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Futures 35 (2003) 975–987

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# Mobilizing grassroots' technological innovations and traditional knowledge, values and institutions: articulating social and ethical capital<sup>☆</sup>

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## Abstract

The Honey Bee Network has helped provide a sort of loose platform to converge creative, but uncoordinated individuals across not only Indian states having varying cultural, linguistic and social ethos, but also in 75 other countries around the world. What the Network is trying to do in a rather quiet manner may transform the way the resources—in which poor people are rich—are used in the future. These resources are their knowledge, innovations and sustainable practices.

I first argue that the classical concept of social capital does not distinguish between the trust in society created for social good versus social 'bad'. For instance, the trust among members of the mafia and other socially undesirable networks does not constitute social capital. I am also trying to emphasize that part of social trust which is guided by higher ethical values which may not have become social norms as yet. This is being characterized as ethical capital. Finally, I conclude that the Honey Bee Network has tried to articulate the social and the ethical capital of society at the grassroots to demonstrate how local individuals and communities are trying to solve local problems without any outside help.

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<sup>☆</sup> The paper is based on the collective experience of the members of Honey Bee Network, only some of whom are included here as co-authors. It is written in first person to articulate the ideas more precisely and evocatively by the first author.

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## 1. Introduction

The healthy growth of democracy depends upon the emergence of decentralized, dispersed, polycentric spurs of social, ecological and economic entrepreneurship. Networking among these seemingly disparate cross currents sometimes gives enough momentum to the civil society initiatives to transform the social and cultural values of the society. There is always networking taking place among stronger economic and cultural forces, notwithstanding the nature of state. But sometimes, this transformation also takes place through subtle networking among the grassroots deviants, innovators, and other marginal but creative forces in society. Gerlach and Palmer [1] called these forces as SPIN (segmented, polycentric, integrated networks) while I tend to view these as SPLICE (segmented, polycentric, loosely integrated and coordinated entities). These SPLICES need attention today since they have the potential to take the society by surprise when their real power manifests, if it does. It is true that due to loose coordination, many times these forces remain on the margin and thus their potential does not get realized for a long time.

The networks are segmented because historically, the formal and informal institutions which are meant to connect creative voices have remained weak. The leadership based on performance and merit might not have felt threatened by the emergence of these networks. But, the conventional leadership drawing its legitimacy from cultural, religious, political or socio-economic affiliations has not come under pressure to connect these segmented but creative social forces. The polycentric nature of these forces is apparent from the fact that there is no single leadership which either spurs or sustains these loosely integrated or connected networks. The coordination among these entities and networks is slowly emerging through civil society initiatives such as the Honey Bee Network but these are still very weak. The democracy will thrive if polycentric, meritocratic leadership emerges based on its ability to solve local problems, rather than just articulate them. In this regard, the role of individual innovators is important; but even more important is the role of networks, communities and collaborative teams to connect these individuals which will transcend the technological and institutional inadequacies faced by the innovators and tradition knowledge holders.

The future, a recent study argues,

is the last frontier where nonwestern societies are still free—free to envision desirable futures based on their own worldviews, cultures, and traditions. Yet the discipline of futures studies...has abandoned its goal of exploring such diverse and alternative futures in favor of a single, myopic vision that is incapable of seeing outside the framework of western thought and action. Its overemphasis on forecasting and prediction, its overpreoccupation with technology, and its neglect of nonwestern cultures and concerns have transformed the discipline into an instrument for the colonization of the future. [2]

The revitalization of local communities was identified as an important goal of sustainable future [3] (Olson, 1994). Mindquakes are expected to become commonplace,

and a study on the future form of society concluded “the industrial era is being replaced by the compassionate era, which will be based on a profoundly different set of values.” [4] The running theme across various future studies seems to be that social structures will achieve new balance between the articulation of social and ethical capital at the grassroots and the intellectual capital in the formal dominant sector. The knowledge of the marginalized people may become a new counter point.

## 2. Saga of Honey Bee: new ethics, a new future

The Honey Bee Network evolved 15 years ago in response to a personal crisis. While I had grown in my career, received awards<sup>1</sup> recognition and remuneration for writing about knowledge of innovators and other knowledge experts at the grassroots level, very little of this gain had actually been shared with the providers of knowledge in concrete terms. Much of my work was in English till that time. I had tried to share the findings of my research with people; but this process had not been institutionalized in local languages. Likewise, I had tried to acknowledge the knowledge providers; they still had remained, broadly speaking, anonymous. It was obvious that my conduct was not very different from the conduct of other exploiters in society. They exploited the poor people in land, labor or capital markets. I exploited the people in knowledge market. It is at this stage that a realization dawned upon me that something had to be done to overcome this ethical dilemma of using people’s knowledge without appropriate reciprocity. The Honey Bee as a metaphor came to the rescue one day. The Honey Bee does what we, intellectuals, don’t do. It pollinates the flowers and takes away the nectar without impoverishing them. The challenge thus was, to define the terms of discourse with the people at grassroots, in which they do not complain when we document their knowledge, instead they get the opportunity to learn from each other through the documentation and dissemination of their knowledge in local languages, they do not remain anonymous but everything learned from them is sourced to the knowledge providers and they get a share in any wealth that we may generate and accumulate through value addition or otherwise in their knowledge, innovations or practices. The Honey Bee Network has brought lots of volunteers together who share this philosophy, partly or completely, and who want to link up with an immense source of energy and inspiration available with the grassroots innovators.<sup>2</sup>

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<sup>1</sup> The Honey Bee Network has also received many awards and recognition. Apart from Pew Conservation Scholar award to Prof Gupta in 1993, the Far Eastern Economic Review chose SRISTI and the Honey Bee Network for the Asian Innovation Gold Award in, FEER, Oct 26, 2000, Business Week conferred Star of Asia Award, July 2, 2001.

<sup>2</sup> The Honey Bee Network was founded with the help of Prof Vijay Sherry Chand, Jyoti Capoor, and many other friends. Later Kirit Patel joined and made an immense contribution. Kapil Shah, Rakesh Basant, Amrut Bhai Agrawat, Chimam Parmar, Praveen, Mahesh Parmar, Hema Patel, Shailesh Shukla, T.N.Prakash, P.Vivekanandan, Srinivas, murali. Dilip Koradia Sudhirender Sharma, and many others have contributed to the growth of the Network.

The asymmetry in relative weight which contemporary society places on this resource of grassroots innovations and informal knowledge vis-à-vis formal knowledge and technologies in devising developmental options almost always is skewed in favor of the latter.

Below, I will present some evidence of this bias and also share the lessons of the Honey Bee Network.

### *2.1. Poverty because of generosity, and consequent knowledge erosion*

Unethical exploitation of local knowledge continuing for centuries, leading to capital accumulation in the formal sector without any reciprocity, cannot continue for long. Since many of the grassroots innovators conserve nature, particularly biodiversity, despite remaining poor themselves, share their knowledge with outsiders generously and do not assert their rights, an anomaly has emerged. The youth in the same societies do not want to follow in the footsteps of their elders. They do not want to get penalized because of the superior ethics of their elders who shared their knowledge and remained poor. If something was given, it was accepted but a payment for services was not demanded. This has had several adverse consequences. One, the erosion of knowledge is taking place at a very rapid rate, the building blocks of healing and herbal tradition are getting lost. Many plants are becoming weeds. Just as one cannot locate a book in a library if the catalogue is lost or misplaced, likewise if the knowledge about the plants, their place in nature and uses is lost, one cannot accord them the value they may deserve. There are several other forces that accentuate the erosion of knowledge such as the loosening links between grandparents and grandchildren. But the crucial issue is the loss of respect for this rich source of traditional knowledge. It is taking place precisely because the younger generation, exposed as it is to the media, and everyday news of upward mobility of some ordinary people, does not perhaps want to remain poor because of their superior ethics.

### *2.2. Articulation of social versus ethical capital*

The question which arises is, how do we harness this ethical capital for social transformation? I differentiate ethical capital from social capital because trust and goodwill exists among members of the mafia also. We cannot obviously interpret the trust among various segments and networks in society as an absolute unmitigated good. Trust is very valuable when it is also mediated by desirable social purpose and helps in reducing transaction costs of the disadvantaged. If it increases the transaction costs of the poor because the well off forces in a social situation have tremendous trust among themselves (such that nothing would disturb their privileges and resource wasting life styles, no matter what), how could such trust be considered social capital. In such a case the trust among the social networks that do not necessarily contribute to the creation of common good cannot be called social capital. The debate on the subject has included this divergence but the resolution has eluded us so far. My contention is that trust accompanied with reciprocities in a social network bound by pursuit of a common good in the larger social interest does constitute

social capital. However, when this good is pursued through ethical means and for non-sectarian interests, one could argue that it constitutes ethical capital. There are many other sources of ethical capital such as the norms of ecological ethics, social and professional ethics, and eventually the individual ethics which permeate all kinds of organizations whether formal or informal and political or public or private or civil society organizations.

The relationship between natural capital and social, ethical and intellectual capital has recently been described elsewhere.<sup>3</sup>

The natural capital has provided the spur for economic progress all through the history, though its role has varied. The natural capital can be governed by social capital, some of which is also ethical capital (Fig. 1).

The social capital could be defined as community based institutional arrangements which help in conservation and reproduction of natural capital. It is essentially a trust based community capital. The ethical capital is essentially such investments and institutional arrangements that may be governed by ethical norms of accountability, transparency, reciprocity and fairness to both human and non-human sentient beings. Some of the ethical capital is a sub-set of social capital. When common property institutions follow ethical values, then the intersection of social and ethical capital takes place. Knowledge about natural capital as well as other kinds of technological and social interactions constitute the intellectual capital which is embodied in litera-

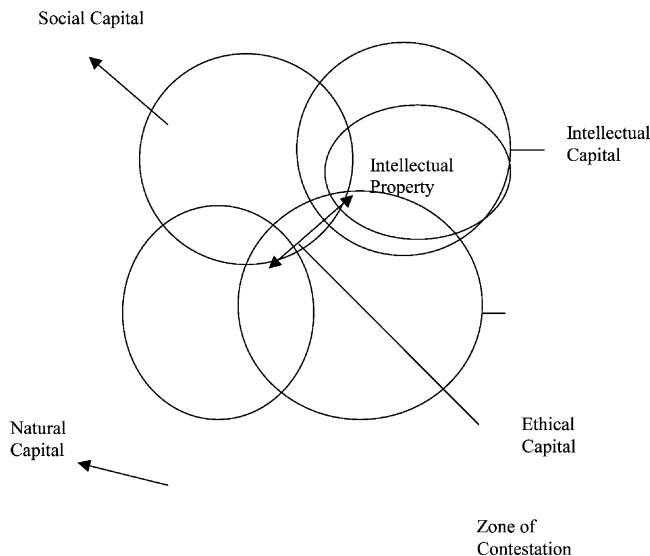


Fig. 1. Source: (Gupta 2001 own compilation in Gupta and Sinha 2001).

<sup>3</sup> Anil K Gupta and Sinha, Riya, Contested domains, fragmented spaces: Rights, responsibilities and rewards for conserving biodiversity and associated knowledge systems, Feb, 2001. Presented at the International Conference on MAB UNESCO on Biosphere Reserve, IFRI, Dehradun.

ture, data bases, folklore and other kinds of formal and informal sources of wisdom. Part of the intellectual capital constitutes intellectual property from which the knowledge producers can exclude others for a given period of time from commercial exploitation.

The purpose of this discussion is to emphasize that intellectual property is only one means of conserving and augmenting natural resources and associated knowledge systems. Since in the absence of this kind of property it is unlikely that the private sector would invest resources to add value to traditional knowledge, the discussion becomes relevant. It is not our contention that private investments alone can help in conserving resources and the knowledge systems. In fact, there is considerable evidence that expansion of market institutions has led to erosion of biodiversity as well as associated knowledge. It is more due to the fact that the traditional knowledge was not valued properly within and outside the communities than due to expansion of market alone. Once a commodity becomes valuable, the bidders try to appropriate it. Some critiques suggest that commoditization of traditional knowledge is contrary to the local culture and ethical values. This may well be true. However, one has to appreciate that every commodity that local communities and individuals have to buy from the market place has to be paid for. It is an ironical situation that the critics see no impropriety in commoditization of rest of the market in which local communities have no comparative advantage. But in resources in which they are rich, the commoditization is supposed to be disruptive. It is also ignored many times that the concept of intellectual property is not inconsistent with community wide sharing of knowledge for self use. It is only when somebody tries to enrich oneself at the cost of the community or individual innovator that the protection could help. Therefore the communitarian spirit which has helped conserve resources and generate respect for nature has to be nurtured. Our contention is that this spirit will give way when options for survival require deforestation or other resource degrading livelihood options because the resource conserving options are not available. The knowledge based approach to livelihood, and conservation of biosphere regions can indeed be evolved without causing any injury to the local institutions that have helped in conservation so long.

The Honey Bee Network is an attempt to articulate the ethical capital of our society, guided as it is, by the spirit of innovation, sharing and networking for generating eco-compatible technological and institutional solutions for natural resource management problems.

### *2.3. Ecological ethics*

There are several ways in which ecological ethics has been articulated in the Honey Bee Network constituting ethical capital. Our first encounter with this phenomenon took place seven years ago when we were making a small film on grassroots innovations and outstanding traditional knowledge with the help of the Indian Space Research Organization. The photographer and the director of the film, Jayantibhai had accompanied us to a village in north Gujarat to meet a herbal healer namely, Karimbhai. He was extremely poor economically but was very rich in his

knowledge and ethical values. When Jayantibhai plucked a particular plant on the roadside growing abundantly and asked Karim Bhai to hold it in his hand facing the camera, Karimbhai suddenly became upset. He asked as to why was this plant plucked when there was no immediate need for using it. He could have held this standing plant in his hand. We realized the importance of the notion that even a roadside plant (which was not endangered or scarce) should not have been plucked unless there was a need for it. This was the value unknown to us till that time. Likewise, we have had many examples of ethical capital manifesting in our network. In drought prone regions, a large number of villages have institutions to collect grains from every household to feed the birds. Despite the fact that birds attack the crops and cause loss, I have never come across farmers killing the birds by poisonous baits or shooting. On the contrary they would rather sit on a raised platform under the scorching sun and scare the birds to save their crops. A variety of bird-scaring devices have been developed by the farmers but the taboo on killing birds is widely prevalent. Occasionally, one does come across a single dead bird hanging on a pole to scare the other birds but killing the birds in general does not happen, though there are other tribal communities which do kill the birds and eat them.

There are fishing communities which have common property institutions to ensure that nobody would use a gillnet of mesh size smaller than four inches. This is done to ensure that small sized fish don't get caught. All these examples indicate that institutional innovations help in articulating ethical values and accumulating ethical capital in societies trying to live in harmony with nature. It is obvious that this capital base is narrow as evident by the extraordinarily serious situation with regard to environmental externalities and much irreversible damage caused by human actions. So long as there remains a hope through continuing living wisdom, one is challenged to explore opportunities for expanding such a capital base.

#### *2.4. Technological innovations to overcome inertia and improve efficiency at grassroots*

The Honey Bee Network has documented more than twenty thousand innovations and traditional knowledge examples in SRISTI and National Innovation Foundation with the help of various collaborators. These are either of contemporary origin or based on outstanding traditional knowledge primarily from India but also from all parts of the world. Many of these innovations are extremely simple and can improve efficiency of farm workers, women, small farmers, artisans and others a great deal. However, the diffusion of these innovations across language cultures and regional boundaries has been extremely slow despite the fact that the Honey Bee newsletter has been coming out in six languages for more than a decade and a half. There are many barriers to the evolution and diffusion of these innovations. (i) A lot of people have learnt to adapt and adjust to a constraint rather than transcend it. In the case of women based technological problems, this constraint has been a consequence of cultural institutions, which prevented them from acquiring blacksmithy or carpentry tools. Women are very creative in coping with the constraints and sometimes transcending them but relatively speaking, except in health, child care and animal care,

the innovations by the men have outnumbered the ones by women in our limited sample. We have to look deeper to understand the dynamics of such engendering of a particular kind of creative capacity. (ii) there is a contempt in society for someone who breaks out of the mold. Despite an upsurge of entrepreneurial spirit in different parts of the country in recent times, by and large a social deviant who is trying to do something new is often a butt of ridicule. Only those innovators who can withstand sometimes the indifference and occasionally the hostility of their peers can succeed in developing lasting solutions. (iii) The lack of social networking among the innovators has prevented them from faster collaborative learning or from provision of moral support in the times of crisis or failure (iv) lack of access to formal scientific institutions accompanied by lack of general responsiveness on the part of scientists has also prevented grassroots innovators in optimizing their solutions and in some cases even pursuing their innovations to a logical conclusion. (v) the formal scientific institutions at national and international level have failed to build upon grassroots innovations thereby weakening the momentum for even articulating the innovations. (vi) the educational systems at a different level ranging from primary to higher education have ignored this subject and have almost never included profiles of grassroots innovators in the curriculum or pedagogy. The result is that young people often grow with the assumption that technological solutions to their problems would come from outside and generally from the west and rather than evolving from within. The defeatist mentality and pervasive cynicism add to the problem. (vii) the lack of micro venture capital prevents the transition of small innovations into enterprises. The incentives for innovators therefore, remain limited. While micro finance facilities are now available around the world, micro venture finance for small innovations has been almost totally absent. This institutional gap shows the lack of appreciation by the global as well as national public policy institutions of the potential that grassroots innovations and traditional knowledge have for generating employment and overcoming poverty. (ix) the lack of intellectual property protection through specific instruments and legal frameworks designed for helping small innovators may also inhibit the articulation or sharing of innovations.

Despite all these reasons, innovations have indeed been scouted, documented and disseminated by Honey Bee Network and SRISTI ([www.sristi.org](http://www.sristi.org)) (and now National Innovation Foundation) over last fifteen years. Innovations such as a modified pulley to draw water, a gum scrapper to enable women to collect gum from thorny bushes or trees, or large number of small machineries, herbal pesticides, veterinary medicines, new plant varieties, agronomic practices or other products have been developed by the unsung heroes and heroines of our society without any outside help ([www.sristi.org](http://www.sristi.org)).

### *2.5. Linking innovation, investment and enterprise: Micro venture promotion fund*

As a follow up of the first International Conference on Creativity and Innovations at Grassroots held in January 1997 at IIMA, a regional fund was created in collaboration with Gujarat state government to convert innovations from the Honey Bee database into enterprises. GIAN (Gujarat Grassroots Innovation Augmentation Net-



work, [www.gian.org](http://www.gian.org)) was set up in 1997 to link innovations, investment and enterprise. The idea is that innovators sometime may not like to become entrepreneurs themselves. And even if they want to become entrepreneurs they may not have access to risk capital, technical know-how or design input for making their innovations into a product, which can be commercialized or diffused through non-commercial channels. GIAN has filed patents on behalf of grassroots innovators (in United States as well as India), incubated several innovations into products, and licensed some of the innovations to entrepreneurs on district wide basis with the license fee going to the innovator (even when patents for the licensed innovation have only been filed and not granted). Why are there not many GIANS within the country or around the world? The possible reason could be that the development planners and international aid and investment agencies have failed to see the potential of knowledge intensive approach to development. It is useful to summarize some of the lessons of incubation process. Many times, the innovators don't prove to be good entrepreneurs. They seldom realize that by not making any two machines or products alike, they generate a doubt in the minds of the customers that some people get more features in their products than others. Likewise, there are innovators who don't think they can learn very much from other experts particularly from formal sector. It is a different matter that many times, the experts in the formal sector also fail to see the merit of the local innovations. The lack of incubators, labs and other science and technology institutions dedicated to adding value to local innovations make the tasks of these innovators even more difficult. The lack of venture promotion capital and R&D funds constrain the pace and scale of technology upgradation of the innovation. The lack of mentors affects the moral of budding entrepreneurs who often need a shoulder to cry on. The lack of certification facilities at concessional rates for the products based on local innovations delays and sometimes inhibits the diffusion of innovation. Finally, the lack of media support prevents the horizontal networking among the innovators and generation of the demand for their products.

While the Honey Bee Network is experimenting with the use of information technology through multi media multi language databases accessible through touch screen kiosks, we are conscious of the limitation information technology has at the current level of infrastructure in making major impact on society.

#### *2.6. National and international register for innovations and a clearinghouse for horizontal networking and innovation market*

The transaction costs for innovators around the world to learn from each other and thereby improve the livelihood options, are very high. The popular media and other channels of communication do not pay attention to this source of creativity. Unless we have a clearinghouse in multiple languages and easily accessible in remote areas through internet as well as radio, it will be very difficult to create horizontal networks of grassroots innovators. A step in this direction was taken in India recently. National Innovation Foundation (NIF, [WWW.nifindia.org](http://WWW.nifindia.org)) was set up in March 2000 with a corpus of US 5 million dollars by Indian Department of Science and Technology at Ahmedabad essentially to scale up the Honey Bee model all over the

country. NIF has developed a national register of inventions and innovations, is trying to link innovation, investment and enterprise, connect excellence in formal and informal sciences, set up incubators and help in changing the mindset of the society to ensure respect, recognition and reward for the grassroots innovators. As against around 1600 innovations and traditional knowledge examples scouted in 2000, with the help of Honey Bee collaborators, NIF could scout more than 13,500 similar examples from over 300 districts of the country next year. Honourable President of India Dr. A P J Kalam gave away the awards to the innovators and outstanding traditional knowledge holders in December, 2002. Enormous upsurge of creativity at grassroots demonstrates the positive energy that has been locked up due to institutional inertia over the last several decades and centuries. This is the message which is relevant for every other country facing similar challenges. In the ministerial gathering of Commonwealth Science Council (CSC) held in South Africa in June 2002, the goals of the Honey Bee Network were adopted more or less as such for the future work agenda of CSC. And the hope was the CSC would become CIN i.e., Commonwealth Innovation Network.

SRISTI has moved a proposal for Global Innovation Foundation primarily to create multi language multi level clearinghouses for networking innovators. However, one of the problems that remain is the protection of intellectual property rights. It will be impossible for traditional knowledge experts and contemporary innovators to pursue standard patent protection where the average cost is about 15–20,000 dollars per international patent. The cost of validating the patent in each country every year is extra. There is a provision in the TRIPs as a part of WTO that an international negotiation be initiated to develop a global registry of wines. Obviously, it was done to persuade France to sign the GATT treaty. There is no obvious reason as to why international registry should be restricted only to wines. It should be considered possible to develop track two system of intellectual property protection. Under this, any inventor from any part of the world should be able to register one's innovation or traditional knowledge and get at least 8–10 years protection with 3–5 claims at a very nominal cost to be paid in national currency at the national IP office. This registry will provide an incentive to the millions of knowledge rich, economically poor people to disclose their innovations and at the same time explore the possibility that an investor or entrepreneur from one part of the world joins hands with them to set up an enterprise in their own country or in another country. Thus, the grassroots creativity can harness global capital and entrepreneurial support for decentralized development. This is the only way I can imagine that the forces of globalization can be mobilized in support of autonomous development at grassroots level.

### **3. Agenda for future change**

The democratic development of multiple futures in different parts of the world hinges considerably on the possibility of polycentric spurs of innovations. Unless a hundred flowers bloom and we create legitimacy for diversity and autonomy for each flower to blossom, there is no future for democratic development with human dignity.

If such is the case, why is it so rare to find Honey Bee kind of networks around the world? Why should every country not be concerned with building national registers of inventions and innovations so that livelihood support systems at the cutting edge of society become efficient, competitive and effective. Forces of globalization tend to homogenize the human taste and preferences, constricting in the process the space for articulating ethical capital, particularly from the grassroots' green innovators. The major institutional gaps in the developmental thinking and action around the world prove the sterility of conventional wisdom in overcoming the massive problem of poverty, unemployment, iniquity and discrimination. It is not my contention that grassroots' innovations whether technological, institutional or educational will solve all the problems. But I do hope that it can ease the pain in the short run and generate or reinforce the self-esteem of lot of knowledge rich economically poor people around the world. We are on the threshold of a new paradigm.

The development process can become sustainable only when it has an intrinsic source of revitalization, self-renewal and self-criticism. Most of the innovators recognize the need for constant learning and incremental improvements in technologies and institutions. I have argued (Gupta, 1992)<sup>4</sup> that technology is like 'words' and institutions are like 'grammar.' Innovations in both dimensions enrich the lexicon of development.

For a polycentric development in future, we need to look for multiple spurs of entrepreneurial growth. This will require an approach of innovation based enterprises that the Honey Bee Network makes it possible. The relationship between formal and informal science has been strained because of lack of respect for people's knowledge. The respect is unlikely to arise unless solutions developed by people are analyzed for their unique creative contribution. It is this kind of contribution which has led to setting up of the NIF (National Innovation Foundation) in India. And it is the same potential, which has led the AAAS (American Association for Advancement of Science) to seek cooperation with the Honey Bee Network. Likewise, the desire on the part of the Commonwealth Science Council, London to seek partnership with the Honey Bee Network, SRISTI, IIMA and NIF illustrates the growing realization that the future belongs to the grassroots' green innovators and tradition knowledge holders. The Global Innovation Foundation will have to be put in place to spearhead a movement for recognizing the long-neglected unsung heroes and heroines of our society. There is no justification as to why technology like the water pulley used by millions of around the world had to wait 2000 years for improvement till Amrutbhai designed a small stopper to prevent the bucket from falling into the well when the rope was loosened or when they needed to gasp for breath.

The legitimacy of big science in the eyes of small people is suspect if inertia for

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<sup>4</sup> Gupta, Anil. K., "Saga of a Star Fish: How do we participate in the People's design of Institutions for natural Resource management," Paper written for Asian and Pacific Development Center (APDC), Kuala Lumpur, presented at the workshop at Bangkok, Nov 19–20, 1992, "Sustainable Institutions for Natural Resource Management: How do we participate in Peoples' plans?" in Peoples' Initiatives for Sustainable Development: Lessons of Experience (Eds., Syed Abdus Samad, Tatsuya Watanabe and Seung-Jin Kim), Chapter 15, pp. 341-373, Kuala Lumpur, APDC, 1995.

such a long period of time can be justified. The future world order is unlikely to provide legitimacy for such historical lapses.

#### 4. Summing up

I have argued that democratic development requires not just the social capital but also the ethical capital for energizing SPLICE. To ensure that SPLICE works in a sustainable manner, one needs an injection of innovations. The national and international institutions particularly of science and technology, cannot find solutions for highly location specific problems faced by the people in a given region. Occasionally, an innovation emerges to solve such a problem. These innovations may be based on traditional knowledge and resources or emanate from an entirely contemporary context. Incentives for these innovations, accountability towards these innovators and opportunities for these individual or collective innovations to generate more efficient and competitive livelihood support measures are necessary. This is possible only when an educational, socio-cultural and institutional agenda of global institutions changes and accommodates the expectations of grassroots' innovators as articulated by the Honey Bee network and other such networks. Several small, simultaneous and sequential changes in different sub-systems of society will be needed to institutionalize the Honey Bee philosophy. No innovator whether individuals or collective should remain anonymous in this discourse. We should ensure that people about whom we are talking should have access to the products of our enquiry in their language and with proper attribution and citation of their contribution. We also have to ensure that if we, as outsiders, whether corporations, other organizations or individuals gain some pecuniary advantage from the documentation of value addition in innovations, we must share a fair part of this gain with the knowledge provider. Only then, can we call this discourse ethically valid and democratically sound.

The survival skills of knowledge rich, economically poor people developed to cope with environmental uncertainties in high risk environments (flood, drought or hailstorm prone regions, hill areas, deserts, etc.), are likely to become very valuable in future. The importance of tacit knowledge will increase in times to come. The knowledge networks in the formal sector will become more responsive to the informal knowledge, institution and value systems not out of generosity or greater humanism but because of their own need to survive. I and my colleagues expect a new ethics to emerge which will balance the interests of public, community and private domains in such a manner that no one domain excludes the chances of expression of creativity, innovation and green values in other domains.

It is possible that many more steps will be needed to incorporate the innovation value chain in the very fabric of society. In this paper, we have outlined the steps that may help make a mosaic or a quilt. Transformation of a quilt into a strong fabric would require each patch of an idea or innovation to be assimilated into an overall framework of development. The generosity of innovators and traditional knowledge experts has been taxed for far too long. It is time for a change.

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