systems. This is in addition to meeting the local needs. But, incentives for developing technologies which will have limited diffusion because of socio-ecological conditions are very difficult to institutionalise. The result is that such niches remain unserved. If difficult regions with poor market and bureaucratic infrastructure have to remain outside the developmental impulses, the social harmony is unlikely to be maintained. Sustainability then will become suspect.

3.1 Different kinds of *socio - ecological conditions* favour the emergence of the innovations by people without any outside help. The questions that remains to be answered, is it the stress or sufficiency

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remained obscure. Recently, SRISTI had organised a small research project to bring India, Brazil and China together to develop online and offline incubation platform for developing and diffusing grassroots technologies. The idea was that an innovation, say from Brazil may have much greater scope for diffusion in India or China and vice versa (see [globalgian.sristi.org](http://globalgian.sristi.org)).

<sup>8</sup>The language shapes the habit of thought, as a Danish linguist said. BOP does exactly that. It distracts attention from creativity and innovation, which may be higher at so called base of the pyramid.

in resources which is vital, or, is it the strong institutional environment or weak one which leaves space for local innovations to emerge? It seems that weaker the process of public technology generation or extension institutions in a given region, greater the compulsions for local innovations to emerge. But then this is also not uniformly applicable. In some areas of institutional weakness, the apathy and stressful local livelihood environment might not trigger many innovations. But in other places, even with stronger institutions, there may be specific areas of technological change where the institutions might contribute much. Agri-engineering is one such area, where formal institutions have contributed perhaps much lesser compared to many other disciplines.

- 3.2 We know that given a specific problem in any region, not every one is bothered or disturbed equally by a problem, even if he /she is affected by it no less. We need to know, what *motivates* some people to take initiative to get disturbed by a persistent or episodic problem, having serious proportion leading some times to a localised or generalised crisis. Many people give up and adjust with the problem. Some even out migrate in search of work after a drought, flood, pest epidemic or other natural or man-made crisis but some do not. Which factors distinguish those who give up and those who do not?. We all know that many of us have motivations to do many things in larger social interest and yet these benign thoughts do not get often translated into initiatives or actions. The potential problem solvers or innovators may also go through similar process.
- 3.3 Motivations or intentions are not always enough to develop innovative solutions<sup>9</sup>. The *triggers* for action can be many and each trigger may act upon the social network as well as individuals having appropriate motivations differently. It is not just one factor which determines the propensity to take action but many, and often in conjunction (Sinha, 2008). There could thus be many factors which might explain why certain kind of opportunities triggers innovations in one setting and not others. The relationship between social network from which support is sought and which may also inhibit the initiatives or sharing of ideas, and the individual motivations and triggers have to be studied in each case to understand the innovation process better.
- 3.4 External institutions as well as *public policy* can influence all of these factors. Recently, a workshop was organised to generate *lateral learning* among the innovators, including the one who had developed this first and all others who had improvised a motorcycle based ploughing machine. SRISTI facilitated a social audit of design by users as well as fellow fabricators. The openness of culture of sharing and feedback seen in the workshop was very inspiring. Rarely do we find such bonhomie among institutional researchers. The dissonance between whether some thing should be done and if so, when, was much less evident in their cases<sup>10</sup>. Innovations seemed to follow democratic ethos<sup>11</sup>. Users and fabricators shared their feedback as well as feed-forward. What the Honey Bee Network contributed was, a process of short circuiting the usual network processes through which this feedback might have taken as long as it took in past. Or it might not have taken place at all, as became apparent when some of the innovations had not been noticed by any of the other innovators or users though these had taken place way back in 1982-83 as against the dominant innovation in 1993-94 (see, Sinha, 2008, p c). The public policy implication is clear. The resources spent in promoting learning among institutional researchers have delivered results, as is obvious by the fact that many conferences are awaited eagerly by the member scientists and technologist because of new ideas that are shared in them. But similar resources have not been allocated among learners, innovators and tk holders in informal sector for building upon each other

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<sup>9</sup> Researchers in largely organizational context, have grappled with the “insufficient explanation of dissonance between cognition, motivations and plans and behaviour” (Montalvo, Carlos, 2006, Technovation, Volume 26, Issue 3, 312-323).

<sup>10</sup> Schick (1991) draws upon Aristotle to describe, “belief as thinking or knowing and desire as wanting or needing or as what should be done: Beliefs + Desires = ACTION” (Pamela I’Anson, Patrick Page, James Fisher and Linda Leonard, 2006, Identifying change management triggers, [http://www.regional.org.au/au/apen/2006/refereed/4/3092\\_iansonpl.htm](http://www.regional.org.au/au/apen/2006/refereed/4/3092_iansonpl.htm), downloaded on may 7, 2008).

<sup>11</sup> Von Hippel, 2005, Democratizing Innovations, Mass: MIT Press

ideas. Not to mention, policies are lacking for facilitating their access to resources (tools, techniques, library of open source components developed by peers in the villages) and workshops and risk capital, product development grants etc.

- 3.4 Intellectual property right, one may argue, should not be used to restrict knowledge flows among self employed people struggling with livelihood issues. The concept of **Technology Commons** can be defined as pooling all the components of technology improvements in a common pool collectively owned by the peer innovators for unrestricted use. The contributors have an obligation to share the further improvement in the initial stock of innovation same with each other and the rest of the society. But no one of them could license this to a firm or a company (which will be necessary, if such a company wanted to use this technology) without reference to others (or to the agency to whom they may have assigned these rights for facilitating technology transfer to formal sector for a consideration). So knowledge about innovative *forms, features and functions* was open source for fellow farmers and artisans. But not so for the firms (see Sinha, 2008). Its scope needs to be studied. It may be very vital for producing *quasi public domain* knowledge.
- 3.5 SRISTI has organised 21 *Shodh Yatras* (journey of exploration) so far covering a distance of about 4300 kms in different parts of India - a collective walk held during last ten years, every summer and winter (twice a year)<sup>12</sup>. The purpose is to understand the roots of creativity at grassroots level through engagement with innovators, outstanding traditional knowledge holders and other community members. The traditional knowledge holders and innovators with outstanding knowledge are also honoured in their own villages. It will be useful to investigate how the recognition of such creative people and their communities has influenced the knowledge networks and their ability to become more inclusive and accommodative of local positive deviance.
- 3.6 Apart from scouting and documentation, the complexity in obtaining Prior informed consent from the knowledge holders will have to be more thoroughly investigated and analysed. The emerging consciousness about **Prior Informed Consent (PIC) and protection of intellectual property rights** at grassroots level also needs to be respected in consonance with local aspirations. Various experiments in benefit sharing will have to be evaluated to develop contingent models for testing. Recently, advance benefits from the commercial exploitation of eight technologies led to the sharing of benefits among more than a dozen farmers from different parts of Gujarat. Each farmer got at least three cheques, one for oneself, another for community and third for nature conservation. The assumption is that earmarked amount, though paid to the same person, may most likely be used for the purpose for which it is intended.
- 3.7 Likewise, the **institutional arrangements of adaptation of innovations** in one context for meeting the needs in another context have to be studied so that the public good aspect of grassroots innovations remains as strong as it has been in most societies. For instance, a ground nut (pea nut) digger developed by Yusuf in Rajasthan was adapted for sea beach cleaning in Visakhapatnam (Andhra Pradesh). Similarly, the foot pedal sprayer was adapted as toy for children. Ribs on the bottom of a cooking plate, improving thermal efficiency in heat transfer was being advocated as a technology for changing the outer surface of heat tubes in chemical plants.
- 3.8 It is generally assumed that for many poor farmers, artisans and labourers, accessing innovative products and services will be possible only if these are available at low cost or no cost. Apart from the *access*, the *ability* to use these technologies and the *assurance* about the outcomes will also shape the *attitudes* towards GRI (see Gupta, 1995 for 4-A model of Eco-institutional perspective). The **institutional mechanisms** to diffuse **open source innovations** are often very weak. Studies

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<sup>12</sup> 20<sup>th</sup> Shodh Yatra was held during December 25, 2007 – January 3, 2008 in West Bengal. The 21<sup>st</sup> Shodh Yatra is proposed to be held in Andhra Pradesh from June 2-9, 2008. There is going to be a special Shodh Yatra in UK from Cambridge University to North Sea from Sept. 15-20, 2008.

have shown that public extension agencies almost consistently and persistently downplay or neglect the non-monetary technological inputs compared to the monetary inputs. If this is the case with regard to institutionally generated technologies, the fate of GRI could be worse. We have to find out the factors, which would enable public institutions to internalise the GRI in research, teaching and extension programmes. They are likely to do so not only because of the incentives but also because of the peer culture and the possible advantage that such incorporation or internalisation may offer to the final user. At the same time, commercial opportunities even for open access technologies provides a basis for meeting consumer needs. These consumers themselves may not like to convert open access information into self use products. The institutional context in which the local or community best practices are pooled to develop new products has to be analysed to explore the concept of horizontal or circular markets. While marketing literature is full of analysis of *verticals*, there is hardly any discussion on *horizontal*s.

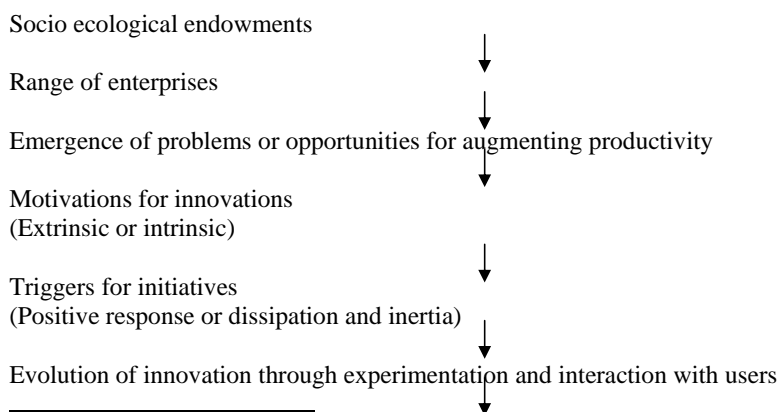
3.10 There are technical issues involved in validation, standardization, testing and certification of GRI. The role of **standards in stimulating demand for GRIs** has not been much explored. There are several technologies for which standards do not exist and thus public procurement becomes a problem. In such cases, diffusion may suffer. There are other cases where an emerging GRI may require standards to be modified to give it a competitive edge.

*There are several initiatives of SRISTI, which need research to analyse their possible impact on various social segments. The network has provided a basis for not only asking difficult questions but also has generated several frameworks to search for cogent answers. These issues just indicate the tip of the iceberg. A lot remains to be understood and analysed to facilitate bridge between formal and informal sector of technological innovations, knowledge and science. In this research programme, the questions will be asked not just about the way markets work but also about the way they are moulded to work so that menial workers are transformed into mental or knowledge workers. The 'sink' becomes a 'source'.*

**Note: Not all knowledge gaps will be attempted in the present study. Only some of these gaps are being pursued through research questions. If additional finding becomes available, then those questions will also be pursued.**

## Part II

### 4. Conceptual framework: A generalised scheme<sup>13</sup> (See Figure I to VI, Sinha, 2007<sup>14</sup>)



<sup>13</sup> The general framework is divided into four phases dealing with motivation, triggers, initiatives to innovations and diffusion and discontinuance or further innovation (Fig. 1). Each phase has been expanded further into more detailed dimensions in Figure 2 to 6.

<sup>14</sup> This framework has been developed under the guidance of Prof Anil K Gupta, iima

Diffusion or discontinuance

Further innovation and feedback to modify original designs

Modification of endowments and impact at local, regional and national level

All the research questions and activities listed in the section herein after draw upon this framework. The mapping of innovations is being done to relate the distribution of innovations to socio-ecological context. In fact maps prepared by SRISTI earlier had clearly shown the mechanical innovations seemed to exist more in rainfed regions where land size was larger and need for timely farm operation was also higher.

**Socio-ecological conditions** define (and not determine) the range of economic enterprises that can be pursued in a given region. However, the scale of each enterprise in the household portfolios is determined by the access to the factor and product market, kinship networks, other public interventions and perception of, and response to risk (Gupta, 1984). If the endowment is taken as given, it still has to be characterised to understand the relationship between the nature of endowment and the range of innovations that emerge in that context. There are several processes through which the endowments can constrain or enable the search for creative solutions:

- 4.1 If a resource is abundantly available and there are no property rights constraints to access it (for instance, a road side weed which may have medicinal property), it may be used for local problem solving by a few people. The problem is that many times, communities tend to discount the utility of a solution simply because it is too simple or easily accessible. This may appear counter-intuitive but one can analyse the empirical basis of such discounting. For several years, the idea of building up developmental options on such abundantly available resources has been mooted but the experimentation has been limited. There are exceptions. Lantana, as a weed has diffused widely in many parts of the country. While in majority of the areas it is a constraint, in some areas it has spurred innovations dealing with different uses of Lantana such as furniture, pesticide and medicines. One has to unravel the institutional conditions, which convert such favourable conditions into constraints and thus preventing the emergence of innovations. One can also investigate the opposite.
- 4.2 Endowments become opportunity when external exploiters start accessing the resource. Local communities and/or individuals may become curious to find out why this resource was accessed by outsiders. Here also, in the majority of the cases, the collection does not lead to curiosity. If such was not the case, most herbal collectors could also have become either healers or processors of the herb or some other materials.
- 4.3 The characterisation of a resource generates opportunities for experimentation. Once we learnt during a shodh yatra in Kutch district, Gujarat, from a village herdsman that all plants which were not eaten by animals could be the source of potential pesticide (a fact which we had known empirically but we had not developed a generalisable principle), we shared this knowledge in every subsequent shodh yatra. In some areas, it triggered experimentation and local innovation. If this is a viable way of triggering innovations, then it has a public policy implication. Diffusion of such knowledge about soil, plants, minerals, and a whole of other materials can trigger innovations, which otherwise might not take place as easily.
- 4.4 There are periods of economic (for example, oil price hike of 1973, cheap import of edible oil affecting prices of coconut and other oil seeds) or ecological (bird flu, drought, floods, natural forest fires, epidemics, etc.) or even socio-political crisis (war or unrest or insurgency), which may trigger search for local solutions from within the existing endowments. In northeast, the insurgents mediate solutions to healing the wounds caused

by conflicts and discovered several plants which immediately stopped the bleeding. This may become a common knowledge later.

- 4.5 The scarcity of certain endowments/resources may trigger search for innovations that may otherwise not take place. Labour constraints may trigger mechanical innovations and animal feed constraints may trigger innovations for developing galactagogue.
- 4.6 The preponderance of an endowment may facilitate serendipitous or systematic search for innovations that improve productivity of that resource. However, mere preponderance does not explain the emergence of innovations. In the paddy regions, the varietal innovations are not as pervasive in the recent few decades as must have been the case in the pre green revolution period. In rainfed regions, within a village one could find 20 – 30 paddy local varieties developed by farmers long ago for different flooding levels and durations. Once externally induced innovations or plant varieties became available, in some regions the farmers made selections and developed new varieties from within the externally induced materials. In some cases, new materials provided new possibilities for developing local innovations. Mr. Khobragade, a dalit small farmer selected a variant from Patel 3 (officially unreleased paddy variety developed by a scientist at Jabalpur but released informally) crop grown on his farm. HMT variety so developed diffused over 0.1 million acres in five states. The endowment of paddy and favourable soil and water conditions made it possible for divergence to be tried. But an eye for oddity made the innovation possible or at least visible.

**5 The relationship between endowment and innovation** is mediated by several variables, which can be classified as (a) motivational, (b) volitional, (c) institutional and (d) consequential in terms of social impact. Unlike conventional understanding generally drawn from organisational innovation literature, neither one may have a problem to begin with, nor may one need a sponsor for taking the idea forward. Given the paucity of literature on unaided innovations by people, scholars many times draw upon literature from organisational context. In some cases, the behaviour of innovators in formal and informal sectors may be similar. But in most cases, the conditions are quite different. And hence, there arises a need for a different theoretical framework. The studies on national innovation systems have generally focussed only on R&D in public and private organised systems. The R&D has often been equated with innovation system. It need not be so. Further, the innovations in the unorganised sector may not have much to do with the flows of information and resources within the organised or formal innovation system. The motivation of experimenters and potential innovators expected to seek approval or appreciation from the formal peer group may be quite different when such recognition may either not be sought or may not be easily available.

#### 5.1 *Motivational factors for triggering innovations*

The motivations of the innovators could be intrinsic or extrinsic, or a combination of both. Both intrinsic and extrinsic motivations could be induced by material, non-material interests or rewards. Same innovator may have different motivations for different technologies developed by him over a period of time. As is true of us, it is also true of the innovators that despite having positive motivations for solving a particular problem (faced by oneself or others), the actual action does not begin soon after the recognition of the problem. The inertia or indifference can continue for long time in some cases. However, certain kinds of triggers induce a potential innovator to take initiative for solving the problem. The external conditions may facilitate the transition of trigger to initiative or frustrate it. Many of these triggers may operate sequentially or simultaneously, as the case may be. The conceptual framework (Figure 1 to 5, Sinha 2008) illustrates the relationship between contextual factors and the motivational factors. Despite being aware of the need for a particular technological change, one often does not take an initiative till some action or event triggers the same. A study of these triggers might help in mediating transition of motives to initiatives.

#### 5.2 *Volitional factors*

The volitional factors include the criteria by which choices are made and the indicators used to assess the effectiveness of those choices for future learning or guidance. The criteria by which an innovator may decide whether a problem is worth pursuing or not may distinguish different innovators in terms of their persistence, approach to solving problems, evaluating the results, deciding how much efficiency to seek and appraising the feedback. We do not have a great deal of data as to what kinds of criteria are generally used. But, if we look at the range of innovations developed at grassroots, one can hypothesise that there exists a very wide variety of criteria as well as indicators for assessing the utility of a particular solution. It is not that innovators always begin with a problem. Sometimes, a random event such as mutation in a crop field may trigger the idea of selecting the off type plant and evaluating it to see its performance. Search for innovation may thus be embedded in the curiosity and the skill for looking odd things out. Obviously, search for a different plant (whose characteristics can attract attention either morphologically or functionally) in a field with millions of plants may appear like searching for a needle in the haystack. But heuristics used by the innovators may help in reducing the complexity into simple thumb rules. These rules are nothing but the criteria. One can use same criteria for different innovations or different criteria for different kinds of innovations. During the life cycle of the innovation, the criteria for making different trade offs in terms of materials, cost or durability or timeframe, etc., may vary. The volitional factors interact with triggers, which may be individual or social, episodic or sustained and intense or mild. The choice of the criteria by which an innovator evaluates not only the desirability of change but also the degree or optimality of change have to be inferred from the decisions actually taken. Decision tree analysis can be one tool for such a study. Critical incident analysis can be another. Case studies will provide data for study of these factors.

A biographical or the ethnographic history of an innovation may provide insights as to how some innovators overcome inertia and convert an awareness of a problem into initiative, while others just ruminate.

### 5.3 *Institutional factors*

The initiatives triggered by a set of particular events or interactions or interventions may lead to technological or institutional initiatives. The *speed, scope and scale* of these initiatives may vary depending upon the nature of support one can mobilise from within the family or outside from a social network. Innovators may pursue different kinds of experiments depending upon his knowledge domain, access to inputs, perception of and response to risks and feedback. The trials may have varying level of success and the consequent innovation may have numerous dimensions in terms of complexity, functionality, eco-specificity, variability, compatibility with other endowments, etc. The innovation may be governed by different kinds of individual or institutional incentives as well as processes. The diffusion may be slow or fast, continuous or discontinuous, or intermittent depending upon the user feedback. Just as adoption can be early or late, the discontinuance can also be early or late. If technology is not continued, one has to analyse the patterns of adoption and discontinuance. Some users may discontinue while others experiment and sometime, surpass the productivity of the original innovation.

The institutional factors, therefore, may include the feedback networks, peer culture, positive or negative reinforcement from within the family, social group, community or formal institutions. The norms evolved by various communities about tolerance for deviance are very important factors. Deviant research by the innovators need not get sanctioned but may also not be appreciated. Indifference can be tolerated but hostility may stifle the spirit of some. The transaction costs in sourcing support from peers or markets may influence the speed, scope or scale of innovation. One has to find out how the institutional factors enable or constrain the journey of the innovator.

The study of both formal and informal factors will also require understanding the relationship between private, community and public domain knowledge as well as resources (Gupta and Sinha, 2001). The role

of collective choice in influencing individual as well as group based innovation has not been studied adequately.

#### 5.4 Consequential factors

The consequential factors or social impact factors will influence the process of diffusion, feedback, modification and further innovation.

The form of diffusion may also be very different in terms of the purpose, which is being pursued. Sometimes, only the concept diffuses, while in other cases whole or part of the technology diffuses. Users modify certain technologies during the diffusion so as to facilitate their adaptations for varying user contexts. The modification could be through blending of different components or features or their bundling. The blending refers to an arrangement in which user cannot separate at will, different components combined in the design. On the other hand, the bundling implies a choice about the features one wanted to have in the technology and these features can be combined either by the user himself or at his suggestion by the innovator easily. The diffusion of bundled technologies, one can hypothesise, may take place among far different social segments than the blended technologies. Social benefit of the bundled technologies may be higher. The mode of diffusion could be protected or open source or a combination of these two, through peer communication or through the labourers or workers. The entrepreneurs (licensees or imitator), traders (authorised or unauthorised), civil society organisations or others may also help in diffusion through commercial or non-commercial channels. The technology may be targeted at different levels or scales and thus may also have impact on different sub systems, environment, gender balance, or regional or global developmental prospects.

There is a need to refine these frameworks (figure I to VI) and supplement these with other tools to understand the processes that may be followed at the level of farmers, artisans, labourers, and other stakeholders, to transform innovations from one context to another. The relationship between technology, considered as 'words', institutions taken as 'grammar' and culture, understood through the metaphor of 'thesaurus' needs to be spelt out to look at the innovation and knowledge chain properly. Likewise, each of the steps in the value chain may further be expanded to understand how, for instance, an entrepreneurial network emerges. How are benefits generated and shared among different stakeholders? Does protection of IPR help in incentivising innovations at grassroots level? Does one have to blend the open source and the IP models in a manner as general purpose licence (GPL) attempt to do in the open source software community (see the concept of Technology Commons discussed earlier)? Should one stifle imitation if it reduces cost, increase affordability and facilitates local diffusion? What are the implications of public good aspect of grassroots innovations?

The portfolio of incentives will vary from case to case depending upon the nature of technology, socio-ecological context and the motivations of the innovators. The institutional support system can make a significant difference to the articulation of preferences of the innovators as well as other actors involved in the value chain.

	<b>Individual</b>	<b>Collective</b>
<b>Material incentives</b>	IPRs and awards Angel investments Support for workshop  Financial awards  Honour, felicitation Linkages with formal and informal r and d system	Trust funds, public labs

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## **Non -material incentives**

Creation of public goods by innovators may depend upon their capacity to subsidise the cost of societal learning. The external incentives to encourage and compensate the innovators may help in sustaining the grassroots innovation system. It is true that certain kinds of innovations would emerge even without any external incentives and the extent of their diffusion will depend upon the ability of innovator to provide information, materials, or artefact. Innovative processes are easier to diffuse than the products. But sometimes, one without other may not be of much use. The purpose of creating common or public good is also to incentivise the communitarian spirit guided by desire to share one's learning. If this desire is not reciprocated by the formal system, then the knowledge providers may feel short changed. Such a feeling may have already emerged in many parts of the world.

Every time an innovation diffuses, it modifies the endowments for future innovations. If there are negative externalities of the innovation, then mitigational innovations have to be triggered. If an innovation triggers positive externalities, one has to see as to how much incentive there exists for improving or innovating in other sectors. The innovation processes may vary over space, time and sector beside social segments.

*Note: While there is a considerable scope for modifying and improving the framework developed by Ms. Riya Sinha for her Ph.D thesis on "Local creativity, institutional context and technological change: An exploration of complementarities for up-scaling", it provides a very useful building block to begin a comparative research. The thesis is being pursued at University of Wageningen, The Netherlands.*

## **Part III**

### **6 Research questions**

#### ***Emergence and existence of GRIs (phase I)***

- 6.1 What elements in a socio-ecological context provide or favour conditions for an innovation to emerge?
- 6.2 What kind of motivations leads innovators to develop open source / public good technologies vis-à-vis more restricted innovations? How do different triggers make innovators take initiatives to solve a local problem creatively? Does feedback from potential users influence both the motivations as well as the triggers for further innovations or improvement of existing innovations?
- 6.3 How do institutions (local and national level and in some cases, international ones too ) respond to the needs and aspirations of grassroots innovators for converting their ideas into product? What can we learn from experiencing of blending formal and informal science and how can this process be strengthened?

## **B Dissemination and Incentive (phase II)**

6.5 Dissemination strategies: What are the incentives for innovators to disseminate their technologies to other farmers (within and across regions, nations and cultures) and other stakeholders?

- a. How can we identify context-specific dissemination strategies for different kinds of technologies and user groups?
- b. How can we blend open source and intellectual property based innovation strategies such that access of local disadvantaged farmers and artisans to new solutions does not get impeded?
- c. What role portfolio of incentives play in evolution and diffusion of innovations
- d. What are the key policy impacts and how to diffuse findings to policy makers?

## **7 Objectives**

**Objective 1 Understanding factors for the emergence, existence and successful functioning of GRIs within the NIS**

**Specific objectives**

- 1 To understand the socioeconomic and cultural factors influencing motivation, trigger, facilitative or inhibitory factors influencing success or failures of innovations
- 2 Study institutional environment for emergence and promotion of GRI.
- 3 Capacity building of individual and institutional actors for promotion and scaling up of innovations

**Objective 2 Creating opportunities (existing, experiential and perceived or anticipated) for dissemination and incentivisation.**

**Specific objectives**

- 1 Identification of technology-specific pathways for diffusion/dissemination
2. Identification of opportunities to link GRI, and social innovations to promote GRI
3. Explore evolution of portfolio of material and non material incentives with specific attention to identifying concomitants of GRI-friendly IP/open source policies and procedures.

## **Part IV**

### **8. Methodologies and Timeline**

**Objective 1 Understanding factors for the emergence, existence and successful functioning of GRIs within the NIS**

**Specific objective**

- 8.1.1 To understand the socioeconomic and cultural factors influencing motivation, trigger, success or failures of innovations
- 8.1.2 Study institutional environment for emergence and promotion of GRI.

### 8.1.3 Capacity building of individual and institutional actors for promotion and scaling up of innovations

**8.1.1 a) Mapping innovations and TK:** SRISTI will do qualitative research to understand context and stages of innovation process. Emergence of different kinds of innovations and outstanding traditional knowledge in different socio-ecological contexts (Gupta, 1984, 1988, 1989) needs to be studied so that one can target special institutional efforts over space and time. SRISTI will conduct a systematic study of the livelihoods and socio ecological conditions for traditional and contemporary innovations and knowledge systems.

Mechanical innovations may emerge more in a semi arid region with relatively speaking, larger holdings requiring mechanical operations both by bullocks and motorised means. As droughts occur and problem of fodders scarcity leads to decline in the bullock population, the motorcycle and tractor based mechanical innovations increase. In tribal semi arid regions and other regions with predominant reliance on livestock, the traditional knowledge for the livestock may be richer. In south Gujarat sub-humid tribal region, the human healing traditions may dominate given weak health infrastructure in tribal region.

#### ***Methodology and timeline***

In the first year and a half, the existing data of about 5000 innovations and TK practices will be mapped for Gujarat state. Initially the data will be mapped in Gujarati and English language. Later, other Indian and other languages can be added depending upon the resource availability. The maps of various endowments and innovations could help us in estimating probabilities of different kind of technologies in different regions. Even if quantitative estimations may be deferred for the second phase, in the first phase, mapping of these knowledge systems would certainly be helpful.

There are several interrelated factors that influence the innovation process. Factors that lead to success or failure of innovation cannot be correlated in a straight forward way. Factors that motivate innovator or trigger an idea or initiative, which may become an innovation could also be a reason for the success or failure of the innovation.

*The question however remains, how do we define an innovation to be successful or a failed one? If the local outcome of an innovation is positive i.e. the problem is solved partially or completely, choices of the local communities are expanded, or affordability increases so that those excluded from similar solutions are included now, , does it necessarily mean that the innovation is successful? Outcome of an innovation could altogether turn into a new or different product or process, much different from the original innovation. The reason for which efforts were made may not work out (or fail to work) for several reasons and instead the innovation does extremely well in another field. So does it become a failed innovation in original context yet with a positive outcome in another context? What can one learn from such cases? Actually, it is well known that even the formal sector innovations seldom remain unchanged in the user hands.*

#### ***Methodology and Timeline***

##### **8.1.1 b) Motivations and Triggers**

Apart from studying motivations and triggers, SRISTI also wants to understand the factors which mediate in the transition of an idea into innovation through various inhibitory or facilitative institutional conditions. Twenty five case studies will be taken up in the first two years through an interactive, iterative and conflictive methodology developed earlier (Gupta, 1983) by involving at least one co-author from the community of the innovator. There are two assumptions behind this methodology, (i) there are questions relevant for a particular case which cannot be anticipated

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beforehand, no matter what the expertise of the researcher and (ii) some of the anticipated questions in the checklist are not relevant at all for the concerned case. Thus, a checklist is made for facilitating the case studies but it is not shared with the researchers. There are four rounds of the case study methodology. In the first round, researchers/field investigators/students are explained the purpose of the study and the criteria for selecting innovators/TK holders. Once the innovator is selected, preliminary understanding is made according to the framework diagrams (figure I to V, Sinha, 2008). In the second round, the checklist is given and the researcher validates the above two assumptions. They add their own questions and at the same time decide not to pursue irrelevant questions. In the third round, the links of the innovator with the other institutions, actors and forces are pursued. In the final round, the entire case study is read out to the family of the innovator. It is then that the family of the innovator realises why various questions were being asked. They offer new insights and additional information which, I have argued, cannot be generated by any other methodology. It is only then that the context of the case study becomes clear properly. In addition to generating feedback and new insights, this step also fulfils an ethical responsibility. As mentioned in the annexure one on Research on Research, the innovator is not just the subject. He or she also has right to ask questions and pursue their own enquiry. They must get an opportunity to ask questions every time. The key research leader meets the field researchers after every round and enables each researcher to add questions to each other's list. There are two contradictory practices are noticed, (a) researchers write about details which they did not observe or here but actually assumed, (b) they do not write many observations even though they notice them because these perceptions do not match with their theories – in – use. The research leaders' role is to highlight the contradictions and facilitate authentic documentation.

8.1.1.1 These case studies will provide socio-ecological context and use the framework developed for Riya's thesis (see annexure I – VI). These frameworks will be modified according to the context and flow charts for different cases will be developed apart from an ethnographic account of the process of evolution of innovations (This may also provide partial answer for RQ 1). These cases will be taken up in different regions of the country and a workshop will be organised at local level and at national level to analyse the policy and operational insights from these cases studies. The factors which facilitate or inhibit the transition of triggers into initiatives and initiatives into innovations will be studied. Whether certain kinds of motivations tend to amplify or diminish the role of various factors will also be looked into. For instance, if motivation is to create a public good, then certain factors which tend to be seen as inhibitors by private profit oriented innovators may be ignored by these innovators.

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8.1.1.2 A survey will be undertaken in the third year in the hinterland of each case study to find the generalizability of these insights. These studies will also be shared in the local language with the local communities so as to validate what is agreed and record the differences in the interpretations through mutual consent.

8.1.1.3 The implications of the feedback analysis for lateral learning among the users and also for the innovators will be studied by looking at the process of utilising feedback. Some innovators tend to discount feedback from first time users while others give importance to feedback, no matter from whom. Some innovators are so headstrong that they show tremendous resistance to incorporate feedback easily, until they are convinced. The empirical analysis of different kind of feedback may lead to development of a theory of learning by innovators.

## 8.1.2 Study Institutional environment for promoting GRI

- *Maximize involvement of different stakeholders in strengthening GRI throughout the value chain.*

- How do we analyze facilitative or inhibitory institutional conditions at different stages of the journey of an idea to innovation and product/service with or without blending with formal science and technology?
- Identify the best possible way to promote an idea which is promising depending upon the applicability of the technology. (Can be done in two ways) :

i) Recognizing the effort in developing local practices or open source technologies based on the local know-how which may require very little support or input to take off. SRISTI may help in disseminating and marketing of such ready ideas.

ii) Extending support like providing technical expertise, testing facility, technology transfer throughout the incubation process of innovations.

### Methodology and Timeline

- 8.1.2.1 The response of formal R&D sector to grassroots innovations and /or outstanding traditional knowledge will be studied by interviewing the scientists in various labs or research institutions who have participated in validating grassroots innovations. National Innovation Foundation (NIF) has MOU with CSIR (Council of Scientific and Industrial Research), and ICMR (Indian Council of Medical Research). Selected scientists will be interviewed to assess their motivations for taking initiatives to add value to local knowledge.
- 8.1.2.2 A separate analysis will be done initially through case studies about the role local institutions play in evolution and dissemination of grassroots innovations.
- 8.1.2.3 Analyze the experience of various kinds of support systems for GRI and outstanding TK so that better institutional eco-system can be suggested.
- 8.1.2.4 The content of extension packages of public agencies like agricultural department or agricultural university or ICAR institutes will reveal through a sample study as to how much of content is based on non-monetary, open source technology inputs from grassroots innovations or formal sector R and D. Implications are for reforming institutions as well as incentives for creating public goods.
- 8.1.2.5 The analysis of facilitative or inhibitory factors revealed through case studies will further amplify the role of not just individual institutions but also of inter-organization networks in improving the GRI eco-system as a part of NIS.

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### 8.1.3. Capacity building of individual and institutional actors for upscaling and promoting GRI

At times, the limited capacity and willingness of various actors involved in the innovation chain becomes a reason of major handicap or bottleneck in implementation of the idea. Therefore SRISTI would explore the possibility of identifying capable actors and institutional support besides identifying the gaps there in, to develop strategic alliances and partnerships for promotion and scaling up of innovations.

### Methodology and Timeline

- 8.1.4.1 The documented cases (25 case studies as mentioned above) will also be shared along with other findings at the international conference proposed either in China or India or both to help in disseminating the lessons. These cases will also be used by AASTIIC (Academy for Augmenting Sustainable Technological Inventions, Innovations and traditional Knowledge) for organising capacity building workshops of researchers, activists and students from around the world. Workshops of innovators/TK holders addressing similar problems at regional and national level to generate data on heuristics, dimensions of lateral learning (people to people learning, barriers to diffusion and processes of innovation in diffusion by users, by fabricators and others. The background compilations and maps will

be shared with the participants along with some prior art search information to contribute towards blending of formal and informal science.

- 8.1.4.2 Some manuals on GRI system may also be developed. Idea is to share simple tool kit with the new actors in GRI value chain so that they learn from the experiments pursued by network members so far in different places. This is itself a very elaborate research project but an attempt will be made to just make a beginning in this regard.

## **Objective 2: Creating opportunities (existing, experiential and perceived or anticipated) for dissemination and incentivisation.**

*SRISTI may enhance dissemination and diffusion in the following ways depending upon the nature of technology:*

*i) In case of unique innovative initiative: improve the impact of the innovation through minimal input and extensive publicity (little support can do wonders sometime).*

*ii) In case of innovative ideas which are replicated and/or copied, e.g multi-purpose tool bar or saanti on their own: extend support to improve the efficiency of the innovation through formal channel (as well as through lateral learning among informal innovators) to develop improved models of the same for various applications.*

- *Social innovation: the process of triggering, diffusing and incentivising innovations may be no less important than the innovation itself. By studying these processes, policy and institutional implications can be drawn for strengthening NIS.*
- *Systematic analysis and evaluation of the impact of award, recognition and honors to innovators and traditional knowledge holders for developing model of incentives*
- *Strengthen its efforts for creating public goods through Open access technologies, and redefine the conventional intellectual property framework through Technology Commons and other improvement in innovation protection systems.*

### **8.2.1 Identification of technology-specific pathways for diffusion/dissemination**

8.2.1 The following approaches have been tried by SRISTI for disseminating innovations among potential users and other stakeholders so far such as:

- a. Publications in local languages( in Honey Bee newsletter Hindi, Gujarati, Kannada, Tamil, Oriya, Malayalam, Telugu, besides English)
- b. Web based dissemination ( there are seven databases of med plants, TK and innovations in four languages( developed with the help of Central government, department of scientific and industrial research three years ago), endogenous common property institutions that is those institutions which are developed by local communities on their own without any outside help, from 24 countries, only database (CPRI) of its kind, small ( 84 cases) but needs to be expanded,
- c. Shodh Yatras—Learning walk through the villages every summer and winter, SRISTI has organized two Shodh Yatras every year for last eleven years covering about 4500 kms., excluding the walk with the students in a course with the same name in IIMA for last seven years in Himalayas.
- d. Shodh Sankal (workshops of experimenting farmers in different villages where we share what we know, plan experiments that farmers want to do on their own, informally, collegial and people managed) any plans next ?
- e. The innovators and TK holders spread the word about innovations on their own—word of mouth

- f. Innovations and TK are registered at various web based search engines and other databases which potential users and actual users approach for looking for solutions, expertise (like birchbob, [www.newideatrade.com/free\\_tools.htm](http://www.newideatrade.com/free_tools.htm), [ideaconnection.com](http://ideaconnection.com), [yet2.com](http://yet2.com), [Your Encore](#), and many others
- g. Students who help in scouting the innovations and tk and as a principle first disseminate the same to communities and individuals whom they meet. In China where we started the campaign two years ago through Faculty at Tianjin University of Finance and Economics, students have proved to be very effective in dissemination as well as scouting grassroots innovations (GRI) (SRISTI just helped in setting them a TWIN centre on GRI).
- h. Media: both, international and national (including regional print, radio, TV) media has also helped in spreading the message around the world and the country about the innovations. That gets us many new leads and also creates wider consciousness about the Honey Bee Network.
- i. Public lectures: Participation of HBN volunteers in various conferences, student conventions, fairs, workshops and exhibitions to spread the word around through presentations, lectures.
- j. The Multi media – multi language database first developed by SRISTI in 1997 and showcased at the Global Knowledge conference, Toronto, 1997 provides a basis for inclusion of those who can learn only in mother tongue, even if they are illiterate and not only from local knowledge but also from global knowledge of GRI. The multimedia database is shown at various fora including Shodh Yatra, meetings, and workshops for children, farmers and policy makers.
- k. Satvik-Traditional Food Festival, organized every year by SRISTI at IIMA campus also hosts an innovation exhibition and about 25-30 thousand people visit the exhibition and the fair.
- l. Techfest at IITs and other technology and management institutions: various technology and management institutes draw upon the grassroots innovations to be show cased at their festivals or organize business plan competitions including Pratyarpan at IIMA

### ***Methodology and Timeline***

- 8.2.1.1 Systematic feedback will be collected about only *some* of the above methods by survey, discussions and analysing the sample of letters and queries received at NIF, GIAN and SRISTI as well as other collaborators so that we can assess the relative utility of various methods. We could then modify the design of dissemination strategies and do some action research on the relative efficacy of some of the redesigned strategies. The analysis of the existing data will be taken up in the first and second year. The survey of users through various approaches will be pursued in the second year. The action research on the effectiveness of redesigned dissemination strategies will be taken up in third year.
- 8.2.1.2 Dissemination by the innovator themselves seems to be a dominant mode in open access technologies. In some cases, the market forces have also contributed in disseminating such technologies, particularly plant varieties.
- 8.2.1.3 There are very few examples where public extension agencies have tried to diffuse the farmer innovations except when they may have appropriated the same without attribution or reciprocity. The content of the dissemination packages will be made to identify the gaps and then pursue the leaders of these agencies to fill the same. Already two workshops have been organized of KVK-Krishi Vigyan Kendra located in more than 500 districts, to create awareness about Honey Bee Network and its databases at NIF and SRISTI so that dissemination can be improved. More such workshops will be organized to collect data about the reason for gaps, and new ways of dissemination of GRI.
- 8.2.1.4 From the sustainability point of view, dissemination of low cost, non-chemical technologies may suffer an unfair competition with non-sustainable technologies backed up by huge promotional

budgets. The study will document above implications wherever feasible in the case studies or special purpose surveys as mentioned earlier.

8.2.1.5 The relationship between open source and IP protected technologies will be studied in the cases where innovators have shared their knowledge with others even after having patents on the same. Likewise, there are some who have not done so. The dissemination outcomes may be different in both the cases.

## **8.2.2 Identification of opportunities to link GRI, and social innovations to promote GRI or other institutional mechanisms with NIS**

### ***Methodology and Timeline***

8.2.2.1 Social innovations have taken place in various aspects of promoting GRI as well as TK. For instance, Uplenchwar, a social entrepreneur had written about the formula of a herbal pesticide on the wall of his village school asking people to make it as they wished. But if they wished to buy from him they could do so also. Later, he wrote to thousand villages in his district and did the same, shared the formula but also offered to sell if they wished not to make it themselves.<sup>15</sup> There may be a large number of such innovations which will need to be scouted apart from technological innovation so that the relationship between, technology as 'word', institutions as 'grammar' and culture as 'thesaurus' can be elaborated further. That will also help in adding new dimensions to NIS.

8.2.2.4 Social innovations used by innovators will be studied separately from the ones developed by mediating organizations or networks. In livestock related TK, SEVA has organized diagnostic camps and shared the relevant TK in those camps. Collaborator from Orissa has published a book as also SEVA from Tamil Nadu and SRISTI on indigenous veterinary practices to promote the use of such knowledge.

## **8.2.3 Explore evolution of portfolio of material and non material incentives with specific attention to identifying concomitants of GRI-friendly IP policies and procedures.**

A study of different models of incentives, monetary and non-monetary for individual and groups will be taken up to analyse the diffusion of different kinds of technologies. To some extent, this dimension will also be captured in the case studies. But, a survey of innovators and awardees of SRISTI and NIF will be undertaken to draw implications for development of future portfolios of incentives for triggering and disseminating GRIs.

SRISTI will analyse the relative efficacy of several incentives provided by the Honey Bee Network so far as given below:

8.2.3.1 Publication in the magazines is one of the most prominent incentives. A sample of farmers and artisans whose profiles have been published in multi language Honey Bee Network magazines will be contacted to assess the impact of such recognition on their motivation and social capital. SRISTI would also contact the community members and try to understand the role model effect. If their experience has triggered innovations in some other regions and they are aware of it, those will also be looked into. While full impact is not easy to assess, some understanding will be achieved through this study so that better impact of publications can be obtained.

8.2.3.2 Honour at SRISTI's annual meeting. In addition, in the last eight years, National Innovation Foundation (NIF) has organised four award functions and fifth is due this year.

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<sup>15</sup> Astad Pastakia, 1996, Grassroots Innovations for Sustainable Development: The Case of Agricultural Pest Management, FPM thesis, PSG, IIM Ahmedabad

More than 250 innovators and TK holders have been honoured by NIF and about 500 by SRISTI. We need to assess by going back to some of those honoured during learning walks and award functions as to what effect has such honour had on (i) their own motivations, (ii) incentives of other individuals and community members to innovate and share their knowledge, (iii) younger generation and their experimental ethic and (iv) larger society at least in the hinterland. Surveys will be undertaken to collect data and the same will be shared with not only the knowledge providers but also their families and communities in local language before sharing it with others. Suggestions will be sought to find out ways in which impact of such honour can be enhanced. This may be pursued through a sample study.

8.2.3.3 The impact of community monetary awards and non-monetary recognition will also be assessed to understand the impact on community members as well as on neighbouring communities.

8.2.3.4 A survey will be undertaken about the preferences for different kinds of incentives among innovators and TK holders to suggest the portfolio of incentives that might stimulate better social impact under different institutional and socio-economic conditions. Three different surveys will be taken up to ascertain the preferences of different incentives by agricultural, mechanical and herbal innovators/TK holders. In addition, we would also take up a survey of children innovators.

8.2.3.5 The role of PIC and the way to improve the process of taking PIC of communities as well as individuals will be studied to draw lessons for future.

### **Policy impact:**

In addition to various other outcomes, it is proposed to bring out short policy briefs on different research ideas and findings at least every six months to disseminate among the stakeholders.

If additional resources are available, international capacity building workshops may be organized on various aspects of grassroots innovations and their role in national innovation system. The experience of APCTT workshop can be replicated with the help of other partners. The Chinese experience with the replication of Honey Bee Network philosophy makes it possible to achieve similar breakthroughs in other parts of the world. Policy briefs on such possibilities will also be brought out with specific reference to the emerging conditions in those developing countries.

Some of the developed countries may also find the inability of the existing safety nets coming to the rescue of communities affected by economic downturn. The possibilities of Honey Bee Network approach kindling creative spirit at grassroots might become attractive even in developed countries. A policy paper on G<sup>2</sup>G (Grassroots to Global) will be brought out to draw attention to various dimensions of globalisation processes.

### **Chances and risks:**

In any research project, there are uncertainties, which can affect the outputs and in some cases, even the outcomes. At the same time, in a project with wider participation of stakeholders, it is unlikely that all stakeholders will decide not to cooperate and thus affect the outcome adversely. At the same time, for various reasons, some may do so. That is unlikely but is possible.

Key risks are:

- a. Given the economic uncertainties and downturn, some of the case studies selected for highlighting the successes may turn out to be the stories of failure. In such a case, the case study will still serve the purpose, but not necessarily the same, which was originally intended.
- b. The workshops on institutional responsiveness and diffusion of innovations may be affected by the unexpected natural or social downturns. Institutions may come under budget squeeze and communities may come under market squeeze. The participation may not be zero but can come down.
- c. The study of farmers' feedback on various products taken to market may reveal biases on account of expected results being higher than the actual results even if the actual are higher/better than the alternative technologies.
- d. Any unexpected, economic or social disaster prior to the survey can depress the responses for the same objective experience. In the current times, such episodes cannot be considered as improbable.
- e. Institutionalization of National Innovation Foundation (NIF) as an Institute of DST from the next financial year might influence the popular perception in either direction and thus affect their responses to the expected role of institutions.
- f. On the issue of incentives, depending upon the historical cultural experiences, different communities may place different weights on the individual versus collective incentives as well as monetary versus non-monetary incentives. These weights may turn out to be time and space sensitive depending upon the long past and the immediate past experiences. In the event of recent social conflicts, the preference for community incentives might go down regardless of the community's innate belief in such incentives. It will be important to capture such influences in the research to reduce the chances of misreading the community preferences.
- g. Any mishap in the organization or network pursuing the research can also affect the sequence of steps planned and actually taken.
- h. Public policy can affect the people's preferences for sustainable technologies and thus their responses.
- i. Success of certain policy initiatives such as Technology Acquisition Funds may also hinge on the way implementation is perceived to be fair and just.
- j. Given the sensitivity of diplomatic relations between India and China, unpredictable situations may emerge which may affect the scientific operation adversely although chances are very little [given the trade and economic relations].
- k. If the team on Chinese part is transient and therefore unstable, the expected capacity building outcomes may not follow. However, the experience so far has been very positive and such a situation may not arise.

There could be many other factors, which can affect the outcome of the research project. Only a few are anticipated and mentioned here just to highlight the sensitivity of the research team on the subject.