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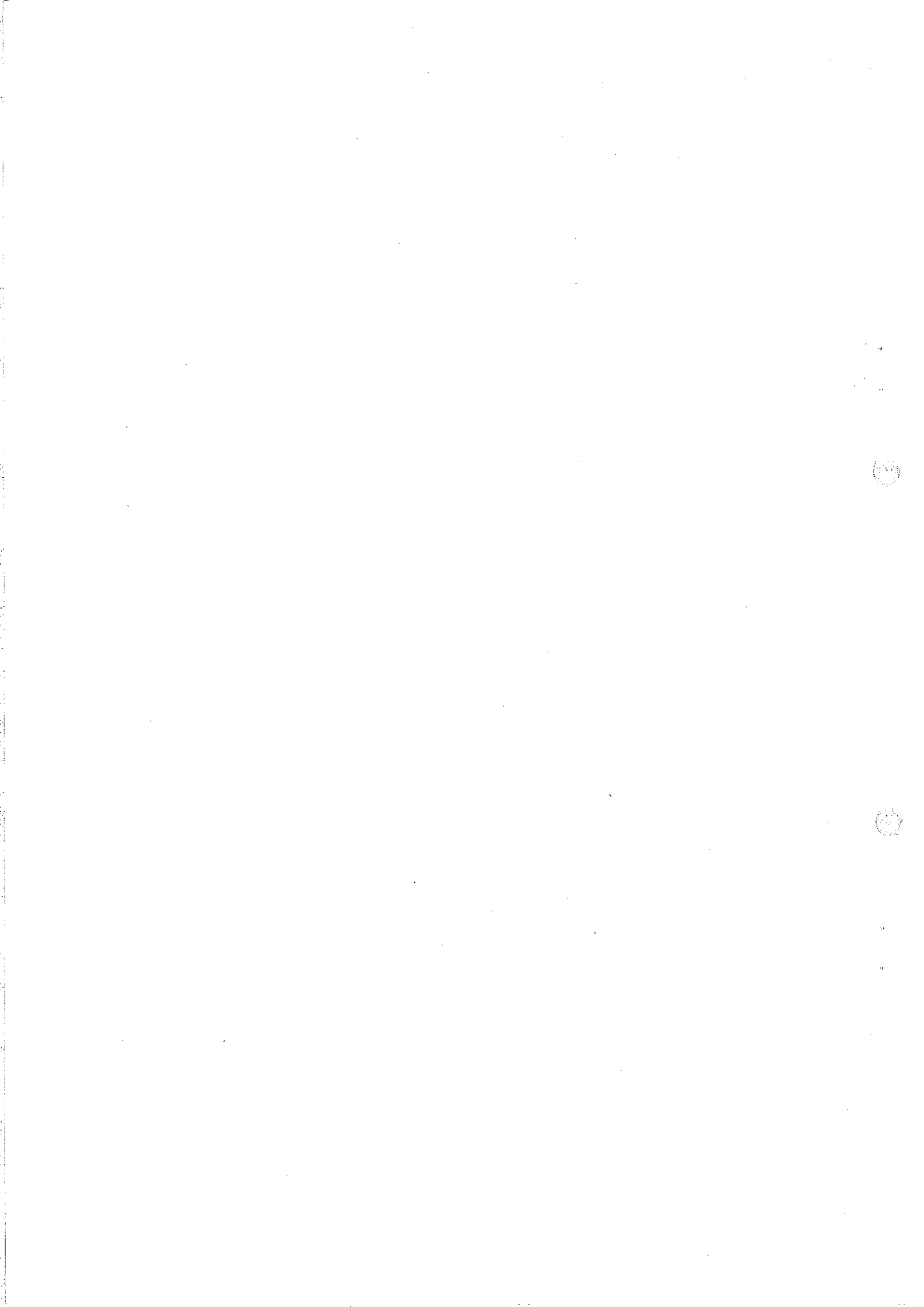
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CREATIVITY, INNOVATION, ENTREPRENEURSHIP AND NETWORKING AT GRASSROOTS LEVEL

**Conserving Biodiversity through documentation, experimentation and
value addition in local innovations for development and diffusion of
sustainable technologies and institutions**

Anil K. Gupta

Context

It is being recognized widely that the tropical developing world is gene-rich but often technologically poor while the developed world is gene poor and technologically rich. The emerging concern for protecting natural resources and associated knowledge systems is valid. However, a few additional dimensions of indigenous ecological and technological systems need to be taken note of:

- a) Regions where biodiversity is high, (primarily due to diversity in soil, climate and other physical and social structures) are also regions where poverty levels are very high.
- b) Poverty levels here are high because markets are often unable to generate demand for diverse colours, tastes, shapes and qualities of natural products. Products of mass consumption particularly when processed by machines have low variability because throughout by machines has to be of uniform quality.
- c) Regions of high diversity also have very poor public infrastructure (just in tandem with weak private market forces) because the people have a limited surplus and are less articulate and organized. As a result they neither attract public servants nor can they generate political pressure (except through insurgent movements, as is becoming evident from different parts of the world).
- d) The low demand for ecological and technological skills of these communities characterizes them as an 'unskilled' labour pool fit only for the urban slums. Once their knowledge systems are devalued, the cultural and social decline follows. Their tenuous relationship with nature is ruptured. Ecological degradation spurred on by various external resource

extractors is aided and abetted by many poor as well as not so poor people for whom short-term survival seems possible only through eco-degrading strategies.

It is in this context that a global voluntary initiative was launched five years ago, to network people and activists engaged in eco-restoration and reconstruction of the precious ecological, technological and institutional knowledge systems of the people at the grassroots.

Global networking: **Honey Bee** - A Newsletter

The HONEY BEE network draws its philosophical principles from the conduct of the honey bee:

- (i) The network believes that we should collect the knowledge of the people, as the Honey Bee collects pollen, without making the flowers poorer.
- (ii) We should connect people to people as innovators with other innovators as the Honey Bee connects different flowers through pollination.

The Honey Bee network newsletter is brought out in five languages in India (Hindi, Gujarati, Malayalam, Tamil and Oriya) and Zonkha in Bhutan so that dialogue with the people takes place in their own languages. Creative people from one place should be able to communicate with similar people elsewhere to trigger off mutual imagination and fertilize respective recipes for sustainable natural resource management.

We realize that technological innovations cannot survive without institutional innovations and support structures. Hence, we have been documenting the ecological institutions which have been evolved by the people to manage knowledge and resources as common property.

Concrete initiatives can now be taken which link the concerns of the Third world peasants and the consumers and the organic producers of the developed world. The collaboration so evolved will no longer be a kind of aid from one country to another, but a partnership between two or more interested stake holders with precise mutual interests. We aim at commercialising the results of this partnership so that in due course returns from those products may even fund such research. It may appear utopian, but many new ideas have suffered this label. In any case, we intend to work towards strengthening the entrepreneurial abilities of innovators and other supporting institutions to add value to local inventions, innovations or what is sometimes called traditional wisdom.

We insist in our work that two principles are followed without fail: one, whatever we learn from the people must be shared with them in their language; and two, every innovation must be sourced to individuals/communities with names and addresses, to protect the intellectual property rights of the people.³

It is also possible to take the current global debate on biodiversity and peasant knowledge beyond rhetoric. Our network extends into sixty countries at present. Some colleagues have started similar documentation in their respective regions. Offers have been received for Nepali, Sri Lankan, Ugandan, Fulfuldi (Mali) and Bangla versions of the newsletter.

The Honey Bee network is headquartered at SRISTI (The Society for Research and Initiatives for Sustainable Technologies and Institutions) c/o IIMA, - an autonomous NGO - and supported by individual faculty members at the Ravi Matthai Centre For Educational Innovation and the Centre for Management in Agriculture at IIMA.

Long-term Goals

There is a recognized need, not only in developing countries but also in developed countries, for reorienting research and education processes to incorporate greater sensitivity towards nature. While transformation of this kind cannot be achieved through a centralized lab to land model as followed by the Consultative Group on International Agricultural Research, the need for a coordinating centre for networking autonomous and independent initiatives still remains. (SRISTI) seeks to provide such a hub. Thus its key aim *is to establish links between formal or reductionist or institutional science and the holistic or informal science underlying local ecological knowledge systems.* Following from this aim, the key objectives of SRISTI are:

- * strengthening the capacity of grassroot innovators and inventors engaged in conserving biodiversity through
- * protecting their intellectual property rights,
- * experimenting in order to add value to their knowledge,
- * developing entrepreneurial ability in order to generate returns from this knowledge, and
- * enriching their cultural and institutional basis for dealing with nature.

In due course an International Centre may be developed which, apart from networking, may provide a global forum for authentic and accountable discourse on indigenous ecological knowledge. The Centre would also provide a registering facility for innovations and inventions, so that patent protection can be invoked in favour of the individuals or communities developing these innovations.

It is also hoped that SRISTI and its associated institutions will be governed by the grassroots innovators. A lot is often said about accountability and transparency. But usually, even basic documents such as balance sheets are never shared with the people with whom organisations work. SRISTI would try to set standards in this regard.

It is obvious that North-South relations are not going to be easily transformed. The recent conflicts on the intellectual property rights regime clearly indicate the short sighted view of biodiversity and related knowledge systems taken by Western institutions. There is no reason why disadvantaged communities should maintain biodiversity if in the process they have to remain poor (Gupta, 1990). The entire modernization paradigm builds upon what people do not know, instead of what people know. The ecological, technological, institutional and cultural knowledge of the nature conserving communities is the basic building block of our work.

We hope that future initiatives in not just the agricultural sector, but in every other sector of the global economy will be based on the existing knowledge of nature-dependent communities.

In passing, one may add that if global climatic changes do indeed take place, and environmental fluctuations dominate the regions which have managed without much fluctuation, then the skills of people used to dealing with wide fluctuations would be in greatest demand. Who would these people be if not the inhabitants of forests, hill areas and drought and flood prone regions? For this reason too we need to understand the logic of survival of disadvantaged communities, creatively.

Key Tasks ahead

- a) To look into the taxonomic basis of indigenous ecological knowledge systems and derive a comparative understanding of local and global categories of sense making.
- b) To survey, document and disseminate local innovations through India and in other collaborating countries.
- c) To provide training and technical, methodological and institutional support to Honey Bee Network members.

- d) To put in place the software and hardware required to support access to information, data analysis and electronic communication for researchers and network members.
- e) To provide legal technical and managerial support to local innovators in order to protect their intellectual property rights and ensure their ability to generate returns for their knowledge, inventions or value addition.
- f) To provide support in market research, product development and testing.
- g) To produce training material supporting the incorporation of insights from indigenous knowledge systems into educational curricula.

a. Methodological Approach

- I. To analyze the relationship between the indigenous bases of classification of soil, climate, plants pests, and insects, etc. This would help not only in uncovering new scientific concepts, but also in targeting well-developed low-input technologies.
- II. To support experiments in farmers' fields, agricultural universities and to collaborate with private small-scale entrepreneurs in order to develop or to help develop commercializable herbal products for use in India and other countries. The results would be interpreted through multiple heuristics, i.e. the cultural and religious categories will be given as much importance as other so-called more rational categories.
- III. Study of indigenous folkloric nature-conserving traditions, particularly riddles, proverbs, songs and stories. This will help embed secular technological ideas in sacred institutions.
- IV. To sponsor postgraduate research and development of training material for distance learning and workshops for natural science and other faculties.
- V. Research on intellectual property rights and legal registration support to the innovators.
- VI. Entrepreneurial development for value additions to local innovations.
- VII. Organization of biodiversity contests to trigger off local initiatives for conservation, identification of endangered species and other eroding parts of ecological knowledge systems. One such contest was organized through an NGO in South India in December, 1991. A student of class five who came first could identify as many as 116 different plant species and varieties with their uses. The farmer who came first could identify only 240 different plant types. The remarkable thing about this is that this student, only 12 years old, had covered half the intellectual journey of the most knowledgeable adult of that community. Such contests may help in

uncovering the tacit knowledge through competition and help restore pride of the people in their own knowledge. In a second contest, organized in village Gangagarh, UP in Northern India, all three students who got the first three prizes were from the sixth class and could identify about 65 plants with their uses. It is not surprising that biodiversity in this predominantly irrigated village is half that of the South Indian dry village.

b. Documentation

- I. Survey of innovations through students, farmers, rural youth and other activities in different parts of India and other collaborating countries.
- II. Translation, editing, computerization for research, experimentation and dissemination purposes.
- III. Compilation of bibliographies, annotated as well as otherwise, on different aspects of indigenous innovations and ecological knowledge systems.
- IV. Collection of antique manuscripts and books on indigenous knowledge systems.
- V. An *International Documentation Centre On Indigenous Innovations For Sustainable Development* to be set up at IIMA (or supported by IIMA) in this pursuit would help reorient the ongoing development assistance, trigger off a climate for greater self help and lateral learning (i.e. learning from each other) and build positive linkages within existing developmental projects whether supported internally or by external agencies.

c. Network Support

- I. Training and documentation support to various collaborating NGOs and academic activists engaged in bringing out local-language versions of the Honey Bee newsletter.
- II. Assistance in organizing local biodiversity contests to discover latent ecological talent among rural children and adults.
- III. Organization of workshops and comparative action research on biodiversity conservation.
- IV. Graphic support to local language versions of the Honey Bee newsletter, besides assistance in identification and storage of plant samples.
- V. Orientation workshops for young political leaders, media planners, journalists particularly of vernacular newspapers, to generate sensitivity about scouting for local creativity and documenting innovative ethics.

VI. Establishment of a bulletin board and/ or a global electronic mail network on indigenous ecological knowledge systems and grassroot innovations to be called International Network for Sustainable Technological Application and Registration. Effort will also be made to set up a server on the SUN system (or a similar system) for making certain automated data bases available through electronic mail to registered users. These data bases will try to make certain aspects of knowledge common property among the bonafide users. Efforts will also be made to acquire communication technologies and hardware by which direct links can be made through satellite without having to use telephone lines. Alternatively, we will gain independent access to the electronic mail network 'ethernet' established by Indian Telecommunication Department.

d. Data Base Development

We seek to develop a computerized data base which can be used through electronic mail on the pattern of NAPRALERT, but emphasizing complementarity with it. The focus of NAPRALERT is more on human drugs and therefore, its information on botanicals for animal or plant health is limited. Innovations for Sustainable Technology Applications and Registration or some other such name may have to be chosen for the proposed data base.

It should be developed in various global languages in due course so that people may be able to access it through decentralized availability of computers near local biodiversity gardens or parks or collections.

Preliminary screening of botanical knowledge of the people has already revealed plants of pesticidal importance (n=250) and veterinary medicinal importance (n=340). These plants can be taken up for further experimental research. We have also been screening these plants through the University of Illinois, Chicago data base, NAPRALERT, to identify the relative uniqueness of peasant knowledge. NAPRALERT screens about 500 journals on natural products and ethno-ecological knowledge every month. We have discovered several plants on which either little work has been done, or on which work has not been done from the perspective of the uses which people have identified.

The idea is to explore whether some innovative solution discovered in one developing country can be of use in another developing country as a concept, recipe or even an analytical approach. We are conscious of the limitations of traditional technology transfer approaches in rained high-risk environments. At the same time we realize that cross fertilization of ideas is most important to provide vibrancy to local creativity. We strongly disapprove of attempts to restrict the scope of technology development in difficult regions to only

adaptive trials by farmers. Cross-cultural and cross-regional dialogue would in fact help not just by scientists but even creative farmers, pastoralists and artisans, in theory formation.

We also hope that some of the third world innovations can provide a basis for developing sustainable technologies even in the development world. (4) Perhaps that would generate demand for Third world skills and herbal and other products.

In summary, the areas of action are:

- I. Efforts to identify expertise for development of local language data bases for flow of information across language barriers with the purpose of storing information on innovations. At the same time, existing software will be used for documenting both the literature and field innovation data base.
- II. A system of registration of innovations across the world will be developed so that legal and other steps may be taken for filing patents and occasionally court cases against infringement of rights of grassroots innovators and inventors.
- III. To develop or collaborate with software designers in evolving software which can interlink information in different data bases such as NAPRALERT and MEDFLOR at the College of Pharmacy, University of Illinois, Chicago. Since NAPRALERT has more than a hundred thousand references on about 46,000 species with full scientific, biological, biochemical and biosafety information, there would be obviously no purpose served in duplicating the effort. Dr. Farnsworth has made this data base accessible freely to scholars from the Third world although it is available to drug companies and other Western scholars only for a price.

e. Legal Support

Legal expertise will be mobilized through existing institutions for strengthening the Intellectual Property Rights of grassroots innovators. Since this activity would require close cooperation among the legal NGOs concerned across the world, we will learn from the experience of existing NGOs and strengthen their capacity to appreciate the finer biological, ecological, technological and institutional dimensions of intellectual property rights.

f. Market Research, Product Development and Testing

I. Market research to explore the scope for development of herbal pesticides and other such products for use by intensive agricultural farmers as well as organic farmers.

It may be necessary at some stage to involve the private sector, not just in market research, but also in the commercialization of viable products. It would of course be necessary that the ethical and professional values and goals of such collaboration are respected by every collaborator. In due course, other areas of commercial importance can be explored such as vegetable dyes (or anti-oxidant compounds) on which a very rich data base has been built as part of our network activities in Bhutan.

There are several constraints on increasing public attention towards this important area of research and action in developing countries. Given the weak consumer appreciation for ecological agriculture or eco-friendly products in developing countries, the market for herbal products may not be very large to begin with. But the needs of organic producers in Europe can certainly be met by the Third-world peasant innovations, to some extent. Some of these innovations could in due course, or even simultaneously, be popularized in the developing country providing this knowledge.

After all, the active ingredients of most chemical pesticides are imported at great cost to the economy and the ecological conditions of developing societies. Change in that regard would therefore have to be attempted at both ends (i.e. in developed and developing countries).

II. It is necessary that if grassroot innovators and inventors have to compete with multinational corporations they should have access to the same tools and techniques as are available to competitors. Given SRISTI's close relation with IIMA, mobilizing professional expertise would not pose any problem. Wherever possible and necessary, support from private entrepreneurs would be taken. Links would be established with reputed scientific and technological institutions across the world so that the grassroot level innovators get the best technical and market research expertise for launching their products.

g. Education and Training

I. There has been a significant increase in the interest for indigenous ecological knowledge systems across the world. While rigours empirical and conceptual studies have been lacking, the emergence of this interest is indeed a positive sign. Sustenance of this interest will, however, depend upon the availability of demystified and easy to use methods and approaches which can convert individual interest into initiative and initiative into action and

reflection. We have been opposed to so called rapid rural appraisal (RRA) methods and their variants. We have evolved simple and robust analytical approaches which make us dispensable in pursuing the search for innovations. The comparative effectiveness of our approach vis-a-vis the much celebrated and sold RRA/PRA can be gauged from the fact that while we have around 1200 indigenous innovations in our data base, other groups in different parts of the world cannot claim to have even a few dozens with the names and addresses of the relevant communities.

We intend to organize training workshops and educational materials for use by natural as well as social scientists to incorporate insights from indigenous ecological knowledge systems into curricula at different levels.

II. Curriculum reform requires linkages at multiple levels in the educational system. Postgraduate, graduate, school, and pre-school education would need to be reoriented to incorporate insights from indigenous ecological knowledge systems.

III. Summer schools for teachers from various colleges may be organized at IIMA so as to generate critical scrutiny of the concepts and approaches available in indigenous knowledge systems, from different disciplinary perspectives.

Conferences

We will try to hold SRISTI-sponsored conferences once in three years in different parts of the world. Only those colleagues who have shared their ideas and work with the local communities in local languages will be invited. Hopefully, intellectual discourse, in due course, will become more authentic and accountable towards those whose knowledge we document, write about and from which we generate personal and professional rewards.

Summing up

Poor people are not poor because they lack an invention ethic. They are poor because poverty of our imagination discounts their knowledge systems. In this process we generate a system of development which encourages people to discount their own institutions and knowledge systems.

The search for sustainable technologies the world over provides a unique opportunity for empowering the poor in hill, drought and flood prone regions and forest regions. The proposed International Centre intends to support the intellectual property rights of rural innovators through lobbying for their rights to Genes, herbal medicines, plant protection and veterinary medicine recipes,

implements, vegetable dyes, anti oxidants (which are needed by consumers to store processed food), etc.

It also aims at reorienting agricultural research strategies by creating alternative agenda in a language which scientists understand. It aims at linking knowledge, institutions, technology and politics in such a manner, that control for shaping the future direction of development passes into the hands of those who solve the problems in a sustainable manner, rather than let it remain in the hands of those who only talk about people as victims, problems and helpless sufferers.

End notes

(1) There are some exceptions to this dominant trend. French wine produced from grapes grown on particular small patches of land has generated strong consumer demand, notwithstanding the recent GATT or EEC provisions (reinforcing uniformity of production systems). Tea and honey are two other such products. These exceptions only prove that the market finds it difficult but not impossible to reinforce biodiversity. We have to discover the right kind of incentives and regulatory framework which will induce markets to do so.

(2) We do not think that there is any person who does not have any skill. The term „unskilled“ is in fact an admission of our inability to deal with the knowledge of others.

(3) We have noted the interpretative statement President Clinton has appended in April 1993 to his decision to sign the Biodiversity Convention agreement. We intend to continue our struggle to overcome the asymmetry in the rights of indigenous communities vis-a-vis the biotechnological and other companies in the developing countries as well as in the West. We do not agree with those who argue that the IPRs of local communities are violated only by Western companies. We also do not suggest that companies which invest in research and development of various crop varieties or drugs or other products based on knowledge and resources conserved by local communities should not be compensated. On the contrary, SRISTI believes in extension of similar protection to the primary sources of ideas, inventions, innovations and institutions for conservation of biodiversity and related knowledge systems.

(4) During my recent visit to organic and other producers in Denmark, I learned that fungal diseases were a very serious problem in wheat and some other crops. In a dry part of Gujarat, some farmers tried to use fifteen day old flour of millet which is unfit for human consumption as dust for disease

control. Perhaps the molds in the flour include some microtoxins which can be used as fungicides. If this is proved, a big market may emerge for millet producers particularly in the years when production is large or when people have alternative means. The technology will of course be sustainable.