



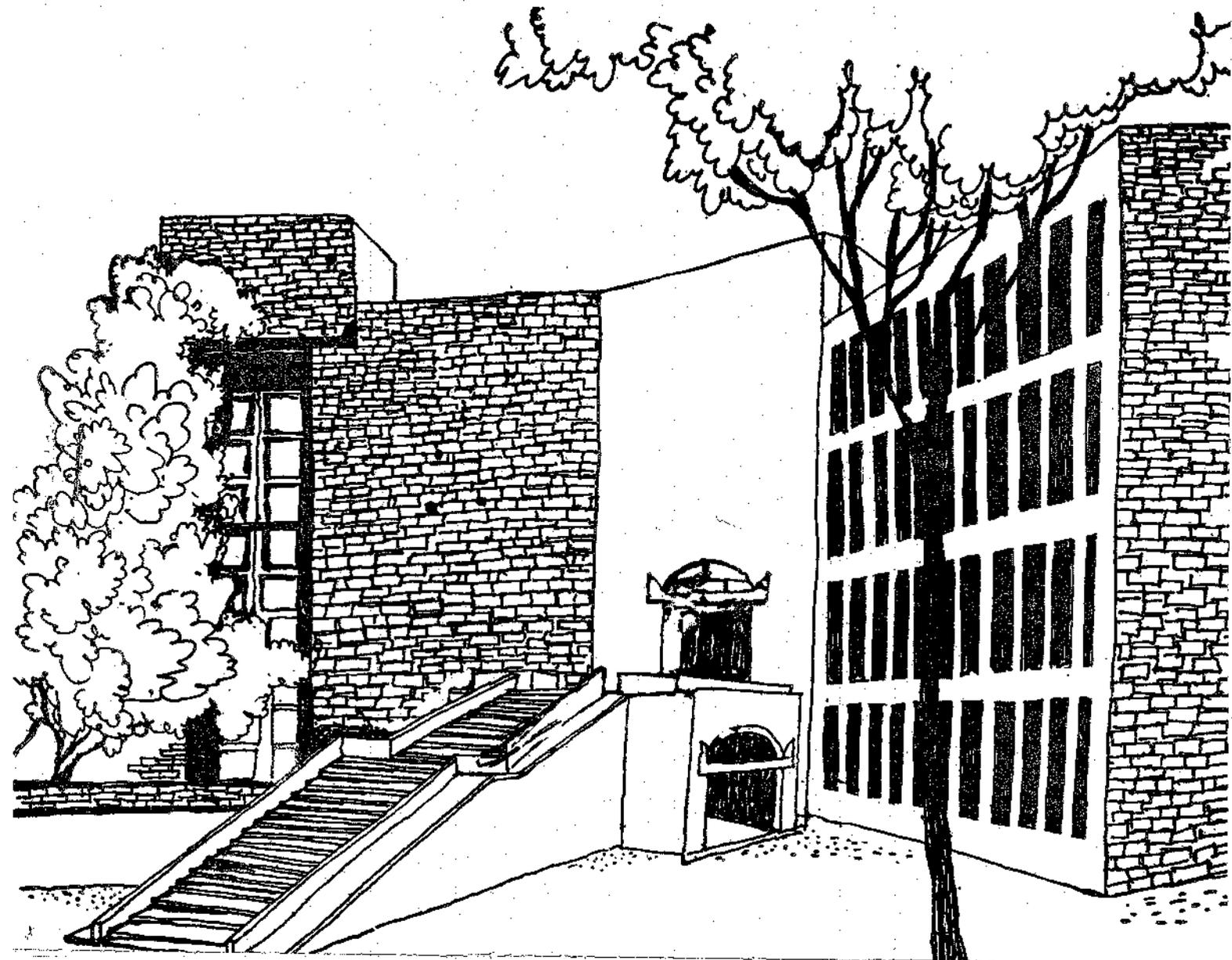
W.P. 1077

Working Paper

**Saga of a Star Fish:
Participative Design of Sustainable Institutions
for
Natural Resource Management**

By

Anil K. Gupta



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The main objective of the working paper series of the IIMA is to help faculty members to test out their research findings at the pre-publication stage.

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Saga of A Star Fish:

**Participative Design of Sustainable Institutions
for Natural Resource Management**

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Search for a Sustainable Spirit

Squirrel, Grains of Sand and crossing the sea

Lord Ram was very frustrated on knowing that his wife, Sita (abducted by Ravana) was just on the other side of a vast expanse of water and he didn't have wherewithal to cross the sea or build a bridge. His followers were equally restive. The task appeared impossible. Suddenly a ray of hope emerged.

Ram observed that a squirrel was behaving in an odd fashion. She was wetting her tail in water, coming back to the shore, rolling in sand and going back to the sea and washing her tail. She was doing it repeatedly and almost furiously. As if in a great hurry. Ram called that squirrel and asked her the reason for her odd act. She replied that knowing the challenges before them, she was contributing her mite. She was trying to fill the sea by the sand attached to her tail so that a path could be built.

The entire work force of Ram felt ashamed at their despondency. And soon, with their collective effort, the path was built.

The projects like the squirrel's efforts are seldom sustainable. The trick is to unfold the locked up entrepreneurial energy of all those around. The momentum so generated may eventually solve the problem or generate the ripple which unsettles the patient status quoist.

Saga of A Star Fish
Participative Design of Sustainable Institutions
for Natural Resources

Abstract

Management of natural resources requires reconciliation in the conflicting world views of different stake holders. The conflicts emerge because of the variation in (a) the perception of nature, (b) associated socio-ecological interactions and (c) the ethical values generating respect for non voting members of our society. It is not easy to design institutions for collective action such that resources are managed not only for the current generation but also in a manner that options of future generations are not compromised. An organization becomes an institution when its members use internal commands (i.e. the directions for action emanating from within one self) instead of external demands (i.e. external regulation or direction for individual action). The cultural conditions in both the cases are very different.

The paper provides discussion on the issues which affect 'Our' participation in 'Peoples' organizations and institutions in part one. Much of the literature on participation deals with the opposite, i.e. how people participate in the organizations designed by us.

The eco-sociological perspective for survival of households over space, season and sector is given in part two. The nature of risks and the strategies for coping with the same are described. The relationship between culture and ecology is discussed in the light of eco-specificity of social interactions in part three. The problem of collective action, the role of risk and redundancy, and resource diversification are discussed in part four. The Eco-Institutional model dealing with interactions between access, assurances, ability and attitudes of the households with ecological resources, institutions, technology and culture are described in part five. How local creativity and innovative potential can become the building block of future development is discussed in part six. How institutions designed on the basis of alternative eco-ethics generate accountability to people and encourage people to people learning is illustrated with the help of the case of Honey Bee network. This global network of innovators at grassroots level builds upon the local excellence, and urge to experiment and evolve technology and institutions for sustainable resource use. The role played by the process of monitoring the collective action by different stake holders is given in part seven. In part eight, the linkages for lateral learning with particular reference to biodiversity are outlined. In part nine, the lessons and issues for becoming accountable to people are summarized. The ethical issues in farmer participatory research and implications of scaling up the peoples' organization are brought out in part ten. In the annexure, a discussion on the philosophy of sustainability is presented.

Saga of A Star Fish:

How Do 'We' Participate In 'People's' Design of Sustainable Institutions for Natural Resource Management¹

Anil K Gupta²

Much of the emphasis in the current debate on sustainability is on technologies rather than institutions. The relationship between the two is quite organic. The technology enables not merely a transformation of resources but also determines the pace, cost and effectiveness of change. Institutions determine whether and how the relationship between technology, environment, people including various classes within them and the next generation would be viewed now or in future. Institutions provide legitimacy for trying certain alternatives which may not entirely be rational or cost effective in short term but help in keeping the collectivity together. Institutions also provide rules and rule making processes by which regulation of individual and collective action takes place.

Not all technologies can provide similar stability and even if a particular technology could, the environmental fluctuations make it difficult to sustain stability. The fluctuations are far more in the ecological contexts, like drought or flood prone regions, hills, cyclone prone coastal regions, some of the forest regions etc.) where the people depend primarily upon nature. The institutions generate mechanisms for coping with the cycles of affluence, subsistence and deprivation. Different institutions incorporate different values, some justify triage (survival of the fittest and sacrifice of the weakest in the interest of the fittest) while others justify sinking or swimming together i.e. sharing and caring. There are many other options in between which are available through, markets, state institutions, individual ingenuity and other social organizations.³

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1. This is preliminary draft of the paper for an UNDP-supported research project on "Building Operational Strategies of Sustainable Development Upon People's Initiatives: Development and Management of Local Resources", coordinated by Prof. Seung Jin Kim, Asian and Pacific Development Centre, Kualalumpur, 1992. I am grateful To Prof Ramakrishnan for sharing many useful insights about authenticity in research relationships.
 2. Professor, Centre For Management in Agriculture, and, Chairperson, RM Centre for Educational Innovation, Indian Institute of Management, Ahmedabad-380015, India
 3. The organizations do not evolve just to do tasks or perform functions which are difficult to do alone. Markets can perform certain functions just as well. *Markets* fail, Ouchi(1980) observes when, "the costs of completing transactions become unbearable". At that point the inefficiency of *bureaucracy* are preferred over the higher costs of markets. He adds, "when tasks become highly unique, completely integrated, or ambiguous for other reasons, then even bureaucratic mechanisms fail". The *clan* arrangement is preferred in the case of "excessively ambiguous performance evaluation" as it helps in achieving goal congruence.

An organisation evolves into an institution when internal commands with in individuals. replace the external demands made by the organization. If people behave in the collective interest not because someone is supervising or has an authority to reward or punish, then they are responding to internalized commands or values⁴. When these values are shared very widely, these become part of culture. The sense making in organisations requires interpreting norms, beliefs, values and actions of other people. When there is a large extent of consensus about basic values, the interpretations become easier. At the same time what is gained in convergence is lost in divergence of approaches and worldviews.

It is not necessary that consensus on values should necessarily mean consensus on perspectives or actions. Thus at one level everybody in an organisation may share the values and yet the norms may provide freedom to interpret the same. As long as the range of interpretations is narrow organization does not have to differentiate into different units on the basis of beliefs. It can differentiate on the basis of tasks, technologies and skills. But once the range of interpretation widens, an organisation can either divide into smaller autonomous units once or iteratively over time⁵, or it can

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The summary of organizational failure framework is given by Quchi thus:

Mode of Control	Normative Requirements	Informational Requirements
Market	Reciprocity	Prices
Bureaucracy	Reciprocity Legitimate-Authority	Rules
Clan	Reciprocity Legitimate-Authority Common Values and Beliefs	Traditions

William G. Ouchi, Markets, Bureaucracies and Clans, *Adm. Science Quarterly*, March 1980, 25:129-142

4. The institutions may show clannish features when the values are shared very strongly and people have a strong sense of purpose. But it is not necessary. There may be high consensus on certain values and yet considerable differences on other. In such a situation, on some specific tasks, value consensus being high, members of an institution may follow their own internal code of conduct. But on other matters, they may show quite a divergence. In those respect, the institution may show organizational cultures. That is why we distinguish an institutionalized culture from an organizational culture. The former is implicit and often does not need articulation. The latter needs not only articulation but also periodic reinforcement.
5. Holbek (1988:254) discusses an interesting dilemma of dealing with innovations in organizations. He draws upon Wilson's ideas to suggest that the organizational forces which help in generating the innovative ideas and proposals are often in conflict with forces which ultimately secure adoption and implementation. He concluded that different *configuration* of organizational parts or structures appeared to facilitate changes in the different parts of innovation process. The organization may switch between mechanistic and organic forms depending upon the stage of innova-

use coercion against the minority view. Or it can generate an internal market of IOUs so that giving in on one issue may not necessarily require giving in all issues. Once an organisation becomes an institution, the need for divergence to divide into sub-units gets reduced considerably. In the best democratic tradition the minority view may be heard and if necessary allowed more time and energy to influence the rest, if the argument so demands.

Even if creative differences remain, the sustainability of an organisation would depend upon the dynamics unleashed by the differences. It is possible that some efficiency is sacrificed in favour of outcomes that are less than optimal but are certainly sustainable.

If a hen lays golden eggs, it may be optimal to have such technological changes that all the eggs may be laid in one day or in shortest period of time. But the capacity in the recipient society may be limited to either manage with too many golden eggs at one time, or to ensure such a future investment of this wealth that the eggs are not required ever again. In either case the organisation has to learn to live without sustained supply of golden eggs. It is not without significance that traditional societies did not evolve a calculus which would justify getting all the eggs one day.

Part-One : 'Our' participation in 'Their'(people's) organisations:

Almost the entire literature on people's participation rests on the premise that the crux of participative development lies in generating incentives for people to participate in externally designed programmes and projects for resource management. Even when consultation is at the design stage, the control over resources and the way these are used is almost always in the hands of the outsiders. By itself, this may be all right in certain situations where the technology involved requires external involvement. But an important alternative remains either unarticulated or feebly articulated. That is enabling people to evaluate various choices and the participation of external people in the plans of local communities at their (i.e. local people's) terms.

It requires not only learning by outsiders of the history, culture, language and embedded rationality of local practices but also a willingness among them to move at a pace which local communities find reasonable. Matching the speeds of formal bureaucracies (or outside groups) with that of informal groups is not easy. Thus either the external organisation or professionals can choose selectively such a sub-group of local community which can co-operate, or it can implement only that part of the plan which is compatible with the speed and systems of the external agency. If the choice is former i.e. selecting a small cooperative sub-group, then alienation of this group with the rest of the society is generally inevitable. That is how the alienated elites emerge in different societies and control resources, discourse, and the instruments of governance.

The second alternative of partial co-operation is helpful only in gaining time. Sooner or later the non-sustainability of partial co-operation shows up. The resultant dissatisfaction and frustration may often assume violent proportions⁶. The rise of insurgency movements in the regions where resources have been used in partial and often unaccountable manner can be appreciated in above light. It goes without saying that the leadership of many of the militant groups even when guided by noble intention becomes autocratic because violence can never breed tolerance and pluralism.

The non-violent, participative and accountable structures can emerge if the essence of local knowledge systems, culture and institutions provides the building blocks of new organisations and institu-

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tion. It may differentiate over time or in different units or both at different stages of innovation process.

Jonny Hilbek, *The Innovation Design Dilemma: Some Notes on its Relevance and Solutions*, in *Innovation: A Cross-Disciplinary Perspective*, Kjell Gronhaug and Geir Kaufmann (Eds.), Oslo: Norwegian University Press.

tions.

Part-Two: Survival over space, season and sectors: eco-sociological perspectives⁷

Rural households have to diversify their strategies of resource use to survive not just individually but also collectively in any high risk environment such as desert or hills. The pattern of diversification is closely linked with (a) the nature of initial endowments of the family, (b) access to factor markets like land, labour, capital and product markets including technological choices, (c) historical process through which the portfolio or combination of various resource use strategies has evolved in a given ecological region and among different classes, (d) cultural and institutional mechanisms (kinship, caste, religious, ethnic or other interest groups) guiding individual as well as collective behaviour for economic and non- economic purposes, festivals, rituals and religious performances etc., and (e) the nature of the state and its delivery systems. Analytically, the relationship between the pattern of diversification in a given ecological context and social exchange relations has to be established in a manner that effect of changes in one can be measured on other. A causal model of household adaptation is thus needed.

There are three levels at which we can analyze the household adaptation to risks. At micro level we need to look at the relationship between ecological, technological and institutional variables. At meso level we have to understand the relationship between spatial, seasonal, sectoral and social exchange relations. At household level we have to link the ecological context with the evolution of portfolio of enterprises, emerging perception of risk and response, and consequent feedback on the ecological system itself. In a dynamic framework, such a feedback constrains or widens the household choices over time.

The nature of risk:

The drought and flood prone regions, hill areas and forest regions are inhabited by people who use diversified resource strategies to deal with risks. The sources of the risks could be environmental, institutional, social, cultural and even political. Not to mention, the risks induced by market weakness or failure. Some of these risks can just be appreciated. There is little one can do in the short run. Some can be influenced and in other cases the risk inducing factors can be manipulated. It is obvious that the same risk may have some components which can be influenced, appreciated or manipulated (Lethem et al, 1980). The strategies for risk adjustment at the household level can be strengthened or weakened by public policies as well as various organizational or market interventions. Various studies of these risks undertaken earlier (Jodha, 1973, 1979, 1983, Gupta, 1980-1991) were taken as the backdrop for the purpose. These strategies can be analyzed at household, technological, institutional and cultural level.

1. Household risk adjustment strategies.

Intra-Household	asset disposal, migration, reduction or modification of consumption, reallocation of resources among different enterprises, etc.
Inter-Household	labour, credit, land related bilateral or multilateral contracts, informal sharing, gifts, etc.

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6. The resistance can also be passive through silence or indifference.
7. This section on risk adjustment draws upon two of my earlier papers, Gupta Anil k," Household Survival Through Commons: Performance in an Uncertain World", IIMA working paper 940, 1991,(revised draft of the paper presented at International Conference on Common Property Resources, Duke University, 1990); and Gupta Anil K, "Pasto-

Group or Communal reliance on Common Property Resources, group ploughing, sowing or other farm operations like plant protection, drainage, purity of breed, etc., group level grain, fuel wood and resource reserves, etc.

Public Interventions Drought or flood relief, aerial spray for plant protection, distribution of seed or seedlings after natural catastrophes, infra-structural interventions, etc.

Cultural artifacts Myths, folklore, religious or other sanctions against private profit from community deprivation or for sustainable resource management, use of lunar calendar to synchronize farm operations, informal cooperation through cultural rituals regulating resource use, etc.

2. *Technological adjustments*

Agronomic dry sowing, early sowing to break synchrony in the vulnerable stage of crop and virulent stage of pest, summer ploughing, cropping, contour ploughing and sowing, inter and mixed cropping, mixed aus and aman sowing (in paddy), laddering and planking, sowing in set and furrow system, water shed technology etc.

Contingency In many regions probability of some major treatments or risks can be anticipated and accordingly provided for through mid-course correction. For instance, relay cropping, thinning plant population after stress, mulching (it can be both - regular practice or a contingency practice), devegetation, etc.

Salvage treatments Once a crop or some other enterprise suffers a shock or disturbance, technology may be required to recover or recouperate from the losses. For instance, in flood prone regions, cold temperature at the grain feeling stage may cause sterility for which harvesting crop as fodder and rations may help, in a flood damaged deep water rise cutting and sowing of stem of the surviving plants may help.

Preventive treatments Several indigenous ways of seed treatment by organic gels and other materials exist to minimize drought and pest damage, border and trap crops for pest control, indigenous vaccination among animals, etc.

3. *Institutional risk adjustments*

Spatial The banks can lend to less risky villages, scientists can locate trials at less risky sites, the input agencies may locate distribution points in less risky regions because of larger demand.

Seasonal The lending can be constrained in monsoon season, input supply may be erratic and inventory level low or nil in kharif season, the banking disbursements may be clustered around

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financial year end even if results are sub-optimal.

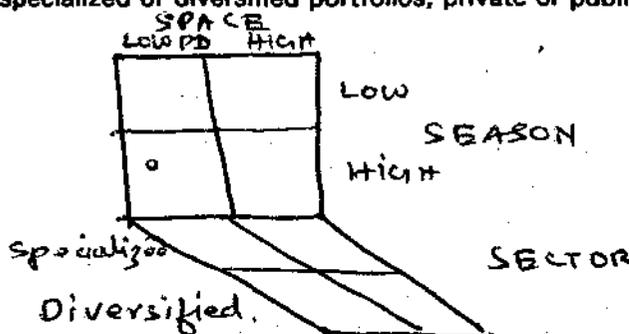
Sectoral	Loans for non-farm purposes, rainfed crops, small ruminants, long gestation investments like watershed treatments, etc., may be highly restricted. Credit for various purposes may be clustered even though there may not be a rational justification for such a portfolio.
Procedural	High margins, insistence on collaterals, shorter repayment schedules (even though this practice may eventually increase the default risk), multi-enterprise loans, linkage between investment and working capital loans, group guarantees, saving and lending groups, linking banking and technology, etc.
Background risks	Deposit and credit insurance and guarantees, crop and other enterprise insurance, failed well subsidy, etc.

4. Cultural risk adjustments

Collective action	Group based management of resources such as water streams in hills, plant protection, watershed management, grazing land and common property resource management, rotating saving and credit associations and use of discount money for common property assets such as temples, school furnishings, pesticide sprayer, group norms for collecting fuel wood or roofing material on particular days in the hills, etc.
Folk ritual	Several folk songs, myths, stories, proverbs, etc., are used to generate psychological assurance or social resilience in the local communities, attitude formation and generation of eco-ethic is also facilitated by folk media.
Institution building	Generation of norms and values suggesting respect for common properties and participative processes of decision making aid risk adjustments, pooling of bullocks, implements and other resources also facilitated by institution building processes.

4-S Model: Interaction between, season, sector and social exchange. (Gupta 1981, 1984, 1985)

As shown in Figure 1, each dimension of the matrix can be dichotomized in its contrasting dimensions. For instance, space can be seen in terms of low land or upland, low population density or high population density, lesser or higher slope etc. Likewise seasonality can be contrasted in terms of high or low rainfall, diurnal temperature variations or any other parameter of climate. The sector can be contrasted in terms of specialized or diversified portfolios, private or public and single specie versus multi specie portfolios.



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Our contention is that if we know any two dimensions we can speculate about the third. Likewise, if we know the three dimensions we can speculate about the fourth dimension that is nature or pattern of social exchange. If we know all the four dimensions we can then more carefully explore the type of common property institutions that may emerge to satisfy collective expectations of fair and sustainable collective behaviour.

Let us take the combination of two dimensions that is low population density and low rainfall with high diurnal temperature variations and also high seasonal fluctuations. There is an inverse empirical relationship between the average amount of rainfall and its coefficient of variation. Lesser the rainfall higher is the variation over time and space. It is for this reason that communities living in such high risk environments diversify their portfolios over time, space and sector.

The sectoral portfolio would thus be diversified over time and space, and gender. That is different family members would pursue either same or different occupations in different parts of the year and in the different resource markets.

Making Sense of Space:

Various species have niches or pockets where conditions for their survival are optimal. Human beings have been able to overcome some of the niche specific constraints because of technology and organizations. Some spatial units may be inhabited or used by different species. This is a fundamental premise of social ecology. In most of the modernist worldview the rights of human beings are prior and superior. The nature is meant to be used, controlled and explained. As against this many of the resource conserving communities (ranging from aborigines or native Indians in North America and Canada to tribal and other communities in various tropical and sub-tropical countries) do not view space in the same way.

The vulnerable sites such as points of origin of river, erodable mountain peaks or sacred lakes etc., are embodied with mythical metaphors or deities so as to generate fear and restrain among the people. The modern society may convert vulnerable sites into sanctuaries (a concept as mythical as any other used by traditional communities) and device a regulatory force (bureaucracy) to keep people out so that other elements of bio-diversity can be protected. Likewise, hunting of certain animals may be banned to prevent their excessive exploitation. The measures requiring external policing or regulation are easiest to design but are never sustainable for various reasons. On the other hand, the understanding of space and its relationships with different species in which human beings have limited rights, provides several alternative ways of conceptualizing collective action.

Bharatpur Bird Sanctuary was set up to enable migratory birds coming from Siberia a safe location for their breeding and growth. It was assumed that grazing by the cattle disturbed the birds. Since the pastoralists accompanying cattle had been using this site for long time, the restriction on movement generated social tensions. In a particular episode, police had to fire and several people were killed. The ban on grazing, however, continued. After some years when the grass had grown quite tall, the birds stopped coming. The ecologists found out that the grubs and insects which attracted the birds could not be eaten because of the tall grass. The absence of cattle meant

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absence of birds. The sanctuary now symbolized a monument of human arrogance and ignorance⁸.

There are many examples where the concept of space is seen only in its physical and sometimes ecological terms. The ethereal dimensions of the space are ignored. The non-utilitarian constructs of local knowledge have to be seen as a necessary adjunct of what appears rationale and utilitarian. The need for myths has existed in all times. The safe nuclear energy is as much myth as a mountain named after a God who does not like iron (lest people take axes or knives on this mountain and cut trees). In one case the myth may serve the interest of the large capital, in the other case it may serve a larger human and societal cause.

The space also provides an identity linked to the bio-diversity, and legends associated with different sites. The peculiarities of a spatial unit may take a long time and several generations to be properly fathomed. The uprooting of people from such sites may rob people of the so evolved specialized knowledge. This knowledge has been sustained through a cultural network. The erosion of knowledge is accompanied by erosion of network and associated institutions. The reason for protest by tribals uprooted by various irrigation and other 'developmental projects' has to be seen in this light. At the same time one cannot expect only tribal people to safeguard the environmental niches by remaining poor as is argued by many social and ecological movements. What kind of compensation, rehabilitation and stake building is required to generate appreciation and accommodation of local visions (see Sen, 1992; Periera 1989, 1991) of space remain to be properly articulated.

Time:

Many of the traditional societies have viewed the space - time continuum very differently. The cyclical concept of time implies need for a very long time frame (Periera,1989, Chaitanya,1992). It also implies a very optimistic outlook suggesting a silver lining for every dark cloud. The transmutation or migration of spirit among species, and over time and space is a concept very deeply embedded in most cultures respecting the domain of nature as larger and more powerful than our own human domain⁹. The concept of time shows up in several ways. When we look at the social

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ral Adapation with Risks in Dry Regions", Studies in History, 1991,7(2) pp325-341.

8. Such tensions are getting built world over when the people (who co-existed with this wild life in the forests for centuries) are excluded. It is often forgotten that the interactive systems survive with human interventions. If there are cases of poaching or excessive hunting, it either shows corruption and collusion of the Forest Protection authorities, or weakening of the property rights of the people over the natural resources. In some cases, it may also be because other support systems for the local people have become weaker. In a few cases it could just be the opportunism of the greedy fews. In any case, the institutional solution may have a better chance of surviving rather than a coercive route(also see McNeely, 1989, Gupta, 1991).
9. Larry Mercurieff(1990), commissioner of Sea Otter Commission, Alaska, raises a very fundamental issue about the politics of defining resource boundaries and legitimacy of a particular way of local people dealing with these. Distressed at the pitiable condition of many of the Alaska natives (considered similar to the problem of poor people in third world), he decries the tendency of Animal First activists to deny them autonomy in determining a sustainable coexistence with ecological context. He observes.

They do not understand that in their desire to protect animals, they are destroying culture, economic and spiritual systems which have allowed humans and wild life to be sustained over thousand of years....Theirs (Animal First activists concept) is based upon a belief that animals and humans are separate and they project human values into animals. Ours is based on the knowledge from hundred of generations which allows us to understand that humans are part of all living things- and all living things are part of us. As such it is spiritually possible to touch the animal spirit. In order to understand them. Our relationship

institutions we can appreciate the advantage of taking a long-term view of human interactions.

Part - Three : Eco-specificity of Social Interactions:

In different ecological regions different kinds of constraint would become dominant and, therefore, require eco-specific mix of strategies and social structures. However, there are some patterns in the way people come together and resolve conflicts in market dominated versus nature dominated regions. The former regions are the well endowed, irrigated, low risk, high population density pockets. Since there is a larger surplus available with people, the market forces are stronger and often provide support which otherwise would have to be derived from social institutions. The nature dominated regions include drought, flood, forest or hill areas where people have to rely on rain or other natural resources for their livelihood. Some of the key contrasts are mentioned below:

	Market dominated	Nature dominated
1. Communication system	Digital	Analogical
2. Pooling of resources	Very low	Very high
3. Reliance on common properties	Low	Very high
4. Settling of books of account	Very short term	Long term
5. The proportion of women headed or managed households	Very low	Very high
6. Women participation rates	Very low	Very high
7. Reciprocities	Specific	Generalized

In high population density, market dominated regions the people can manage their needs (both expected and unexpected) especially by relying on markets or their individual reserves/inventories. If a guest comes unexpectedly, one can always get things from the market or immediate neighbourhood (where community structures exist). In nature dominated regions such possibilities are limited. One has to rely on informal co-operation. Similarly, if it rains on one side of the village and not other, the pooling of bullocks and implements may become necessary so that the scarce moisture is not lost.

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with animals is incorporated into our cultural systems, language and daily lifestyles. Theirs is based upon laws and human compassion..... Because we are intricately tied to all living things, when our relationship with any part of such life is severed by force, our spiritual , economic, and cultural systems are destroyed, deep knowledge about wild life is destroyed, knowledge which western science will never re-

The pooling of resources is a logical necessity in nature dominated regions because the cost of individual maintenance of inventories would be very high given the uncertainty in the environment. The institutions which generate expectation of co-operation and provide legitimacy for collective action have to evolve to make collective survival possible.

The communication systems involve metaphorical or analogical style in the nature dominated regions largely because the ambiguity and ambivalence provide the space for personal meanings. Unlike digital communication which is in terms of yes or no, or other precise categories, the analogical communication required messages to be coded in culture specific metaphors. The compliance of collective decisions was much higher in analogic systems than the digital ones.

The reason for a very long timeframe in settling IOUs is the understanding that various exchanges are actually not settled but nearly carried forward. Given variabilities in endowments, exchange in one resource market may be settled against another resource. The generalized reciprocities dominate over the specific ones in nature dominated regions. It is very difficult to work out the equivalence between thatching of hut by someone with ploughing of fields. It is for this reason that the book of accounts is settled in long term and in generalized reciprocal form.

The proportion of women headed or managed households is invariably more in these regions because of the high male emigration from these regions to the other market dominated regions. This has implications for the choice of technology, nature of social institutions and sustainability of any particular organisational design.

Culture and ecology

Gupta and Ura (1992) have observed in the context of Bhutan

The relationship between objective ecological conditions and subjective human perception and response is mediated by the cultural and institutional memory of society. Which consequences of disturbances are considered externality is in fact the outcome of cultural consciousness. The boundary of responsibility towards the shared consequences we could argue, is one of the important outcomes of historical institutional development. Once the state and its authority supersedes the authority of religion, village or community institutions, the conflicts between historically desired perception of this boundary and the legally, administratively or politically legislated limits of these boundaries, are bound to arise.

How these conflicts are resolved can be studied only after the relationship between culture, institutions, technology and ecology is properly appreciated.

Socio-ecological perspective¹⁰ makes two assumptions, (a) ecological conditions define the range of economic enterprises managed by different classes of households and (b) the scale and mix (or portfolio) is determined by the access to factor and product markets, non-monetised kinship and other exchange networks; public, private or communal risk adjustment strategies; the perception of and response to various environmental and social risks. The stakes different classes have in environmental preservation thus are modified by the surplus, subsistence or deficit condition of the

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place.....I leave you with this last thought-we have an obligation to teach the world what we know about proper relationship between humans and other living things (in Gupta, 1991).

10. Anil K Gupta (1984), "Small Farmer Household Economy in Semi Arid Region", Centra for Management in Agriculture, Indian Institute of Management, Ahmedabad. Also see Socio-Ecological Paradigm for analysing problems of poor in dry regions, Eco Development News No. 32-33. March 1985, pp. 68-74; and (1989), "The Design of Resource Delivery Sys-

household budget on one hand and by the institutional context on the other.

Gupta and Ura further add:

Once beliefs about what is considered 'natural' or even 'spiritual' are shared widely, the cultural codes get institutionalised. Thus certain conflicts about choice of technology or scale or mix of resource use do not arise because duality between cause and effect is resolved through oneness with the phenomenon. Thus if the share of birds in the crops is considered as justified as men's own, historical selection of varieties with loose set grains easy for birds to pick can be understood.

In other cases technological and institutional innovations help generate rules and principles¹¹ cemented through social sanctions, individual repentance and some time accidental {but believed to be mythical or godly) dispensation of justice or retributions.

Rules do not have to be devised always¹². They could arise in at least in certain cases, through perhaps the logic of circumstances. Khalil cites the cases of traffic rules. If there were no rules, the result might not be a chaos. Any one who has seen huge congregation around religious centres on festive occasions would have noticed how crowd could arrive at an order after some time spent in adjustment. It is suggested, "(the) pedestrians or cars interact for no purpose (when they move on a rule less road); rules arise because they are in each others' way"¹³.

The principles are supposed to specify purpose. The destination of pedestrians is determined by the purpose. The possibility of reaching a given destination may of course depend upon the evolution and observance of rules. The grammar, syntax, vocabulary and style facilitate communication. It is the idea, will and a need for relationship between sender and receiver that constitutes communication. Buddhist Ethics, is "an ideology with a set of principles dressed up as rules". The ideology could spell out the limits or boundaries of communal or individual rights irrespective, as Khalil says, of the substantive principle at hand. A scheme of rationalization is considered necessary for achieving this. The scientific theories may serve such a purpose in modern times. It is argued that religious mythology served these needs in per-modern time. We however, believe that even in current context, proper bridges between so called scientific theories (generalizable, consistent and verifiable) and a set of historical beliefs or cultural codes (be of religions or mythological origin) are necessary.

The restraint on individual wants and acceptance of social and ecological limits in deference to the claims of next generation may become difficult to institutionalize through only so called rational rules.

A snake house in a cultivator's field was almost a common sight in many villages in Bhutan. The owner of land would offer milk on certain days in these houses. The rats could be kept in check by snakes and in the process a sustainable exchange could be strengthened. Many of these houses have started breaking down though the problem of rats remains.

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tems: A Socio-Ecological Perspective, International Studies of Management and Organization, Vol. XVIII, No.4, pp. 64-82.

11. Elias I.Khalil (1989), Principles, rules and ideology, Forum for Social Economics. Combined issues including Vol 18(2) and Vol 19(1)pp41-54.

The long time frame in which returns should be appraised and the multiplicity of vectors on which utility is assessed become acceptable, perhaps through what Jodha calls, the limits or potential of shared consequences or externality.

The public choice theorists often equate principles with rules and emphasize a narrow definition of justice i.e. procedural fairness¹⁴. Their contention is that "as long as the rules of the game are fair, one should not manipulate the outcomes. Distribution of income, for instance is one of those outcomes which the state should not temper with (Khalil 1989: 51)¹⁵. The substantive principles like primacy of equality over an unequal system or of collective rights over the need for an individual autonomy can't be resolved mathematically. Under what circumstances state should circumscribe individual rights and autonomy would thus be resolved politically and not 'scientifically'.

The legitimacy of such restrictions on individual needs/wants, our contention is, may spring from respect for ecological principles and the cultural basis of generating an socio-ecological ethic, it justifies primacy of these principles over certain other rules dealing with individual preference of life styles.

Thus an affluent person could not justify violation of certain rules regarding clearance of area near roads for establishing apple orchards or killing animals or cutting trees as long as he/she could pay the necessary taxes or penalties. Such a procedurally just system we submit, may violate the substantive principles that sustainable development in a high risk mountainous requires priority to (a) rights of community or individual, (b) non-consumptive over consumptive use (c) consistent consumption below maximum sustainable yield MSY (also called as "internal bioethics"¹⁶ over upto MSY and (d) slow steady growth rate with hemostatic advantage over high, volatile and unstable growth rate of resource use.

Diversification and Social Exchange

The variability in social interactions will also depend upon the extent of ecological variabilities as evident from the portfolio characteristics of the households. The households could have four kinds of portfolios of economic activities. If we take average income on one side of the matrix and variance in the income on the other side, the four possibilities can be seen as below:

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12. Elias, 1989, op cit.
13. Khalil, 1989, op cit.
14. Khalil (1989): pp 44, op cit .
15. Buchanan James and Gordon Tullock, 1962. The Calculus of Consent: The Logical Foundation of Constitutional Democracy. Ann Arbor, MI : University of Michigan Press in Khalil (1989) op cit.

Khalil, Elias L., (1987). "Sir James Stuart vs. Professor James Buchanan: Critical Notes on Modern Public Choice." Review of Social Economy. October. 1987. 45; 2. pp. 113-132.

_____, (1989), "Natural Complex vs. Natural System: A Nomenclature." Journal of Social and Biological Structures, in press.

Mean or Average Income

	High	Low
High	HMHV	LMHV
Low	HMLV	LMLV

We can see four kinds of portfolios viz. High Mean - High Variance (HM HV), High Mean - Low Variance (HM LV), Low Mean High Variance (LM HV) and Low Mean Low Variance (LM LV). HM-HV portfolios imply that households have such enterprises which generate very high income but also may have high fluctuations. If households prefer such enterprises, they should then be able to reduce the variance by controlling fluctuations or insuring against the same. Their access to institutions should ensure their ability to meet the expected high input requirement of such portfolios and their control over resources to reduce the fluctuations should imply their stronger power over institutions. The nature of networks such households would have among themselves and with other social groups as well as institutions (private as well as public) will be characteristically different from other groups as we will see below. The incentives for bringing such people together would also differ from those who have different kind of portfolios.

HM-LV portfolios would comprise enterprises that give high income with low fluctuation. Households with such portfolios would obviously have very high control over resources and institutions and also accumulate maximum surplus among all the groups.

LM-LV portfolios characterize the household having low technology or low input intensive enterprises such as local varieties of crops, local breeds of livestock with low but stable demand. These households are generally subsistence oriented and can break even with some difficulty. The culture and social ethos of such groups is bound to be governed by stable institutions, networks and cohesive leadership. There will be limited incentives for entrepreneurship and deviance.

LM-HV portfolios are the characteristics of most vulnerable households. These households would have such breeds of livestock or crops which are vulnerable environmental and market fluctuations leading to very low surplus. In fact most of the households with such portfolios would have deficit in their budget. Their dependence on other social groups and informal institutions like moneylender or trader is enormous. Their vulnerability often acquires highly exploitative forms dividing them into different sub-groups or mutually conflictive identities. Collective action among such people is extremely difficult for economic purposes. For cultural and social purposes, they have perhaps one of the strongest indigenous institutional infrastructure. Their tacit knowledge base is rich and often includes confluence of self abnegating images. There are, however, exceptions particularly artisans and pastoralists. Such groups may have a stronger self image and also less vulnerable in regions where some demand for their products exist. The risks spread over space, sector and season or time also need to be appraised carefully to understand the evolution of institutional or individual solution.

Spatial hazards are the area specific contingencies. These are the risks which emerge due to presence or absence of certain endowments. Seasonal hazards refer to over time risks mainly concerned with climate and location interactions. Sectoral hazards broadly refer to risks associated with economic activities. Transport, communication and agriculture sectors face greater incidence of sectoral hazards. Seasonal hazards consist of abnormal monsoon, flood, stormy wind, hailstorm etc. Spatial hazards would require identification of territories which suffer from region specific hazards.

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Part - Four: Collective Action, Risk adjustment, Redundancy and Diversification :

There are several levels at which collective action take place. Every household belonging to any of the categories mentioned above may have several identities. Each of the identity may in turn emerge from prior knowledge base. This knowledge could be collective or individual. If collective it could be embedded in metaphors, myths and folklores. If individual, the knowledge could be linked with family episodes, personal meanings of collective actions and sometimes very specific rituals performed alone. In any case the identities may manifest in formal or informal roles.

In the formal role, the identities may be expressed through participation in social, market or state institutions. The participation itself may vary but its consequences could be measured or accounted for. In the informal role, the identities can be expressed through cultural, religious or ethnic networks or individual creativity. The scope for innovation and creativity exists in both the roles though it is more pronounced in the informal role.

When people realise the limits of what can be done alone, they do not necessarily come together. The options of contracting out, auctioning the responsibility and evolution of various exchange arrangements may be tried first. Only when these options do not appear attractive, the household may prefer collective action. Such a view of collective action is guided primarily by utilitarian logic and may apply to groups which have well-defined property rights over resources and can enter into explicit or implicit contract and also enforce them. In large number of cases such a possibility may not exist. And yet collective action may be evident. Why could people come together for activities which can be performed through other arrangements. The answer to this question may lie either in enculturation processes or in institutional or technological factors. Sometimes accidents and unforeseen opportunities or crisis can also bring people together.

The type of common property institution which may emerge here may have both episodic and continuous or concurrent rules. The episodic rules refer to directions of behaviour which become important only in the times of crisis. These are actually meta rules which provide guideline for evolving rules in such institutions. The specific rules may of course vary from crisis to crisis. These rules are not even recalled many times in the normal times. The continuous or concurrent rules refer to the ongoing directions for behaviour. Even here the equivalence of returns and fairness of distribution may first be evaluated at the level of kinship or lineage group. Only later it may be evaluated across groups and resource markets. Cross compensation or subsidization may be practiced more on moral grounds than just on economic grounds. For instance, not letting anyone sleep hungry may implicitly be understood as a collective responsibility only at a small neighbourhood level.

The conflict resolution may also be first attempted within the sub groups. Though the compensations may require adjustments across sectors and moral boundaries.

Risk and redundancy

The redundant resource will insure the portfolios of different groups differently depending upon the Importance of the redundant resources in the respective portfolios. The variability in returns from each enterprise in the portfolios of three groups would influence their incentives to economize the use of respective resource. Whether the returns from enterprise dependent upon commons say livestock, co vary or contra vary with the returns from other enterprises would influence the portfolio variance as distinct from enterprise variance. We have suggested that an enterprise may be discounted differently depending upon the property regime governing its use. Lesser the control over cash flows from an enterprise, higher may be the discount rate. Further, a negative return enterprise may be kept in the portfolio if its presence (a) reduces the portfolio variance by generat-

ing externality { as in case of manure for crops but which has no market value say in some hill areas or trees in some of the agroforestry systems), (b) meets certain cultural needs (some varieties of rice though with very low return are grown because they are required for certain rituals and religious occasions or an old cow is not culled due to religious taboo on cow slaughter) and (c) provides opportunity for renewing certain skills which otherwise may get lost or weakened .

The trade off between redundancy in resource use to deal with future uncertainties vis-a-vis optimal scarcity leading to emergence of rules for regulating present resource use has to be made very carefully. Too much of redundancy may confuse and too little may cripple (Gupta 1985). Sometimes scarcity in resource use is compensated by redundancy in cultural or psychological sub set of living. Some times the regulation of CPR is done through regulation of managing private resource. Gills and Gamtgard (1981) provided an example of regulating private resource to protect the commons. In other words scarcity in one sub system can influence sufficiency in other systems. In addition to redundancy, randomization has also been used for regulating collective behaviour for managing commons) Gupta, 1990).

Buzdar (1988) provides explanation of multi enterprise, multi resource or eco-niche based survival strategies. The interaction between private and common resources across altitudes in North Pakistan resembles the experience in Swiss Alpines (Netting 1972) and Bhutan (Gupta & Ura, 1990). The agricultural land and animals are owned in this case individually where as water and pastures are owned collectively. No single altitude level or eco-niche has the potential to provide the survival needs of the villagers. All families required access to different micro environments to reduce the risk of bad years and effectively schedule resource use over time and space, no single activity was sufficient either.

The bundle of rights emerged to manage properties under various regimes or rules. It has been shown that individual strand of this bundle may be distributed among state, owners, users, creditors, labourers etc. (Ciriacy-Wantrup 1963).

Buzdar provides examples of coordination among various pastoralists who must regulate the entry and exit in the village such that presence of the animals coincide with the fallowing of the fields. This in turn requires that individual cultivators grow crops which mature in the same time. The fines are imposed for keeping animals longer in the village or bringing them back early. Agrawal (1990) observed a similar practice in Bunakha village of Bhutan.

Cooperation and diversification

Sahlins (1972) had described how pooling and redistribution function could continue if some rent was extracted by the decision centre for performing this function. Something similar to what Birkes suggests as a rent for society in the form of royalty payment for fishing. The difference is that in the first case the rent accrues to individual or institution with large positive externality. In the second case the rent accrues to society through indirect taxation or direct taxation with small negative externality to individuals who pay the rent.

Runge (1985) drawing upon the work of Amartya Sen (1967) suggests that free riding was an option but not an imperative in collective choice situations. Particularly if institutions provided opportunities of learning overtime, and gaining order and security in an uncertain world by providing assurances. The assurance problem was seen as a zone of possibility raising two issues:

- (1) the potential and actual demand for different resources needs to be taken into account while analyzing the incentives for cooperative action, and
- (2) the rules that may coordinate behaviour of groups will vary over size, sector, space and time.

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The dynamism of this variance may be difficult to capture, we submit once again, if institutional rules pertaining to anyone resource such as land, labour, water, etc., are only taken into account. Hence, the utility of portfolio approach.

Study of natural laws helps in understanding the correspondence between the ecological imperatives and social motivations. For instance, in Andes it was found that most indigenous fruits were available during rainy season (November to March) such that the dispersal of seeds through human intervention would take place when water was available (Tillman, 1987). There are umpteen examples of such correspondence between the need for a resource to regenerate and evolution of social customs, resource use patterns which are collectively and individually in conformity with ecological requirements of sustainable resources. There are tribes who do not fish during the period of spawning. Further, high germ plasm variability in some of the regions having highest degree of poverty generated a cultural requirement for different types of varieties say rice or potato and tolerance of low level of returns with high variability in different varieties. The survival was ensured because there existed a contra variance in returns of different local varieties. Thus, some output was available no matter whether rainfall was too little or too much. But with declining demand for the skills of such communities or inappropriate rewards for maintaining bio-diversity, the income levels of people have declined. Once the portfolio shifts took place in favour of uniform varieties or some other enterprises, the cultural edifice supporting respect for sustainability through diversity crumbles down.

Some other ways in which the traditional societies try to manage correspondence between common and private resources are : establishing correlations between one system and another (to use proxy variables like flowering of certain shrubs or grasses to regulate decisions about beginning or ending grazing activity at a given place), generating rituals requiring respect for common properties, instituting customs or festivals which serve as reminders of individual responsibility for a collective good etc. Much of the literature on institution some how has ignored the rich tradition of cultural mechanisms available for management of commons. Stocks (1987) provides examples of cultural norms that counteract irrational tendencies of resource use. For instance, a pastoral group could evolve norms of spending most time on patches with highest rate of return or evolve norms of mobility even if resource supply did not warrant it.

Summarizing discussion in this section, we note that environmental risks are adjusted by various social groups through a combination of strategies that vary over space season, sector and social groups. We also observe that the patterns of diversification are evolved over a long period of time through trial and error and not necessarily only with the economic ends in view. The act of performing sometime is its own reward. Or to put in other words traveling together in a journey is given as much importance by the pastoral societies if not more as reaching the goal. The performance orientation provides the basis or order in seemingly chaotic conditions of individual choice.

Part-Five: Eco Institutional Model : 4-A (Access, Assurance, Ability and Attitudes)

The relationship between the variables on X and Y axis in Figure 2 can be one to one. Or, each variable on an axis can be related to other variables on X and Y axis (Fig.2). If we know the parameters of two dimensions on X or Y axis we can speculate upon the parameters of the third dimension. For instance, if we know (a) what type of access condition exists vis-a-vis market resources in a given situation and (b) the distribution of skills and abilities among various groups, the type of assurances both vertical and horizontal required to generate sustainable resource use can be anticipated. The horizontal assurances refer to others' behaviour vis-a-vis one's own at a point of time and the vertical assurances refer to the future returns from present investments. The attitudes are both the result or the outcome of the experience with resource utilisation and also the causal influ-

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ence on the response to institutions. The attitudes provide a cultural basis of institutional working.

Eco-Institutional Perspective

	Ecological RESOURCES	Institutions	Technology	Culture
Access	*****			
Assurances		*****		
Ability			*****	
Attitudes				*****

All the four As i.e. access, assurance, abilities and attitudes, must be satisfied in a system level intervention for it to be sustainable. The advantage of the framework is if we know any two dimensions we can speculate about the third. And if we know three, we can speculate the fourth. Let us take the case of a technology for plant protection. It is useful for me to use biological pest control, if I have some assurance about others behaviour. But if I did not, I might spend more on chemical pesticides, and increase the cost of plant protection of others as well. Further it is not enough to have access to technology and skills or ability to use it, if assurances are not available. Likewise, the culture of collective survival vis-a-vis individual survival would also influence the sustainability of technology as well as institutional arrangement.

For instance, pastoralists need access to grazing land, water, place for night shelter, food and other necessities like veterinary medicine during migration. Need for assurance about security of livestock and self in the unknown or less known regions generates institutions for collective survival. Aggrawal (1991) illustrates how in some of the migrating dungs(group of shepherds) a sort of relay race is performed for night watchman duty. Every person has to guard the herd in the night by moving around the herds settled in concentric rings with women in the centre and the animals and the men around them. He takes a small stick to be handed over to the appointed person at fixed time in the night to change their turns. If a person sleeps over, it is easy to find out the culprit.

Likewise, there are other mechanisms developed to have other assurances. People in Andhra pradesh villages receiving herdsman from Rajasthan have an informal arrangement for deciding whose fields should be penned this year by whose heard, an assembly of village elders negotiates with the scout party of the pastoralists about which herd will stay in whose field. The obligations of payment to a village common fund, herdsman or the farmers are also spelt out (Wade, 1980). Friendly relations among the visiting herdsman and the local settled populations can not always be taken for granted. There have been many cases of violence against pastoralists around grazing in forests (with or without sanctuaries), private fallows, roadside fallows, at inter-state borders etc. There is a Supreme court Judgment permitting unrestricted right of pastoralists to move from one state to another. However, weakening of assurances from state or host village communities obviously increases grazing pressure on more marginal uninhabited lands leading to ecological crisis.

The improvement in access or assurances only will not help if the skills of the pastoralists to use available opportunities do not simultaneously improve. Most pastoralists can inject medicines or

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vaccinate their animals themselves. But there remain a vast range of traditional medicine systems or knowledge about combination of stress fodder and feeds during drought which remains to be properly analyzed, screened and diffused.

Gupta and Ura (1992) have noted the peculiar way in which ecological and social interactions emerge in the context of mountainous contexts:

The mountain societies have evolved unique ways of maintaining social amity amidst conflicting resource demands and experiences. In Mera Sakte (located at about 11000' height) there is a particular specie called as * Embarrassment Tree'. Everybody comes and hangs their embarrassment over tree. People play jokes even those which in normal course are not acceptable - and curse each other or makes from - go back in the evening. Catharsis at the community level has been known as age old institution for settling emotive books of accounts in the short run so that moral book of accounts could be settled in long terms.

Cultural norms can help in counteracting some of the 'rational' (in short term), but non sustainable resource use strategies. A pastoral group can evolve norm of spending most time on patches with highest rate of return¹⁷; or can evolve norms of mobility even if resource supply did not warrant it. It could be guided by the need to avoid intermixing of yak herd with cattle herd (as we shall see later) to avoid disease transfer. In some cases, hunting tribes have used a randomization rule to overcome the tendency to hunt where the maximum game is likely to be found¹⁸. Assume that there is a water point where animals come at a particular time in the day. 'Rational' strategy might imply hunting the animals when they come there. Some tribes use different ways of deciding the direction in which to go for hunting by circulating a stone tied to sling of rope and then throwing it. In which ever direction the stone went became the direction for that day's expedition.

Such norms require that group should consider no catch or game some day with lots of catch on other days with equanimity. It is also expected that norms of sharing will emerge to take care of the bad days.

Centralized exchange network sometimes could compensate for geographic diversity¹⁹. In a study of Torbel, a small mountain village in Switzerland, the adaptations of the community to diversity of resources and uncertainties of environment has been explained through expansive, intensive and regulation process²⁰. Building irrigation channels though inter-village coordination was the expansionary strategy. Fertilization of meadows, repair or modification of irrigation channels and recovery of washed away soils were described as the

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16. Timothy O' Riorden (1988), "The Politics of Sustainability", pp. 29-50, in R. Kerry Turner (1988) Sustainable Environmental Management: Principles and Practice, Belhaven Press, London and Westview Press, Colorado.
17. Anthony Stocks (1987) "Resource Management in an Amazon Varzea Lake Ecosystem; The Cocamilla Case", pp. 108-120 in Bonnie J. McCay and James M. Acheson (eds.) The Question of Commons: The Culture and Ecology of Communal Resources. The University of Arizona Press, Tucson.
18. Luther P Gerlach and Gary B Palmer (1981) .Adaptation through evolving interdependence. In Handbook Of Organizational Design . Paul C. Nystrom and William H. Starbuck (eds.) Oxford University Press, London, pp 323-384.
19. M. Sahlins (1968) "Notes on the Original Affluent Society" in Man the Hunter. R. Lee and I. DeVora (eds.), pp. 85-89, Chicago: Aldine.

intensification process. Regulation referred to the exclusion of outsiders from the citizenship of the village, limiting number of grazing stock, limiting of wood cutting and democratic means to centralization of power.²¹

Mixing fluctuating scarcities with geographic diversities and resource concentration could lead to complex social structures among three groups of people in Zagros mountains of Pakistan viz. Pathan farmers, Kohistani farmers and Gujar Herders. The farmers using rich soil and water resources exchanged goods with the herders who exploited dispersed grasslands. Two of the groups shared a resource Gujar herders utilized Kohistani pastures in the winters when the latter fed their cattle from resources²². Mutual dependence among cultivation and herders in some cases could be mediated by state control as in the middle east²³. The segmented, polycentric, integrated network on the other hand concede the autonomy of different sub groups, diversity of their goals and multiplicity of leadership or potential for leadership²⁴. Gerlach and Palmer (1981 : 350) suggest several possible ways in which strategies of environmental adaptation could be classified²⁵ :

(a) Diversity as compared to uniformity of resources could be dealt with through alternating structures and resources, by specialization of segments, and exchange through networks; Alternating structures imply temporary cooperation. The centralized exchange networks may compensate for geographic diversity.

(b) Societies respond to concentration of resources through consolidation of consuming and protecting segment, by coordinating productive and defensive efforts in cooperative networks and by expanding resource development. Concentration Centralization may in the long term be quite mal-adaptive since it is like putting all the eggs in one basket and is characterized as producing disastrous inter-connectedness.

(c) Scarcity of resource could be responded through (i) competitive expansion of control over resource use and elimination of outsiders; (ii) involution of structures, diversification of resource itself, increasing efficiency of resource use, specialization of segments and emergence of centralized structures.

(d) Fluctuation required alternating structures, establishment of redundant resources, networking and surveillance of sources, randomization of risks, storage of resource and decentralization of structures.

Gerlach and Palmer (1981:364) discuss a very interesting model of inter-connected organizations. The concept of SPIN(Segmented, Polycentric,Integrated networks) implies a nested network of semi-autonomous segments. People are members of many segments and leader

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20. R. Netting(1972) "Of Men and Meadows: Strategies of Alpine Landuse" Anthropological Quarterly. 45 (3), pp. 132-144 in Gerlach and Palmer, 1981 op. cit.
21. R. Netting (1976) "What Alpine Peasants have in Common: Observations on Communal Tenure in a Swiss Village", Human Ecology 4(2), pp.135-146 in Gerlach and Palmer, 1981, op cit.
22. Fredrik Barth (1956), Ecological relationships of ethnic groups in Swat, North Pakistan .American Anthropologist 58:1079-1089 in Gerlach and Palmer, op cit 1981:362-363.
23. Daniel G.Bates(1974), The role of the state in peasant-nomad mutualism. In Yehudi A Cohen (ed), Man in Adaptation :The Cultural Present (2nd edition):285-296. Chicago:Aldine.
24. Gerlach and Palmer , '1981 :op cit

in one can be follower in another. There is considerable diversity in each segment because each segment is encouraged to devise its own goals, perform according to the special skills of the members of each segment. SPINS have five properties:

First) Foster effective coping with the environment, each segment by doing its own thing maximizes heterogeneity, innovation, entrepreneurship, experimentation, and trial-and-error-problem-solving.

Second) Spins are reliable. The "heterogeneity among segments produces functional versatility, and spontaneous heterogeneity means that some segments duplicate the functions performed by others. Although this duplication often seen as inefficient by the proponents of centralized rationality, redundancy helps assure the accomplishment of necessary tasks even if individual segments fail. Success by one segment helps a whole organization but failures too often help the organization as information about the success or failure is communicated through the network.

Thirdly, a SPIN can penetrate and recruit from a broad range of people.

Fourthly a SPIN is protected from suppression and cooptation of the total organization by its redundancy, multiplicity of leaders, and self sufficiency of individual segments.

Fifthly, a SPIN escalates efforts, and generates forward motion through the rivalries and competitiveness among its segments and leaders (Gerlach, 1971,1978)²⁶.

Bhutanese experience not only illustrates use of several of these strategies but also expands the framework of adaptation through interdependence. Just like Japanese villagers, Bhutanese may not rely entirely on socialization as a means of ensuring behaviour that avoids the tragedy of the common²⁷. They do not rely just on material incentives or disincentives. There is no assumption made about isomorphism between 'religious reformulation and practical experimentation' (Brightman, 1987:137); and long standing contradiction between 'sign' and 'interest' values provide impetus for continued experimentation about relevant rules and principles for changing resource endowment.

The 'sign' values are semiotically determined through social sharing and reciprocity of meaning. The 'interest', value signifies the position of valued object in relation to purposive activity²⁸. The red rice may be grown because it required less water and also served symbolic purpose for certain religious offerings. Once foreign demand for this rice converts

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25. Gerlach and Palmer ,1981 ,op cit
26. Gerlach Luther P.(1971). "Movements of revolutionary change: some structural characteristics. *American Behavioral Scientist*,14(6): 812-836.; (1978). "Fumbling Freely into the Future", in Margoroh Maruyama and Arthur Harkins (eds.) *World Anthropology. Cultures of the Future Series*;315-362. The Hague: Mouton.; cited in Gerlach and Plamer. 1981.
27. M.A. McKean (1984), *Management of Traditional Common Lands (iriachi)in Japan.*, paper prepared for the Fall 1984 workshop on Common Property and Environmental Management ,Duke University, sponsored by BOSTID, NRC, National Academy of Sciences, USA in *Institutional Arrangements for resolving the commons dilemma: some contending approaches*. In McKay and Acheson ,op cit.
28. M Sahlins, (1981) Historical Metaphors and Mythical Realities Ann Arbor University of Michigan Press.,pp 68-70 ; also see Robert A. Brihtman ,(1987) *Conservation and resource depletion :The case of Boreal Forest Alonggquins in The Question of Commons :The culture and ecology of resources*. Bonnie M McCay and James M. Acheson (eds)

it into a highly prized commodity, the 'interest' value might supersede momentarily the 'sign' value. After advent of Buddhism, animal sacrifices were substituted by symbolic rituals in India requiring animal forms made of flour or other eatables .

In Bhutan villages, there is a custom in the high hills that people will go together to collect shingle wood for building their houses. This activity technologically speaking can be done by anyone individual. Still people go together. There are several possible reasons. For instance, while climbing or descending, somebody may fall without anybody else around to help out. While collecting wood, a person may collect too much or may collect from trees which are not ready. The presence of others will insure against risks of falling, too much collection or inappropriate collection. Even though there may not be any explicit rule and yet people may institutionalize restraint on each others' wants through custom of collection on a particular day. Such institutional mechanisms provide clue about self-reliance, accountability and mutual help²⁹.

But the evolution of such institutions is not restricted only to the cases where tasks can be done individually but are not done. There are historical precedences which may have required group action at a point of time though such a need may not have existed subsequently. The original purpose may have been lost and yet the collective performance or renewal of the ritual may continue. Likewise, the collective action may even be a means of catharsis, playfulness or just fun. Thus the portfolios of the economic enterprises provide some clue about the possibilities of collective action, the non-economic cultural and institutional purposes of life may provide the other basis for collective action.

While designing institutions³⁰, excessive emphasis has been given on utilitarian, quantifiable or

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Tucson:University of Arizona Press.,pp 135-136.

29. Periera (1990:25) provides an interesting example of the similar kind based on the Warli tribals near Bombay. He suggests that much against the common wisdom that common resources would be appropriated by the powerful people in a village! which indeed is the case in many villages), Adivasi tradition in some cases are against it. Warlis eat the leaves of *Kovli Bhaji*, a tuberous plant which springs up after first monsoon rains. But the leaves are plucked on only a particular day, "thus ensuring that all who want them can have them, while at the same time over-exploitation of the species is prevented".

Winin Periera, The kings of Jungle: The sustainable Lifestyles of the Warlis, *Anusandhan*, July 1989, revised in August 1990.

30. Gupta and Prakash (1992) have reviewed the institutional context. Eisner views Institutions as "set up of rules for decision making on part of individuals in repetitive decision making situations involving more than one person which has acquired general recognition to the extent that the individuals concerned have reciprocal expectations with regard to their respective behaviour"(Elsner:1987:5-14).

They add:

Institutions have regulated human behaviour since time immemorial. Institutional intervention acknowledges both the economic and the non economic character of human beings (Neo Classical framework views man solely as an economic entity) (Myrdal :1977:3-4 ; Wolozin :1977:33) It therefore uses both economic and non economic processes to bring harmony between individual rationality and collective rationality. Further institutional innovations don't assume decision makers behaviour/taste /preferences to be given. Thus compatibility between environment and growth may be initiated not only through appealing

measurable dimensions of economic realm disregarding the other dimensions as mentioned above. Sustainable institutions can be designed only when sustainability of spiritual dimensions and processes can be ensured. The revival of religious identities world over indicates that the gaps in social existence left unfilled by the markets, state and formal institutions are sought to be filled through religion. To my mind such a view is valid but only partially. To me it appears, that many individuals and social groups are trying to fill these gaps through nature augmenting innovations in technological or institutional fields. It is these innovations to which we shift in the next part.

Part Six: Building upon what is known:

Local creativity and organisational development:

One of the persistent reasons why many externally induced intervention fail is because the local knowledge system is often discounted and if considered, is seen only in an utilitarian perspective (Gupta, 1980, 1981, 1987, 1989; Richards, 1989, 1985, 1992; Verma and Singh, 1969; Dharampal, 1971; Chambers, 1983; Bebbington, 1992; Periera, 1991). This realization has dawned on the development planners now for some time but the mechanisms chosen to build upon local knowledge are often worse than the problem. Various short cut methods popularly called as rapid rural appraisal (RRA) are invoked to get a handle on local situation. We have critiqued these methods on ethical as well as efficiency grounds separately (Gupta and Patel, 1992). It is necessary to note here that organizations of creative people whether in the form of networks or informal cooperatives or just loose associations would generate a very different pressure on society for sustainable development. The spirit of excellence, critical peer group appraisal, competitiveness and entrepreneurship, so vital for self reliant development may emerge, to our mind only in the networks of local 'experts', innovators and experimenters. It is true that every farmer or artisan does do experiments. But not every one is equally creative and not in the same resource related fields. The transition of developmental paradigm from *Victim's* perspective to that of the *victor's*. The organizational principles for a creative group are also likely to be different than for the rest.

The organizational principles which guide collective action in different regions would obviously have some common but many uncommon dimensions.

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to 'human selfishness' but also through changing the thinking of people (green movement, Responsible care code amongst chemical companies in U.S.A.) or through redefining/ creating new markets (e.g. market for Sulphur Di Oxide quotas in U.S.A.)

Ostrom (1990:53-54) argues that three kind of rules influence the institutional evolution viz: Constitutional rules (governance, boundary, legitimacy related), Collective choice rules (prescribing policies for resource management) and Operational rules (allocation, monitoring and enforcement). She further adds that the operational rules are easier to change, the collective choice are more difficult and the constitutional the most difficult.

To put it more simply, one could also suggest that we could have basically two kind of rules: the boundary and the resource allocation. The conflict resolution rules evolve in the context of these two (Gupta, 1985). The boundary related rules determine the jurisdiction, who is in and who is out, what makes people accept these boundaries (customary rules, traditions, culture, historical experience and nature of governance) etc. The Resource Allocation rules determine who gets what when, how will some people be compensated if some others gain or do not lose; or what goals to be pursued (not taking the societal goals as given).

The Conflict Resolution Principles deal with the process through which conflicts are resolved, for example, arbitration, adjudication, various bargaining models, voting, consensus through general body meetings or through delegations (elected, non elected), etc. The principles provided in the Boundary Rules and

The Institution Building process involves simultaneous intervention in eight dimensions of organizational change. Viz: Leadership³¹, Stake Building³², Value Reinforcement³³, Clarifying Norms and rule making process³⁴, Capacity Building³⁵, Innovation and creativity. Self -Renewal³⁶, and Networking. Theory of Institution Building³⁷ (IB) has to be significantly remodeled because of historical reasons. The IB processes were evolved to increase the capacity of third world organisations to receive funds/aid and use it efficiently and effectively. The problem was defined from external perspective and resolved or sought to be resolved accordingly. Such a perspective provided only limited insights for strengthening the capacities of organizations which have emerged autonomously at local level. In a recent study Kleymeyer (1992) very succinctly observes :

—(T)he cultural expression, in all its richness and variety, is not just a by-product of how a society organizes its social and productive relationships; it is a vital instrument for generating the insights and energy needed to transform those relationships.

Nearly two decades of grassroots development experience confirms Wali's contention that this aid is wasted unless it builds upon and strengthens the patterns of community organization which form the core of ethnic identity. This means the community must be given options that allow local people to set the agenda for their own development and to select

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Conflict Resolution Rules are operationalized through Conflict Resolution Rules (relating to processes), so that institutional environment for sustainable resource management can be generated and maintained.

31. The iterative, rotational and interactive leadership models are the only ones which sustain local community organizations. A study of Chenchu food gathering and hunting tribe in Andhra Pradesh (Gupta, 1983, 1987) revealed three principles of sustainable organizational sustenance; First) The leader and follower can iterate. The leader in honey collection sub-group has no particular skill in hunting group and becomes just a follower in that group. Second) The skills and not status determine the leadership(the person who knows the most critical functions in a task becomes the follower rather than the one who is chief of the tribe or his kin. Third) the pooling is independent of the redistribution. The honey, game, food, fish or fuel is shared in this tribe among all the members and not just the one who went on the expedition.
32. The original model of IB which emphasized on the intr-organizational changes is less useful now. The evolution of stakeholders' interest in the organization plays a vital role in the self reliance process.
33. Some values are brought by the members of any organization along with them but some are acquired in the organizational life experience. It is these values which have to be so shaped that reliance on external instruments of control and supervision becomes less important.
34. The rule making process is the one of the most crucial aspect of the IB in any organization. The fine tuning of rules, norms and belief system in accordance with the strategic future directions is not a function of just the leader. The group has to collectively evolve the norms and changes there in so as to ensure that collective spirit is maintained.
35. One of the most inappropriate term in the developmental jargon is the 'unskilled' labour. There is practically no person who has no skill what so ever. The challenge is to provide space with in and outside the organizations for each member to grow. The learning systems at individual and collective levels are to be strengthened in such a manner that the errors are not masked and corrections are not delayed too much.
36. The process of self renewal requires recalibrating the scales of measurement periodically. It is the ability to discriminate finer shades of the colour of life which in the normal course may be missed. The historical perspective helps just as does the urge to relate to larger social causes. One can not discover the immense source of energy to pursue any specific goal till one finds the broader dimension of growth.
37. Several reviews exist elaborating the concerns in the matter but within the externally aided process of IB (Uphoff,

technologies that reinforce rather than undermine community cohesion (1992:22-24).

The only snag in the above inference is that the choices perhaps refer to the selection of technologies developed elsewhere. The value can be added in local technologies which carry cultural genetic code (Reddy, 1981), through a conscious collective or individual decision. Such an approach would transform the relationships more organically.

Thus if there exist local plant protection practices which worked at individual level in local varieties, the developmental options may often include another chemical based pesticides which fits into individually managed solution of the pest problem in a new variety.

An alternative way could be to demonstrate through local initiative the processes of increase in the pest infestation subsequent to the introduction of monoculture of a new variety. Later a combination of collective preventive care could be coupled with individual herbal pesticide so that collective processing of new information takes place. It is possible that either the monoculture would be replaced or other ways would be found out to reduce the incidence of the problem. The organisation building in such a framework is a slower, patient and a much more rigorous scientific process. It is possible that available Scientific tools cannot properly understand some of the local culturally embedded technologies or other practices. In such a case the scientific paradigm itself would need to be modified.

To illustrate, many indigenous communities in North America as well as in Asia and perhaps elsewhere believe that there is a relationship between the health of the soil and the human beings (Raymond Obaswamin, 1992). K.M. Munshi, a Cabinet Minister in 1950s in India had linked the soil with soul in a lecture entitled, "The Gospel of Dirty Hand" addressed to the governing body of Indian Council of Agricultural Research. He strongly repudiated the urge among the bureaucrats in the Ministry of Agriculture to borrow concepts from outside for technology development and diffusion. He strongly believed that unless a concept struck chords in the heart of millions of people (as it did when Gandhi gave various calls during freedom struggle), it would alienate the masses and perhaps force the officials to bypass the Gospel of Dirty Hand implying learning the hard way by working with the people. He felt that the concept of Extension - An American Term - was ill-suited for Indian conditions and would weaken the self-reliance potential. After 40 years not only he has been proved right but even the consequences he predicted have come true. In every country there must have been similar leaders and thinkers who must have given a serious thought of building their societies through indigenous genius and cultural ethos. In the wake of modernization these voices were stifled.

Ecological Ethics:

Restoration of the ecological ethics in the communities where it has become weak as evident from decline of common property resources and associated knowledge systems, will depend upon identifying historical strands of critical thinking as mentioned above. By linking the new interventions with the old ideas, such institutional processes are triggered which generate respect for continuity and at the same time enable introduction of change.

The local knowledge systems include practices where farmers, fishermen, pastoralists etc., do the right things for wrong reasons as well for the right reasons. There are practices where they do the wrong things which may have been right at one time but are no more so. Thus, one doesn't have to romanticize the capabilities of indigenous knowledge system. There are, however, strengths of the local knowledge system which can help extend the frontiers of natural as well as social sciences.

Kurien(1991) provides a rich account of how the interaction among traditional and the modern

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systems of knowledge takes place in the context of fisheries. He rightly observes that any fishing operation is a mixture of skill evolved through past experience and responses to proximate reality and diversity inherent in it. The response are shaped by the way sense is made of the environment, "the feel of the sea bottom assessed by touching depth gauging plumb line, the smell of the sea, the sight of the birds, landmarks, stars, the colour of the sea and ripples in it, the sound of the shoal movement etc. He adds that " it is this merging of experience with proximate reality which initiates the toll using response -dropping of hooks, casting of nets or laying of traps. The result: fish is soon caught". Only one aspect needs to be corrected here. Even the most simple technical operation has a theory behind it. Otherwise, the efficiency will not be there. The articulation may not be easy. Further, not all actions are purposive

Knowledge in many of the traditional societies is not always sought. It happens. Rengifo (PRATEC, PERU, 1990) provided an interesting insight when he mentioned that knowledge could happen while standing at a bus stand, or attending social functions or playing other roles. Paul Richards (1989, 1992) argues similarly when he talks about agriculture as a performance and critiques attempts to seek or impose systems on local knowledge conditions. He believes that there was no point in seeking a consistency in what people do so as to call it an indigenous knowledge system. While I agree with this view to the extent that there is an element of fun or playfulness in the activities of people (including all of us). However, the activities are not entirely random nor without an underlying theory. It is possible that this theory may not be apparent or all the connections in the theory may not be made only in a given framework of rationality. But rationality there is if the activities are sustainable.

The relationship between culture, technology, and environment has to be seen together if strongly rooted organisations have to be developed. The example of parrot flying away or the poacher punished by being asked to stand under the sun and feed the birds, illustrate how indigenous institutions combine culture and environment particularly in the regions where environmental risks and resource scarcity are high. (see page 45 for the example of parrot)

It is in this context that we started the Honey Bee network.

Honey Bee: An experiment in People to people learning

Honeybee - an informal newsletter started three years ago is an effort to make the Golden Bird sing again. We had realized that much against the conventional understanding poor people were poor indeed but not so poor that they could not even think. For them the experimentation and innovation was a matter of life and death given the uncertainties of nature expressed through droughts, floods and hail storms.

Why Honeybee?

Honeybee does two things which we often are not sure of doing ourselves. She picks pollen without making the flowers poorer. She connects flowers to flowers through pollination. We, the researchers extract knowledge of people which sometimes results in exacerbation of their poverty. We very seldom connect farmers to farmers. We write in English language which connects us globally and also domestically with the elite but which prevents us from reaching the people from whom we have learnt. Thus while we grow in our careers and achieve wider recognition and professional rewards, the people suffer often silently. The ethics of knowledge extraction, its documentation, dissemination and abstraction into theories or technologies became thus our central concern (Gupta, 1989).

We started the first issue of Honeybee with a note prepared by a scientist of Gujarat Agricultural

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University illustrating the lessons learnt by him and his colleagues from a careful study of farming innovations, traditional wisdom and localized experiments. This, we thought would encourage the other scientists to make their tacit knowledge explicit. In any case nothing is gained by considering farmers as 'know alls' and scientists as 'ignoramus'. Dialogue very seldom takes place amongst people with unequal respect of each other.

We also enclosed with the first issue a letter in Hindi from a developmental worker in Bihar cautioning us about the possible hazards of documenting local knowledge. His contention was that poor had nothing else left with them. Do we want to drain them of this resource also? Will documentation and value addition not lead to a situation as in Assam where the people and workers who grow quality tea cannot afford to consume it. The best tea comes to London. Will the prospects of wider application of this technology reduce the local advantage and if not, how did we plan to avoid these dangers.

In the second issue we began with the discussion on the Gospel of Dirty Hand enunciated by Dr.K.M.Munshi in 1951-52 providing a framework for linking the soil, the toil of the field worker and the farmer with the soul of the learners and users of knowledge. Unfortunately he did not gain much ground in the bureaucracy or technocracy. We also referred to a Griffith Memorial lecture by Mazumdar in 1925 on the ancient Indian science of Botany in Calcutta. Two masters theses guided by Dr.Y.P.Singh, way back in 1965-67 on Indigenous Animal Husbandry provided perhaps the first acknowledgement of indigenous knowledge by formal scientists. Ashis Nandy planned a large research project on ethno agriculture so that the science and culture behind farmers' wisdom could be systematically catalogued. He could never get through the labyrinth of bureaucracy because the 'Green Revolution' was serving us well in late seventies. Shri.Dharampal in a book on Indian Science and Technology in eighteenth century (1971) brought together several travelogues by British visitors to India 150 to 200 years ago testifying to the brilliance of Indian scientific genius.

These references were intended to persuade the readers that they should not develop a false pride in being involved something very new or something very unique. The interest in learning from the peoples' knowledge has been there in every culture and practically in every era. It is just that the elite fails to build upon these enquiries and therefore societies get trapped in downward spiral of decay, degeneration and strife.

Honeybee also appeals to fellow researchers, activists and planners in other developing countries to identify native wisdom both to inspire and also to provoke the young minds to explore. In every country a very strong oral tradition of knowledge generation, validation, scrutiny and diffusion exists. Honeybee strongly believes that boundaries between formal and informal knowledge systems may often be false. The informal system may have formal rules waiting to be discovered. The formal system may have informal beliefs, accidents, or conjectures providing impetus for further enquiry.

How did we collect farmers' innovations?

There has been of late an upsurge of so called rapid rural appraisal methods and approaches. To us nothing is more disdainful than to use shortcuts in learning. It is true that sometimes researchers get lost in long term surveys which throw useful light but much after the event. Therefore, need for efficiency in learning, analyzing and disseminating results is necessary. But that should not imply that one can abundant rigorous methods of research or analysis. AT the same time one should not be too enamoured by the methods when it comes to exploring a phenomena.

A genuine faith, inquisitive eyes and willingness to court uncertainties, we felt would be necessary conditions for documenting peoples' own knowledge systems. We contacted the second year and third year students of rural colleges during their vacation. We began with documentation of their own experience of dealing with hardships in life or at their homes. Soon a long list started emerging

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of various approaches that the students on their own or their parents or relatives had tried to cope with the stresses in the agricultural environment. By underlining the one which impressed us most, we gave a signal about our biases.

A short checklist was prepared to enable the students to document farmers' experiments. In the first round we were very clear that breadth rather than depth was our priority. Getting to know of more and more interesting ideas that people were playing with was our priority. We planned to follow up each of the interesting practices with more intensive investigation. The idea was to use interactive and iterative learning approach so that all the relevant questions did not have to be asked in one round or even at our suggestion alone. Scope was given for students to show their own creativity in dealing with others creativity.

Samples of plants or other minerals/materials used for plant protection, animal veterinary medicine, soil reclamation, etc., were collected for subsequent scientific identification. Each practice was mentioned with full address of the farmers innovators, or the name of the village along with the name of the communicator, i.e the students or other correspondents of Honeybee. We are very keen that intellectual property of the people must be protected. We do not know whether we will succeed in ensuring proper rewards to the people for their excellence and innovation. But we are trying.

We have already collected more than six hundred innovative practices predominantly from dry regions to prove that disadvantaged people may lack financial and economic resources but are very rich in knowledge resource. That is the reason we consider the term 'resource poor farmer' as one of the most inappropriate and demeaning western contribution. If knowledge is a resource and if some people are rich in this knowledge, why should they be called resource poor? AT the same time, we realize that market may not price peoples' knowledge properly today.

It should be remembered that out of 114 plant derived drugs, more than 70 per cent are used for the same purpose for which the native people discovered their use (Farnsworth, 1988).

What does it prove?

It proves that basic research could link cause and effect had been done successfully by the people in majority of the cases. Modern science and technology could supplement the efforts of the people, improve the efficiency of the extraction of the active ingredient or synthesize analog of the same, thereby improving effectiveness.

The scope for linking scientific search by the scientists and the farmers is enormous. I am beginning to realize that peoples' knowledge system need not always be considered informal just because the rules of the formal system fail to explain innovations in another system. The soil classification system developed by the people is far more complex and comprehensive than the USDA classification systems. Likewise, the hazards of pesticides residues and associated adverse effects on the human as well as entire ecological system are well known. In the second issue of Honeybee out of ninety four practices thirty four dealt with indigenous low external input ways of plant protection. Some of these practices could extend the frontiers of science. For instance, some farmers put cut thirty to forty days old sorghum plants or calotropis plants in the irrigation channel so as to control or minimize the termite attack in light dry soils. Perhaps hydrocyanids present in sorghum and similarly other toxic elements in calotropis contributed towards this effect. There are large number of other plants of pesticidal importance found in arid and semi arid regions, hill areas and flood prone regions which can provide sustainable alternatives to highly toxic chemical pesticides. It is possible that private corporations may not have much interest in the development and diffusion of such alternatives which pass control of knowledge in the hands of people. However, an informed, educated and experimenting client always spurs better market innovations as evident from the experience of computer industry. Therefore, I do not see that there is a basic contradiction between the knowledge systems of people and the evolution of market rules to strengthen and build upon it.

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However, such a model of market would be highly decentralized, competitive, open and participative.

Honeybee in that sense is an effort to mould markets of ideas and innovations but in favour of sustainable development of high risk environments.

Part-Seven: Monitoring Context of Collective Action

When people come together to manage catchments of a stream, regulate water for irrigation or drinking, protect crop or plantations from pests, observe quarantine to prevent other's animals getting infection, or various other resource related opportunities, they do so in a context.

The content of specific institutional arrangements has to be appreciated in the context of cultural, spiritual and socio-economic conditions existing in a given region. The context in a specific organisations may involve the informal culture, the myths, the collective memory of past experiences and the shared understanding of future vision. The evolution of collective action and its sustenance depends upon whether the members of an organisation monitor the content or the context.

Some of the lessons which may help in understanding relationships between context and content are enumerated here so that their bearing on the organisational growth can be worked out.

1. Implicit Context and explicit Content

The emphasis on the context provides understanding of the values and perspectives which guide individual actions and provide motivation for collective processing of information. The context by definition is partly explicit and partly implicit. It involves dealing with ambiguity and fuzzy boundaries. The roles become more important than rules. At the same time, each actor in an organisation performs multiple roles and not always in consonance with each other. Different roles require dealing with different histories and boundaries. The nested nature of these boundaries requires greater emphasis on trust creating processes. The internalization of collective interest provides the necessary motivation for individual actions rather than the external regulation through control. When internal commands start dictating behavior of an individual, rather than external demands, the institution building or development can be assumed to have begun. An organisation becomes an institution when it becomes a point of reference in society.

2. Can you add without subtraction?

Any institution requires mechanism of self-renewal in some parts and obsolesce in others. There can be *no addition without subtraction*. Organisations have a tendency to accumulate structures; rules and norms without rejecting or reducing the ones not in use any more. The result is that all the norms become less effective and thus reduce the incentives for renewal. The organizations which are sensitive to the problem of such accumulation periodically review their mechanisms in the light of new missions and accordingly tune their processes. It is inevitable that several sacred values come in question during the process of renewal while some others get doubly emphasized.

3. Risk and Redundancy

The energy for self-renewal may be provided through the infusion of new ideas, tolerance of dissent and generation and maintenance of diversity. One of the ways in which assurance against unforeseen risks is achieved is through creating limited redundancy. Thus diversity and parsimony have a price. Too much of redundancy can create inertia and too little can cripple. The golden mean can be arrived at by matching the internal resources and external fluctuations. Higher the scarcity of internal resources and external fluctuations, greater may be the need to have redundancy in critical

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functions. Sometimes rituals and other cultural mechanisms serve as redundant reminders of core values. Many of the modern organisations ignore the role of such rituals and thus become weak over time.

4. Containing Creativity and Expanding Boundaries

Not entire diversity, even if functional, can be retained within the boundary of an organisation. Creativity at the margin is always stressful. Any organization can withstand such a stress only for a limited period of time. The alternative before an organisation face with such a problem is to either split or divide into smaller groups or sponsor subsidiary structures.

5. Courting Errors to avoid Blunders: How much to differentiate?

The splintering of an organisation can aid the original missions of an organization if the sub-groups can network and pursue original missions through multiple approaches but common concerns. The emerging challenge before management science to my mind is to get over the traditional problem solving focus and move towards mobilizational goals. In the process of mobilization, the conventional strategies of role definition become irrelevant. When a house is on fire, there is no point in differentiating roles, dividing responsibilities, establishing line of control and organizing the extinguishing of fire. It may be too late by the time organisation emerge. The spontaneous roles and responsibilities can be chaotic and may lead to costly errors. How does one avoid both the extremes.

In many of the traditional societies and even the modern but participative systems, the crisis are invented and spontaneity is rehearsed. However, it is not done too often lest it loses its sanctity. Sometimes the roles are exchanged instead of rehearsing the crisis. This way everybody learns to be inefficient in some roles and efficient in others. Instead of overspecializing, sub-optimality in some roles is deliberately sought so as to be efficient or optimal in other roles.

Whether it is watershed management or organization of collective pest control, these principles will apply and the evolutionary process of an organization can be understood.

Part -Eight: Linking for Learning laterally

The linkages between formal and informal knowledge systems so as to strengthen self-reliance at both the ends can also be conceptualised with the help of mean and variance matrix discussed earlier.

We can understand how different types of linkages will need to be forged in different types of regions having varying combination or portfolio of endowments(Gupta,1989). For example if household portfolios of various enterprises comprising their farming system generate high average or mean income with high variance one can anticipate the availability of market channels. Public interventions can be restricted to the regulation. The extension system could be commodity based rather than household or regional based. In such a context there may not be any need for village based extension workers but there would be certainly a need for focussing on the issues of sustainability. Farmers may try in the short run to reduce their risks by excessive use of chemical inputs. The households with such portfolios may perhaps be served through contractual services rather than through mandatory public supply system.

Farmers having high mean and low variance portfolio would really be the most well en-

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dowed elite farmers whose goal would be to move towards high-input value adding technologies. In such a case farmers groups can even hire the scientists rather than relying on public or private channels. Government should provide tax concessions to promote such organizations and reduce the size of public bureaucracy. In case of households with low mean and low variance or low mean and high variance portfolios the role of scientists has to be much more evident. Given the high vulnerability in case of high variance portfolios around low mean returns the risk bearing systems are necessary for technological trials on the farmers field. We have argued that there will be limited use of transferring readymade technologies in such context. One has to transfer scientific principles so that farmers could develop their own technology. However, there would be areas like biological pest control or management of synchronized sowing or other farm operations which need institution building support.

Viability of a particular institutional arrangement often creates pressures for replicating success. Neither the original model gets renewed nor the other locations get the advantage of similar opportunity of evolving their own model as must have been true in the original case. The lessons in this regard can be learnt from various attempts made to replicate models such as Amul, joint forest management committees, pani panchayat, integrated rural development programme, growth centre plants, river valley projects modelled on Tennessee Valley Authority Model, supervise agricultural credit systems modelled on Farm Home Administration Scheme of US, the electoral model of governance based on Westminster style democracy etc.

In almost all these cases the change agents or the policy makers have assumed that what holds good in one place and in one cultural context may be valid for another situation and the context. There are large number of disaster stories. Without getting into the reasons why the process of replication has failed, it may be useful to learn from the successful cases of networking, mobilization and mutual learning in olden times as well as contemporary context. While drawing the lessons we will try to point out the limits to which lessons can be generalized,

The case of bio-diversity:

It is now well-known that the regions of high bio-diversity are also the regions of high poverty. Why does such an association arise? How is it that bio-diversity has been sustained by the people most vulnerable under the modern states? Does one infer that to maintain bio-diversity some communities will have to remain poor? If not, then how would the strong link between biodiversity and poverty (primarily economic poverty) be broken?

There is global concern for enhancing bio-diversity in the regions where it has been reduced and maintaining where it already exists. However, nobody argues that to maintain bio-diversity in the regions where it is low, the affluent people should be impoverished. And yet, a global conference (UNCED) took place recently violating all the principles of sustainable vision. For instance, the organization and management of this conference followed a pattern almost identical to any other UN conference. The centralized discourse for a problem which can only be solved in a decentralized manner was the first contradiction. The conspicuous neglect of non-western intellectual traditions as well as religious perspectives in the background documents was second major contradiction.

The inability to go beyond the classical model of conference through common agenda and common meeting place, was so obvious that the obituaries of the conference were written before the conference itself. The national and sub-national interests of various countries were subsumed in the empty rhetoric of North-South divide. The argument of various third world countries against setting their own house in order till they got the aid from the West was not only absurd but also an ethical. Knowing fully well the corrupting influence of foreign aid, the elite of the metropolitan environmental clubs joined hands with the state in creating a false dichotomy in the debate. It should have been obvious had the discussion taken place among the disadvantaged groups which maintain

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biodiversity that unless the public policies become more responsive in the existing framework and resource base, more aid would only make the struggle of these groups even more difficult.

The processes through which a consensus is reached is as important as the outcome. The networks through which an idea is diffused influences whose cooperation is ultimately ensured and whose not. It has been observed that "networks begin to matter - the frequency, intensity, and honesty of the dialogue among managers" (Charan, 1991). There are several ways in which networks can influence how commitment is built. The fact that most NGOs who participated in the UNCED process were from metropolitan regions and networked far more globally than locally was reflected in the kind of rhetoric that was generated in the conference.

Networks can also provide some kinds of false assurances thereby reducing individual responsibility for action. This can happen when the ratio of support from network and from one's own base organisation is not adequately maintained. There are cases when individuals and organisations which are strongly embedded in the networks but are very weakly linked with the people at the grass root level. Many of the global environmental networks have contributed to this process of alienation of many third world professionals and NGOs. As Oolberg (1992) said, many times we talk horizontally and act vertically.

Part- Nine: Becoming Accountable to people: Lessons and Issues

One of the fundamental problems of governance in general and natural resource related systems in particular is about mutual accountability not only among followers and leaders but also among human and other species. Many of the traditional societies devised elaborate rituals of sacrifices to atone for intended or unintended injury to other life forms. Among the people, mechanisms of peer culture have always existed though effective to varying extent in different groups. Given the income inequalities, the incentives for weaker section of people dependent upon the affluent for their livelihood to protest against injustice are limited. And yet it is not true that people in any village or community are against each other on all matters. For instance, there is an old convention in many of the Indian villages that a boy and girl from within a village are not supposed to marry. They have to leave the village if they do so. I am not suggesting that there is no adultery in the villages. It is just that the legitimacy of marriages within a village does not exist in large part of the country. This convention may be complied with by all the sections of a village society.

Similarly there is a convention that when somebody dies, everybody in the neighbourhood joins together in the mourning. Even if there are celebrations planned, the same are subdued, postponed or shifted elsewhere. The point I am making is that there are issues on which people cooperate because of an implicit mutual accountability though the same people may be fighting on other issues very vigorously.

The degree of conflict among different groups may also not be similar in different resource markets. For instance, a farmer who is dependent upon common land only to a very marginal degree may not have as much stakes in its management as someone who is primarily dependent upon the same. However, in real life, the stakes of the resource independent person may be there because of other socio = political reasons. The accountability framework which is only resource centered (for instance, among irrigation water users, graziers on common land, users of a common forest, etc.) may not last very long. This is a counter intuitive insight which emanates from the study of some of the sustainable resource management institutions.

While primary accountability may remain restricted to a resource group, secondary accountability to a larger group on more basic values and processes may be equally important. A multi-market, multi level framework of accountability (Gupta, 1985, Ostrom, Feeny, and Picht, 1989) would help evolve sustainable institutions for collective resource management. The accountability towards next

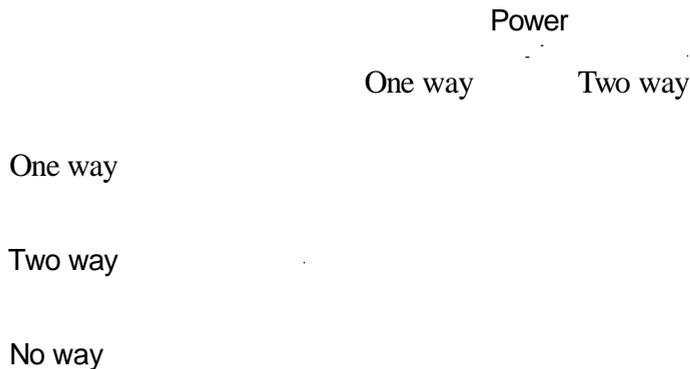
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generation and those who don't vote (birds, animals, other living beings) needs to be generated through cultural means.

The operational ways in which accountability across levels, resource markets, generations and living beings can be achieved are listed below:

a) The horizontal accountability among the organisational members and the people in society cannot exist unless vertical accountability between the top and the bottom level of functionaries within an organisation exist (Gupta, 1935). Many times the rhetoric of participation is used in organisations which are run in a very authoritarian and bureaucratic manner. To expect lower level functionaries whether in voluntary organisations, research institutions or in developmental agencies to be responsive to farmers, agricultural labourers, tribal men and women is futile if the ability of these functionaries to influence macro policy in the organisation is limited. This is a contradiction which for some strange reason, is never faced heads on in most organisations.

b) The relationship between communication and power (Gupta, 1980) can be seen through following diagram:



It is obvious that two-way communication and two way power can only bring about a genuine participative development. The mass line concept of Mao was supposed to achieve this by making brigade accountable to commune and vice versa. It is different matter that such an accountability could not be achieved on a very wide scale. The idea is that in any interaction, the client, consumer, or target group should be able to influence the choice of instrument, nature of interaction and terms of discourse just in as much as the organizational members should have similar opportunity. There are several ways in which this can happen.

i) The transaction cost of the interface between organisation and clients can be so distributed that both the parties have incentives to repeat the interactions or modify its content over time to reduce respective cost. If anyone party feels improperly burdened with the costs, it may either try to free ride or may try to manipulate the terms of exchange through covert or overt means. If the organisation bears the burdens excessively, it may become unviable and in due course may get destructed from its goals. Periodically the missions and the approaches of an organisation have to be reviewed in consultation with the clients so that possibility of goal displacement may not arise. At the same time it may be added that if an organization has to remain responsive to the clients, some shifts in the goals over time is necessary, in an action research study, it was argued that some shifts in the goals is an empirical way of judging the extent to which two-way communication and two-way power are seen in action.

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ii) The choice of the instrument often is guided by the expertise and the familiarity of those who deliver resources. A teacher or a trainer wants to teach what he/she knows best. What the client may need may be considered an uninformed judgment and thus not worthy of much attention. Thus, change in the instruments of delivery or interaction over time can provide empirical evidence about the extent to which clients have been able to influence the source.

iii) There are externalities of any intervention which are not captured by the transaction cost between two parties. The third party (humans or animals or nature) affected by, say, negative externality may or may not be able to articulate their loss. Thus, by monitoring the sensitivity of the parties in a transaction towards third party, accountability towards other being and even next generation can be evaluated.

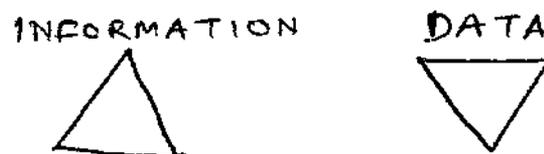
iv) The values underlying the choice of technology and the way to appraise its utility to various constituents may be another way to understand how responsive the actors in a transaction are to the different stake holders.

c) In the classical theories of management information system, it is argued that the data and information flow through two inverted pyramids as shown below:



(Figure 1)

The assumption here is that information processing capacities are much higher at the higher level of organizations and therefore, the data is minimum at the top while information is maximum. There is some truth in this framework. However, it has to be appreciated that local knowledge systems and awareness of their dynamics is highest at the local level. The data about available choices, past experience, the risks and chances etc., may be highest at the higher level. In such a case, the above diagram will get inverted.



(Figure 2)

The information will be highest at the bottom whereas data of a certain kind may be limited. In on-farm research this relationship is often violated. The design of the experiment may be determined at the top while the bottom levels entrusted with mere responsibility of laying out the trial. I know of a case when a crop related trial involved sowing a particular variety early in the season. In that year, there was good rain in the monsoon season and thus the harvesting season got delayed. The result was that original plan of sowing a particular crop had to be changed by the farmers due to delay in sowing. The field scientists, however, still went ahead with the trial because that was the instruction from the top level. Such a practice not only reduces the credibility of the field scientists but also makes the farmer doubt the actual intention of the research organisation.

This is not an unique case. The on-farm research methodology developed by IRRRI and CIMMYT do not provide explicitly the scope for contingency treatments in the experimental approach for high risk environments. The accountability to the clients or lack of it becomes apparent through such conceptual inadequacies.

d) A successful strategy self-destructs.

Davis (1982) in a very interesting paper entitled, "Key to strategy is Context", observed that people who identified problems generally identified themselves as problem solvers. One can suggest that when they fail, they enlarge the problem, magnify its complexity to save themselves from embarrassment. Organisation designed to solve certain problems may have a vested interests in keeping the problem alive, lest they too would become redundant (Gupta, 1982, 1992a). The accountability can in this case be judged by the discontinuance of the need for a particular intervention. In Canada, about two billion dollars were spent on the programmes dealing with indigenous people though the problem of poverty, drug addiction, alcoholism, crime, unemployment, etc., have increased in the meanwhile This amount is more than the developmental aid provide by Canada to the third world countries (Raymond Obswamin, 1992). The bureaucratic proliferation has certainly reduced both the quantity and quality of services available for poor people. Once the budget deficit on account of non-productive expenditure increases, first services which are cut pertain to those dealing with most vulnerable people. The structural adjustment programme have almost always been accompanied by such distortions. The destruction of a strategy implies the time boundedness. Once the accountability is fixed in such manner, the member of the organization would not deliberately delay the activities and thereby perpetuate their existence.

e) By monitoring the metaphors we can access the informal meanings attached by people to different interventions

Metaphors are powerful medium of communication. By disregarding these we could throw away a great opportunity of learning.

Certain values, beliefs which can't be retained in the explicit form are codified into myths. Monitoring what is explicit, is like monitoring the content. Myth provides the context.

Metaphors are by definition incomplete and are not necessarily in the form of myths always. However, both myths and metaphors provided the meanings which formal language often failed to unravel.

In any group organised or unorganized; it is inevitable that after a few rounds of interaction on any problem of common interest, the group - dynamics will generate certain motifs, symbols, folklores, acronyms, popular jokes, etc., to codify collective experiences in a manner in which these remain available for reference generally only to the members of the groups. For instance the 'Touch and Vanish' was a popular joke about the T&V system and not entirely without any basis.

Similarly, many programme acronyms like IRDP (Integrated Rural Development Programme) and DPAP (Drought Prone Area Programme) are given new meanings by the clients or others interested in the transaction through caricature. For instance, IRDP was expanded in Northern India by bankers as, "*inhe rin dena parega*" i.e. these people (the poor IRDP beneficiary)

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will have to be given loans. Such an acronym illustrates the hesitant and unwilling nature of transaction on the part of the bankers. The question of accountability towards the clients doesn't arise in this case. Costly evaluations only make the point obvious.

f) Monitoring access implies designing counters and not corridors (Gupta, 1990).

in any exchange between people and the members of an organisation providing some resources or information, it is natural that information will not be available equally to both the sides. In the process some intermediaries are bound to emerge who will try to reduce the transaction cost of one or both parties. These intermediaries/touts would find their task difficult if the entire exchange was taking place across the counters in an open and accountable manner. The emergence of corridors is an inevitable consequence of institutionalization of intermediaries of this kind. The accountability towards people can thus be monitored by looking at the quality of arena or structures available for exchange and the extent of transaction that took place in the legitimate and open quorum.

g) Long queues and short rules:

Whenever resources are scarce the queues are bound to arise. The issue is, how to define the eligibility rules for standing in the queue. Through whom should one monitor the data on exclusion (Gupta, 1981, 1990):

- i) Those who manage to elbow out the rest of those who could not participate either because they did not know or they would not participate.
- ii) Those who were not eligible because they had either too much or too little of the resources,
- iii) Those who were in great need, new about the availability but could not wait to get in the queue.
- iv) Those who decided to boycott the queue given their past experience.

The implications for accountability of an organisation are obvious because the kind of queues, eligibility rules, scope for exclusion etc., which are designed, determined who stands in the queue and who doesn't. Collecting feedback through those who had vested interest in the exclusion of disadvantaged people would certainly give one kind of signal as compared to the signal obtained by monitoring through the excluded ones. In the case of Narmada project, the campaign by the project affected people conveyed very different messages than the campaign by the beneficiaries of the project. It is a different matter that both the sides have excluded some of the fundamental options that should have been considered (Gupta, 1991).

h) Monitoring 'deviance' to build self-design potential of developmental organisations is sine qua non of building up organisational learning systems (Gupta, 1984, 1991).

One of the implications of eco-specific planning is to have a wide range of variety in both organisational design, policy content and delivery systems. However, tendency of centralized monitoring systems to concentrate on uniform standard indicators reinforces the risk averse compliant behaviour amongst the functionaries in organisations.

The creativity can express through diversity and pluralism. The insistence on standard indicators not only curbs creativity but also prevents organizational adaptation to ecological diversity. The accountability to people having cultural diversity necessary for maintaining ecological diversity can be measured through space for creative deviance in the developmental organisations. In fact, sometimes the deviants have to assume the role of, 'organisational insurgence'. One of the challenge before organisational leaders is to find out, how to spot, sustain and strengthen organizational insurgents (Gupta, 1982)? It is inevitable that many of these deviants leading for ecological diversity and structural pluralism (i.e. the philosophy of reaching the same goal through several routes) would be in minority in respective organisations.

Brunsson (1985:19,31) observes³⁸.

An important cognitive condition of organisational action is *expectation*. If individuals are to find it worthwhile to act, they must believe that they doing so will result in an organisational action..... Organisations face two problems in connection with actions: finding out what to do and doing it. When they are confronted with difficult actions, organisation separate the two problems. They solve the problem of choice by formulating ideologies; the various activities leading upto specific action can then concentrate on creating expectation, motivation, and commitment.

The separation of what and how in fact provides the essence of deviants and insurgent action. The mission statements of most organisations claim that their responsiveness to society, nature and specific client group is total. And yet they refuse to share full information about the side effects of the technologies or products they market or distribute, the likely hazards in the project or other negative externalities which may arise in the process of implementation. Many social and ecological movements have got support from the covert or overt leakage of information by the members of the organisation. Thus the implications of creative deviants must be drawn in a larger perspective of achieving largest social good through minority action, at times in contravention with the existing hegemony of the ideas and ideologies.

The conventional organisational theory has given too much of weightage to the coordinated and consensual processes of action. The debate between Heydebrand (1977) and Donaldson (1985) and others like Clegg (1981), Chomsky (1969)³⁹ etc., has captured some of the problems with this view. While the larger theoretical problem still remains to be resolved, it is sufficient if we note that the emergence of widespread social action through movements or informal networks or even religious organisations does indicate problems of articulation

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1986; Wildavsky, 1978, pareek, 1981; Laudu, 1972; Essman, 1972; Ganesh, 1980; Sachdeva, 1981; etc.). Gupta. 1982 a, b, and Pastakia,1992 discuss the IB process from with in.

38. Nils Brunsson, *The Irrational Organization: Irrationality as a Basis for Organisational Actions and Change*, Chichester; John Wiley & Sons, 1985.

39. Noam Chomsky, *American Power and the New Mandarins*, Harmondsworth; Penguin, 1969.

W. Heydebrand, *Organizational Contradiction in Public Bureaucracies: Toward a Marxian Theory of Organization* in J. Kenneth Benson (ed.). *Organizational Analysis: Critique and Innovation*, Sage Contemporary Social Science Issues 37, Beverly Hills: Sage Publications, pp.85-109.

Lex Donaldson, *In Defence of Organization Theory: A reply to the critics*, Cambridge; Cambridge University Press, 1985.

through existing channels. Perhaps this problem is most severe when it comes to ecological concerns, diffused as they may be sometimes.

To prevent marginalisation of these creative deviants, a networking among themselves and with others sympathetic individuals and networks may be very necessary. A network of such deviants could sustain each other by providing critical feedback, monitoring their errors, extracting lessons each failure and moral of each success (Gupta, 1991).

i) Postponing organisational reforms till people organize and create pressure groups:

Many times in public bureaucracies as well as NGOs, lack of public protest or collective organisation is interpreted as a sign of their complicity and acquiescence in the organisational actions. Lot of unaccountable and non-responsive organisational actions get legitimacy on this account. The cost of organisation by the people and the nature of state response is seldom taken into account. There is no doubt that people have to organize but, till they do so, public organisations do not get a license to pursue their own agendas irrespective of social and ecological consequences.

The strategy of reform only under intense popular pressure is not only very costly but also not very sustainable in the long run. This is particularly so when the protest groups are dominated by the violent extremists. In many parts of the developing world, the ecologically vulnerable regions like forest, mountains and dry grazing lands are becoming the habitats of extremist groups who do not believe in the non-violent, democratic and peaceful ways of protest. It is seldom recognized that Gandhian path of protest had a fundamental strengths. The structure of governance based on non-violence could not be autocratic or insensitive to minority concerns.

There is a need to generate, and strengthen such learning systems in organisations which produce liberating alternatives for the people as well as the professionals in organizations.

j) Converting marginal investors into developmental entrepreneurs requires developing public or common risk absorption mechanisms:

Different classes of farmers and labourers face different degrees of risk, have different historical experiences of success or failures and thereby have different futures expectations.

Very often by assuming much lesser degree of investment risks in developmental programmes, the planners pass on the entire burden of risks on the investors. Implementing officials at time quite judiciously recognized this and thus did not choose the poorest for the purpose (At least they deserve commendation for this!)

There are several kinds of public or common risk absorption mechanisms which can be established to facilitate emergence of developmental entrepreneurs:

i) In case of watershed projects, collective organisation of seed, farm implements, draft power etc. might encourage several unwilling farmers to participate in the project.

ii) Many times the landless livestock owners choose to become either indifferent or hostile to the investment in common property lands because they see a loss of their access to the common lands for grazing of their animals. Since the value added surplus from these lands many times is not earmarked for these people, they do not see why they should supply restraint. The productivity of common lands cannot be improved unless the rights of landless people owning livestock or collecting twigs as fuel, grass for broom making or thatching etc., are recognised. Common fund con-

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tributed partly through the surplus generated from the common properties can be exclusively set up to take care of the short term loss of the most vulnerable people.

iii) In drought prone regions, many studies have shown that the farmers are forced to consume even their seeds during the drought years. In the post-drought period, there is a rain and good moisture in the soil but one often notices the areas where there are no crops. Common seed and germ plasm reserves are the only way location specific seed material can be available under such circumstances.

iv) For livestock owners, the fodder availability during the period of crisis becomes a major constraint. The efforts to transport fodder and make it available in cattle camps is not only costly but also highly energy intensive. Development of common grazing lands and collective fodder banks besides improvement of livestock mobility would help in sustainable resource management.

There are many other ways in which people adjust with the risks of pest and disease problem in crop, livestock, trees etc. Most of these collective risk absorption mechanisms have become weak over time due to ill-designed public interventions. Since individual and collective mechanisms have not been renewed, many enterprises have either become unviable or have been pursued in resource degrading manner. The case of livestock specie composition in most of the tropical semi-arid and arid regions is very instructive. Decline of public investment in collective risk absorption mechanisms coupled with decline in alternative means of subsistence, the pastoralists have shifted their herd composition from cattle to sheep. It is not that the pastoralists do not realise the implications of this shift. It is just that in the absence of alternative risk absorption mechanisms and declining public investment in food distribution system, they have no other alternative to survive in the short run.

Without entrepreneurship at individual or collective level, no lasting solution can be found. Given increasing budget deficit in most developing countries, the state commitment for public funded interventions is severely declining. In such circumstances either market or common property interventions have future. The market interventions are unlikely to merge given high transaction cost in dealing with large number of marginal investors. We are left with only the option of common property interventions. Sustainable choices, therefore, have to be evolved by using scarce public resources in strengthening common property institutions rather than creating new bureaucracies.

k) Monitoring context changes the content:

As mentioned in the beginning of this part of the paper, the context monitoring can make a substantive difference in modifying organizational culture. It can also be a very powerful tool for increasing accountability.

There is a famous story of Akbar and Birbal. When asked to shorten a line without rubbing it, a longer line was drawn adjacent to it. The context was changed. Very often we monitor the content without even realizing the enormous variety of difference in the meanings which may emerge because of the differences in the context.

It is important to realize that by monitoring the context i.e., the setting in which a programme had to be implemented, we would inevitably design better policies, programmes and projects. But the reverse was not true. The tragedy is that often we monitored only the content. The result was that despite highly heterogeneous implementation of the policy, solution often was, more of the same.

In a watershed project which contexts do we monitor- the ecological restoration; institution building fusing people's knowledge systems and culture with watershed organization; a

bureaucratically implemented soil and water conservation project in which people's responsibility is just to protect what the developmental officials create; an attempt to involve local panchayati raj institutions and political institutions in conceptualizing entire developmental planning on watershed basis; or some other perspective?

The meaning of activities i.e. content of the programme would change depending upon the context in which we view it's role.

The answer to the question about which context to monitor can only be given by various stake holders in a given natural resource management project or programme. However, the fact that monitoring context will make a difference is premised on the experience of successful projects. The leaders of these projects have seldom bothered about the precise content of the actions because of the scope for creativity made available at grass root level. Since there are problems which the implementing officials face in dealing with outside organisations and other social forces, the leader by focussing on these constraints assumes a facilitative role.

1) Camps and campaigns, the ultimate weapon in the arsenal of developmental planners to 'shoot' the 'targets' confirm the contempt that planners have towards the concept of participation.

Often in the name of decentralized planning and implementation, bureaucratic machinery chose to organize camps and campaigns to demonstrate its apparent anxiety to deliver results through people's participation. But what do these camps and campaigns really achieve?

- The participation ends where it should begin
- Routine is converted into celebration
- People are immobilized in normal times such that every camp generates a greater need for still another camp.
- Tolerance or hemostatic level of people as well as bureaucratic officials, increased so much that unless the camps or the campaigns were held, system did not perform its normal activities. People as well as officials were desensitized.
- People often interpreted the camps as a sign of helplessness on the part of senior officials who failed to galvanize their machinery to act in the absence of these (the camps).
- Need for internal tension to generate pressure for action was met probably by creating external pressure through these camps.

Nobody need be reminded about what happened after the camps or campaigns were over. Some of the patently obvious acts of routine nature in various organizations/delivery systems had to be recalled and celebrated through camps e.g., a bank celebrating customer - service week or district collectorate organizing mutation camps.

There is a need to systematically catalogue various camouflage attempts to seek participation of people. While one can understand periodic reminders about major objectives of any organization, treating them as substitutes for regular activities betrayed sincerity.

But if the larger system does not improve, the camps are essential. When the author had an opportunity to look at the draft guidelines for national watershed development programme.

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one of the suggestion made was to begin the formal process with mutation camp so that the problem with regard to titles to land could be speedily settled. This was an important lesson learned from the government sponsored watershed project in Chevella in Medak district.

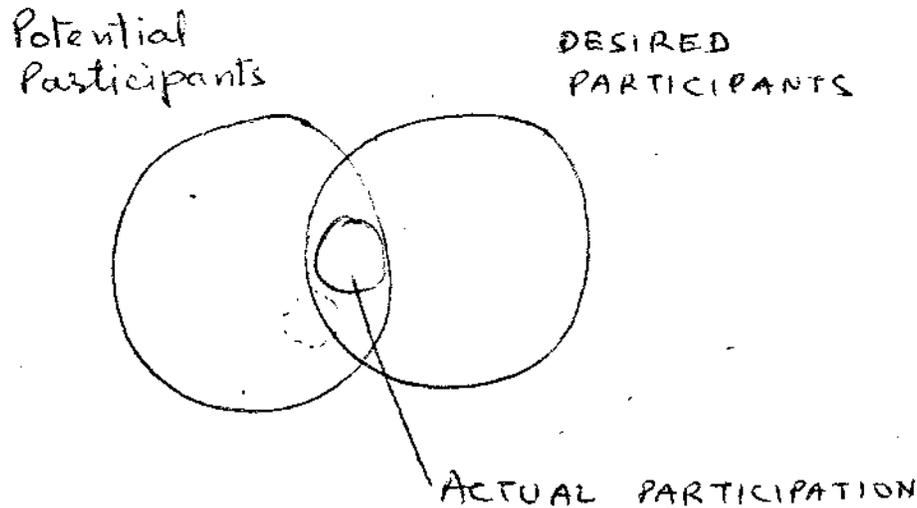
m) How to generate capacity amongst poor to monitor governmental programmes/projects and organizations?

Organizational leaders often pass on the blame for inefficient and ineffective functioning of developmental programmes on to the lowest rung of bureaucracy. Credit, unlike blame, seldom trickles down. In the process, the distrust amongst leaders and followers in public organizations transcends the organizational boundaries and is manifested in the relation between organizational functionaries and the poor clients.

How do we identify role for desired target group to monitor the extent to which programme reached following subsets of target group:

- a) Desired but devoid of technological skill or resource potential for using the project/programme resource.
- b) People with potential but not belonging to the normatively defined category of desired group.
- c) People neither having potential nor belonging to the desired group.

Figure below illustrates the dynamics of participation in any rural development project.



Governmental efforts for generating potential amongst the desired target group would also need to be monitored to test the intentions of planners.

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n) Information is Power : Sharing data among people may generate accountability as well as demand

What were the suggestions of the people regarding various structures and what measures have actually been taken and why should be displayed with the help of maps so that people can see the rationale if any in the official design. Likewise, who have been selected for on farm trials, study visits, distribution of various subsidies etc., should also be shared widely.

o) Will markets act as monitors of misery?

Those who believe in equilibrium economics assume that markets monitor better, who should get what and where depending upon the demand and supply. Is not it true that market forces often in coalition with bureaucratic forces and state power lead to a system whereby only certain types of needs of certain classes of rural society in only certain regions were responded to?

Markets can indeed settle at lesser cost and greater efficiency who should get what, when and how in a context where interpersonal differences in access to resources and information are marginal or guided by the respective acumen rather than the historical legacies. In all other cases the argument for people's collective institutions to manage this function rests. I must caution that state very seldom would perform these functions efficiently unless accountability structures are alert and open.

The reliance on market forces in monitoring misery is useful to the extent that the exclusion and the cost at which some people or certain needs are excluded can be judged at a very low cost through markets. But it is obvious that not all needs will be cleared by the market for want of adequate purchasing power or ability among consumers to use non-market inputs. Thus, the role of networks, common property institutions, not-for-profit organisations, NGOs and consumer groups. No one organisational form will fit all kinds of contexts and consumer needs.

p). How to monitor 'the monitor'?

Very often the developmental interventions as well as the developmental programme managers become incapable of being monitored by the people (with small 'p'). It is very crucial that if poor were to become partners in developmental experiments, they must have incentives and capacity to monitor the interventionist. It has enormous learning advantage for both the sides. In addition to being a very important means of generating valid knowledge in a social setting, the process of mutual monitoring or what could be called as a surveillance mechanism also ensured genuine democratic culture. Unless and until leaders in a group were subjected to these mechanisms, it is quite likely that they would become autocratic and insensitive to the interest of the poorer members. First step in this process was to demystify our own assumed expertise in the matter.

q) Reinterpreting Traditional Myths : Rediscovering the Wheel

One of the important concept of information theory is that people tended to interpret new information in the context of their previous knowledge and the two elements, old and new, became fused in memory. An examples could be given here about how through reinterpretation of traditional myths or stories, new meanings can be generated which provided a language for communication amongst the poor as well as poor and their benefactors.

In Eklavya's story how should we interpret decision of Dronacharya of asking Eklavya to part with his thumb of right hand? What did it teach us traditionally! That subservience to Idols/Ideals of the ruling elite is bliss; Obedience was the best virtue, the tribals should not

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acquire skills which could threaten the dominant coalition of high caste (Brahmins and Rajputs). Did this incident set the right norms for relating teacher and taught ? What were the dilemma in the mind of Dronacharya and Eklavya if at all?

These are several other such fables which needed to be reinterpreted so that contradictions of current phase of Indian society could be analyzed. New emergent meanings would substitute the meanings/context provided by the traditional myths. Monitoring these myths generates tremendous potential for learning about why people would behave the way they do.

r) Being catalytic agent is to trigger change without being affected oneself.

Very often developmental analysts assume the role of catalytic agent. I think this is one of the most inappropriate definition of the role. As we all know a catalytic agent in a chemical reaction does not undergo any change in itself, do we then imply that the social activist can remain unaffected by the process of participation in developmental experiments or encounters?

s) Monitoring transaction costs : By not incorporating the transaction costs in developmental planning these costs do not disappear. They are passed on to the weaker partner

If the scale and costs at which the services or goods are provided do not match with the scale and costs at which they are needed by the clients ,how will the ensuing transaction costs be accounted for in the respective balance sheets ? These costs vary over time and space and thus projects have to provide for progressive scaling down of the costs if implementation continues properly.

t) Choices are Historical

In on-going organizations managerial choices at any point of time are considerably influenced by the choices made or foregone in past.

Projects implemented in past even if unrelated to the new proposed project may influence the response of people. The lessons learned about the lessons not to be learned are also historical. For instance the rush to spend major part of the budget in the months January to March (or what I call spring spending spree) is one of those lessons of history which for obvious reasons bureaucracies have decided not to unlearn.

u) Learning through networks

If learning in an organization is closely linked to reinforcements or fears available from other organizations then how does one conceptualize inter-organizational context of organizational and individual learning. Is it true that lessons that can be drawn from one's experience are considerably defined by the networks in which they have to be diffused? The learning strategies for the top management network may then have to be different from the strategies for lower level networks. Certain things are 'undiscussable' in each- network and thus the learning strategies have to content with these peculiarities.

If the culture, i.e. accepted way of doing things, influences the standard deviations that are generally tolerated in an organization around a particular mean/average behaviour or norm, then is not learning process related to the cultural change and contradictions inherent in this process in the organizations? The often cited case is that of propriety vis-a-vis performance culture in public administration.

v) Learning From Success

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What should one learn from a success; the process of committing mistakes, experimenting alternative solutions, providing room for manoeuvre to the developmental deviants or the solution per se. The example of operation flood and waste land development are the most obvious cases of learning wrong lessons from the right successes. The learning process involved in developing Amul model was never replicated.

w) Status and Skills are not necessarily positively correlated (often the relationship is inverse).

I have noted repeatedly that the field level functionaries often have insights that are not available at the top level. And yet the organizational systems often are designed in a top down manner where the guidance flow from the top with very limited freedom at the bottom level.

One can even extend this principle to suggest that vertical accountability among the top and the bottom level functionaries is essential if horizontal accountability among lower level staff and the people has to exist. We have to appreciate that the participatory design and implementation of watershed projects is not possible without fundamental restructuring of ethical foundation of the entire organization.

x) Watershed Projects can not be handed over, each stake holder must be involved from the beginning

One of the most frequently committed mistakes is the notion that the projects can be handed over to the people after completion. It is like saying that the emotional bonds that a natural mother has with the child can always be established by the foster mother. May be in some cases it can be. But certainly that is an exception. Banks, district administration, Zilla Panchayats, Gram or Mandal Panchayats, line departments, revenue departments, input delivery agencies, people's organizations or local NGOs etc., should be involved from the design stage. In case of bankers it was seen recently in an action research project we coordinated in Karnataka to link Banking with technology on watershed basis that if they were involved from the beginning, they even went to the extent of designing projects without any government subsidy on their own in other regions.

y) Interdisciplinary teams work better when mutuality of interest evolves through group awards and competition

The role of competitive learning has not been appreciated in public systems as much as it ought to be. When say, a forester explains the activities of an agronomist and takes pride in his work, one can assume that the team building process has been triggered.

z) Transfer pricing is an essential feature of sustainability in development projects

If a private well owner in the command area of a major water harvesting structure benefits through the recharge of the ground water, his gain through additional irrigation or sale of water are not a reward for his efficiency. Some share of this additional gain should accrue to the management committee for common expenses like repair and maintenance of various structures. Like wise not every body need be equally subsidized. Comparisons are often made with the large irrigation projects in which cases no discrimination is made among different classes of producers. In my view two wrongs do not make it right. Though in dry regions, it can be admitted that even the large owners of low productivity lands may not necessarily be better off. In such cases discrimination among different group may not be

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necessary.

aa) The linkage between primary, secondary and tertiary sectors are necessary for making eco-restoration projects viable

The concept of the "agro-industrial watershed was mooted more than 12 years ago and still it has not been tried even in one place. The value addition in the biomass grown through conservation of the scarce moisture is necessary to generate incentives for farmers to adopt this technology on their own or through borrowed funds. The role of markets for say, medicinal or aromatic plants cultivated in the catchment areas or on the bunds needs to be properly identified. On its own, this may take a long time to evolve.

Part -Ten : Ethical issues in farmer participatory research.

Much is said about the participation of people in research design and trial implementation though some of the very basic steps are often found missing:

a) The finding of the research are very seldom shared back with the respondents for ethical as well as scientific reasons. The ethical because we have no right use any information given to us interest without clearance from the source. The scientific because only when the findings are fed back, the providers of the data are able to fully appreciate the context of enquiry. It is then that they offer new insights which I have argued are unattainable through any alternative method.

b) A relationship can be sustainable if it involves mutual accountability of highest order. I have not come across many examples where scientists have encouraged people to question assumptions of their own models ruthlessly.

c) The intellectual property rights of the people are still not being protected in most studies. This is particularly true of ethno-biological research. There is no reason why experimentation by local people be considered an ethnic phenomenon. Innovations are necessary in a dynamic environment with declining resources. Many of these innovations can extend the frontiers of science. Since large number of local innovations draw upon local resources and are generally organic in nature, these provide a very valuable basis for searching sustainable technological alternatives.

There are very few technologies sustainable in nature which can be entirely managed at individual level. While the entire research focus in the field of extension science has been on individuals, the group based approaches seem to be acquiring more and more importance. The natural and social scientists have to relax the constraint of individual management while developing and diffusing group based technologies (for plant protection, drainage, watershed management etc.).

The values and norms for sustainable resource management may get built early in life. The curriculum reform may be most necessary to initiate a large scale change in the way human nature interactions are conceptualised.

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Will ecological ethic suitable for generating long term perspective for resource management be ever evolved by poor when short term needs are yet to be met? Can institutions to reinforce such an ethic be ever developed?

The task of institution building for watershed development in dry regions is truly daunting. But the challenge seemed less hard when we looked at some of the indigenous institutions. A song heard in a village in Shimoga might illustrate the point.

Parrot song

In a year of drought, a lady is coming back from the field after collecting the fallen grains. Most of the crop had failed and only a few panicles had matured. On the way she meets a parrot. The parrot was staring at her. She went close to the parrot and asked, "why are you staring at me?" The parrot replied, "Oh! I didn't know. I thought it was grain" She was wearing a necklace in the pendant of which a green agate stone was fitted. Lady then told the parrot that he must be hungry. Parrot said, had not she brought all the fallen grains from the field. She paused for a while and told the parrot that since her children were hungry, she had collected the grains. But she invited parrot to come and share whatever her children would eat. The parrot flew away.

How do we interpret this song? How do we apprise a situation in which rights of birds in a drought year are talked about. Do those who do not vote (the unborn and the rest like birds) have a right at all? Why did parrot fly away? Did he think, his right was relevant only so long as the grains were in the field. Once collected, he lost right over them. Was the eco-ethic of birds superior to our own ethic?

The song has many meanings. But one is clear. It succeeds in raising several questions in our mind without providing easy answers. How do we build upon such an eco-ethic that still exists and that too in dry regions? How do we build modern institutions that can relate to such a cultural context?

These are difficult questions to answer. But poor lambada women who sang this song were not oblivious of the larger social context of short term survival needs.

Local Institutions: innovative ambiguity

In another village in Rajasthan, a village had some lands under trees and grasses protected from poaching through religious sanctions.⁴⁰ These lands are called "auran", i.e the lands meant for god and gods and goddesses. Once a person was caught poaching. The informal assembly of three village panchayats took place to decide the punishment that should be given to this person. After long discussions and review of various decisions in past it was decided that the culprit would be given following punishment.

He would feed two and a half kilograms of grains to the birds standing barefoot under the sun.

How would one interpret such a sanction and whether modern management principles would be able to generate such a meaningful way of communicating the social concern. Standing barefoot under the sun might be a way to generate some torture in hot arid environment. Perhaps, it will also remind the culprit as well as other onlookers that the torture would be shared by everybody if there were not any trees left intact. But, why feed the birds and only so much? Perhaps, a mes-

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sage was sought to be conveyed that the trees also provide sanctuary to the birds which brought various seeds and enriched the biodiversity. I do not know what other possible interpretations could exist. In any case, the point is that indigenous institutions of this kind are very crucial to the sustainable management of natural resources in high risk environments. It is difficult to legislate such sanctions through modern jurisprudence. And yet, we need such strong, metaphorical ways of influencing collective behaviour towards common properties.

Horizontal and Vertical Expansion

Any organization after identifying its niche and an operational fit with clients will aspire to grow horizontally and vertically. The horizontal expansion can be through replicating a model or a given institutional arrangement in very diverse natural and social conditions. The vertical expansion implies both the increase in the reporting levels and the differentiation of tasks leading to growth in size and functions. The vertical growth may also lead to increase in reporting levels but not necessarily. Flat hierarchies can achieve through iterative leadership roles what otherwise may be possible through a multi-level organization.

Horizontal expansion

Replicating an organizational model or its outputs, arrangements of providing programme inputs or any management activity over space and sector can constitute Horizontal Expansion. The success of such replication has often been limited primarily because the emphasis has been on replicating structures rather than the process, culture, and the spirit.

I will first discuss the conditions under which expansion become necessary and then specify various ways of achieving the sealer economy. Finally, I will argue that for maintaining peoples' control over the organisations, certain kinds of horizontal expansion will be more conducive. Our thrust is on the polycentric, smaller and autonomous groups networking for common purposes to achieve the similar results as may be attempted through horizontal expansion (though with much lesser efficiency).

a) Why horizontal expansion

In any pilot project, the problems of scaling up arisa Since we do not have as precise theories of social engineering as we have in natural sciences, we have to look for experimental learning situations for evolving methods of organizing work. For instance, in an action research project on watershed, pasture development, groundwater management or sustainable pest control, any particular group of researchers, activists, public servants or NGO workers may identify certain ways of structuring relationships with people better than others. Similarly, certain technologies may be identified which may be' more viable than others either because of inherent advantage or because of better institutional conditions. Sometimes the policy environment for a pilot project may be much more favourable than is likely to be the case when the activity is scaled up.

The horizontal expansion thus meets a need for making available similar cause-effect linkages to larger number of villages or local communities as were available in the pilot project. Much, therefore, depends on how we construct the cause-effect linkage in the pilot project.

One of the most common mistakes made in the replication is placing excessive emphasis on structures and very low reliance on processes of accountability, transparency and trust. The result is widespread disappointment in the performance of the project.

The scaling up may also be necessary because the concentrated attention that is given in

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the pilot project may be difficult to provide all over the regions where benefits of a programme or a policy are sought to be disseminated. In the process of horizontal expansion, one may moderate one's expectations in proportion to the reduction in the intensity of effort.

The horizontal expansion may also be necessary because successful implementation of a project or programme may raise expectations in the mind of people elsewhere. In a democratic society, the legitimacy of the state depends upon making available opportunities for growth and resource management as fairly as possible to the largest number of people eligible for the purpose.

The expansion become necessary because of the widespread conflicts about the way access to natural resources should be managed and the way value added usufruct should be shared. By expanding the organizational format, it is expected that the arrangement which worked in one place will work in the other place as well and accordingly reduce the conflicts.

b) Achieving sealer economy

Various reasons mentioned above may justify horizontal expansion of an organisation. However, it is not obvious from the above discussion as to whether creating the similar organisations elsewhere would be the right way. There are many ways in which horizontal expansion can take place:

i) Setting up legal structures in all the villages or districts where a similar need as was evident in the pilot project, exists.

ii) It is possible that pilot project may have been conceived by an NGO, individual researcher or administrator, without necessarily seeking horizontal expansion. An outside agency (government, NGO, aid agencies or professional network) sees the merit of the experiment and accordingly tries to learn the critical steps that made the pilot project succeed. In such a case the expansion takes place not by the agency or group which spawned the pilot project. Instead, an interface organization emerges to replicate the critical lessons as identified by it.

In such a case the interest of the interface organisations may overshadow the interests of the client organization or communities. Since such an organization often garners external resources for the recipient system, the sub-optimality of the horizontal expansion is tolerated or masked till the resources flow in.

iii) A bureaucratic organisation such as forest department may find it difficult to protect the forests in the regions where alternative sources of fuel, fodder and timber as well as other minor forest produce are limited. Given the need for generating partnership with people, the department may extend a model of joint management of resource to different areas having problems of protection or resource augmentation (i.e. afforestation). Such an horizontal expansion can be part of the policy to provide enabling conditions for joint management arrangement to emerge. It can also be an excuse to prevent diverse models of management to be tried and evolved. Since monitoring of diverse organisational designs is always difficult, Bureaucracies prefer standardized designs. The horizontal expansion often is accompanied with rules and regulations which may have been designed keeping the most favourable site in mind. Expansion in such case may have limited success because of inherent low fit with the diverse conditions of endowment.

iv) Expansion can also be achieved by contracting out certain functions to large number of agents or semi-autonomous units. The core organization does not expand but its functions do. In the case of agency arrangement, certain outputs and associated inputs are agreed

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mutually so that the agent performs the given functions. The accountability is limited at the same time the outreach is larger. In cases where outputs are precise, measurable and have limited range of quality, the agency arrangement may work. The limitation here is that in the absence of local competition or/and proper regulation by the contracting organization or other bodies, the agents can extract undue rent while providing the given service or goods. By having local watchdog committees some of these limitations can be overcome. Similarly, by inducing competition without impairing ecological balance, the transaction costs can be minimized and sealer economy can be achieved.

v) When the tasks require deeper understanding of local resources and historical arrangements for using them, the horizontal expansion in sustainable manner can only be achieved by involving local communities. The core organization can spell out the broad boundary within which different NGOs, local bodies and other individuals may be encouraged to either bid or seek affiliation. In such a case, the core organisation may or may not provide resources and yet the horizontal expansion of the desirable management conditions may take place. The value building and social mobilization are two major planks on which may rest the success or failure of horizontal expansion. The value building is an institutional process which is triggered through shared beliefs, trust and commitment to common goal. The social mobilization depends on the leadership quality of the core organization or its leader, mutual accountability and the mix of mobilisational strategies and tactics used by the core organization. Sometimes, when the odds are against the given model being replicated, the social mobilization becomes a more effective means of expansion than just the value building.

vi) Networking among autonomous, polycentric and segmented units, organisations or informal association of individuals may provide another way of horizontal expansion. Such networking is voluntary and not equally strong at all the nodes of interface. In other words, some members of the network are more active than others. And yet one carries along such members in the hope that sooner or later, the whole network would move forward. The way each member of the network interprets common goals or means of resource management may not be entirely congruous and yet a kind of commitment to reach the same point generates tolerance for the diversity. It is recognized that no one way to reach the goal is proven to be right for all the conditions. It is also recognized that different members in the network have varying experience in the past of managing resources and collaborating with others. The expansion in such cases is more of a spirit than the structures.

vii) The expansion can take place through religious, cultural or other social organizations which may not be connected directly with management of a given resource. For instance, if a priest in a mosque encourages the devotees to plant trees or regulate grazing lands, the moral appeal may generate compliance from those who may not otherwise be persuaded by the logic of collective resource management. The emergence of religious consciousness in different parts of the world indicates that the moral boundaries may have been unnecessarily ignored in the process of institution building.

c) Conditions for stability of scaling up

As a general rule, one can state that in the situations of very precise property rights, clear resource boundaries, well-defined inputs and outputs, reasonably well distributed access and absence of any major conflict in using resources, the horizontal expansion through bureaucratic Or agency arrangements may indeed work.

However, we are aware that in most developing societies the access to resources is rarely equitable, the property rights very seldom well-defined (the customary laws and rights are often ignored) and conflicts between regulatory or maintenance agencies and the people are widespread. No single model is likely to work in such a case. The problem becomes more

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difficult when contractual rights of resource extraction by the organised sector (paper industry, timber and furniture industries or other industrial users) exist dating back to colonial period. These rights are in direct conflict with the rights of the local communities. The scale of per household demand of a given resource (grass for rope making, timber for house construction or for petty business or collection of other medicinal and related herbs) may be much smaller than the size of the smallest lot sold or disposed by the regulatory agency (forest department or a corporation). Since the transaction cost of retailing a resource are large, the organisation avoids incurring these costs even though it may be within its mandate. It will use various formal or informal ways or discouraging retailing business. In the process intermediaries emerge and depending upon the competition among the intermediaries, the community may or may not get the resource at reasonable terms.

In many cases, the resource dependent communities question the laws continuing from the colonial period to deny the right of local people over resources. At the same time many of the same groups who may otherwise be fighting the state, also recognise that conservation of resource is vital if the conflicts have to be resolved in any reasonable way. Because if the resources is degraded by the time people gain control over it, victory has hardly any significance. The local communities fighting for their rights have started developing strategies for conservation of the resource itself.

It is this consciousness which otherwise should have been welcomed by the state and conservation institutions, becomes the source of renewed tensions. The illegal felling of trees, mining of minerals or water or any other resource often takes place through a nexus between some of the politicians, bureaucrats, contractors and of course a few local leaders. It is this combination of forces which the local communities have now to fight against. Sometimes international aid agencies indirectly support the local power networks by sanctioning projects which deny local people enough choice in the management of resources.

The strategy of sharing the actual information about available resource, cost of maintaining/augmenting it through bureaucratic means and the distribution of benefits among the state, its agencies and the people, provides a reasonable picture about futility of most of the existing developmental approaches.

In a recent case, the scheme of granting long term lease of degraded land to poor people by the forest department was abandoned. People did not comply with the requirement of growing horticultural species only up to one-third of the total plantation. People had prefer mango trees over all other species. This would have meant providing flexibility to the people so long as resource was conserved in the best possible way identified by the local community. The joint management committees in this case became infructuous because the control of people over the organization was limited or rather minimal.

There will be many more examples of failure of horizontal expansion because of inappropriate framework of collaboration between people and the organisations.

Several alternatives can be tried in such cases:

- a) Open sharing of the full cost of managing a resource through bureaucratic means must be the first building block of a dialogue with the people. It will demonstrate the non-sustainability of the bureaucratically managed strategies of resource conservation. It will also disprove the utility of routine huge international aid or borrowed capital through existing bureaucracies.
- b) The ratio of establishment to output cost of maintaining or augmenting a resource should be spelt out so that expansion strategies do not necessarily lead to increase in the establishment. Studies have shown that with increase in the workforce, the time is spent in intra-

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organisational communication far exceeds the time spent in organisation client interactions. This will obviously alienate the organisation from the clients.

- c) The pattern of actual delivery of resources to different groups of people must be shared openly so that accountability can be ensured. The expansion versus splitting up can be considered from the point of view of the possibility of different groups of people controlling different units. Conceptually, it is possible that same group of people can dominate and control all the units or sub-units of a resource management organization. In more than 200 sheep and pastor development cooperative societies in a drought-prone district of western India, it was noticed that almost all of them were controlled by non-shepherd communities (Gupta, 1985). However, this is not inevitable. If rules of access and control can be clarified, and if distribution of power is linked with skill rather than economic status, it is possible that different units may be managed or controlled by different groups of disadvantaged people (who have often better skill with regard to management of certain resources). Therefore, the disadvantage of horizontal expansion can be overcome by splitting up rather than just growing big.

Vertical Expansion:

With increase in the complexity of tasks, need for differentiation is felt in the organization. In view of the limitation of span of control (i.e. number of people a manager can effectively supervise) number of tiers increase. However, the conventional pyramidal structure of an organization need not necessarily be most efficient under all circumstances. When a task cannot be decomposed into its sub-components, when local knowledge of resource is very crucial for performance of a task, and when delegation cannot take place because of the first two reasons, the vertical differentiation into multipliers does not help. For instance, in a watershed management project, one cannot have many levels, if holistic perspective and inter-dependence of crop, livestock, trees, soil and water conservation etc., has to be maintained.

iterative leadership can be effective in a small organization. The implication is that while there are experts, they also have to know other functions and roles in the organization. In some roles an employee may perform leadership function. Whereas in other roles, the person may perform a follower role.

In large organizations responsible for large territories of forests or watersheds or waterbodies, the above principle may not work. However, even here, the answer may not be a conventional bureaucracy. It has to be remembered that bureaucracies function best when task is standardized the goals are well-defined and authority is proportionately distributed. Therefore, in army or during a crisis such as drought even a development bureaucracy can work with a single line of command, well ordered authority rules and minimum ambiguity about tasks.

Such organizations often become out of tune with changing environment and are almost always unsuccessful in dealing with ecological, cultural and socio-economic diversity. Several models have been tried to deal with such problems. For instance, differentiation in time rather than over space can be used (Shepherd, 1967, described experience of a military raiding unit during II World War using alternating structural forms over time).

The planning before a raid was done jointly by the entire unit - the private having as much opportunity to contribute to the planning as the colonel. During the raid, the group operated under a strict military command system. Following each raid, the unit returned to the open system used in planning for purposes of evaluation and maximizing learning from each raid.

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Similarly, a group or organization in civil life might shift its structure while moving through the various stages of the innovation process. With two major stages in the process, this calls for a dual structure (Zaltman and Duncan 1977).

The role of NGOs, networks, social and ecological movements and voluntary initiatives of creative deviants:

In this paper we have discussed how the debate on sustainable development for natural resource management has been pursued in the context of developing an accountable and responsive organizational arrangements. The self-reliance among the people is possible only when their visions and concerns get articulated in the discourse. Unfortunately, the language of discourse has remained alienated from the idiom that people at grass root level use. Our inability to access this idiom stems partly from our reliance on English language references and terms and partly it is because of our insistence on looking for globally generalisable solutions for local problems. I have argued in this paper that sustainable resource management requires rethinking the very basis of entering into dialogue with people.

Sustainability of resource management depends upon the way we define a causal model of interactions, draw a boundary, attribute responsibility for consequences, organize institutions to correct or contain the negative consequences and maintain the positive ones, generate information and feedback sharing system so that enlightened self interest can become compatible with and lead to collective rationality.

Recognizing that nobody likes a person who warns of a grim future, I want to end this paper on an optimistic note. Once a person was walking across the seashore. There were lot of star fishes being thrown on the shore by the waves. These star fishes were dying very quickly. Another person, a lady observed the first person picking up star fish one by one and throwing it back into the sea. The lady asked this person why was he doing it. There were so many star fishes dying, his action would not make difference to such a large number. This person picked up a star fish and threw it back into the sea and said, "my effort makes difference to at least this star fish which I throw back into the sea".

The research on sustainable alternatives even if does not change the face of the earth would certainly change the person pursuing the research. This itself is a good enough reason for modifying one's research agenda. At least one can have one's cake and eat it too this way.

A drop of water:

A Zen master known as Gisan asked a young student to bring a pale of water to cool his bath.

The student brought the water and, after cooling the bath, threw on the ground the little that was left over.

"you dunce!" the master scolded him. "Why didn't you give the rest of water to the plants ? What right have you to waste even a drop of water in this temple ?"

The young student attained zen in that instant. He changed his name to Tekeisui, which means a drop of water.
(Zen Flesh, Zen Bones)

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40. This example is based on the Ph.D thesis of Arun Agarwal based on his work in Rajasthan, Duke Univeristy, 1990, personal communication.

annexure-one

Sustainability: having your cake and eating it too!⁴²

Actually the idea of 'having your cake and eating it too' is not so absurd as long as one does not eat all of it and right away. Nature makes it possible for us to have our cake if not of the same size or flavour as we wish, nearly so. But when it comes to eating, it is not necessary that the process of eating should be pursued through same norms, rituals and recipes across different cultures. Thus some people share the cake with not only those who cooked it but also those who could not either because they did not know it, or they had gone out collecting firewood for the kitchen or were sick and sometimes just a little lazy. There are others who argue that cake needs to be shared with only those who are directly responsible for its acquisition. Others can see it but not partake.

In some other societies not only the human beings but also the ants, birds⁴³ and

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41. Zen Flesh,Zen Bones :A Collection of Zen and Pre-Zen Writings .Compiled by Paul Reps , Anchor Books .Doubleday New York ,1983,pp79.

42. This is abstracted from an earlier paper, " Developing Technologies for Sustainable Resource Management: Eating Your Cake and having It Too I", Anil K. Gupta, 1992, presented at international Workshop on Technology Triangle, April, 1992, Teune, Denmark.

43. There is a parable of parrot drawn from a song sung in Southern India which illustrates the eco-ethics referred in the paper here:

In a drought year, the crop has suffered very badly. A woman is coming back from the field after picking up whatever grains she could. On the way she meets a parrot. The parrot starts staring at her. She asks the parrot as to why was he looking at her so intently. The parrot replies that he was actually confused after looking at the woman's necklace. The necklace had a green agate stone. He mistook it to be a grain. Only when woman came closer, he realised it was just a stone. Woman asks him had he not got anything for eating. The parrot replies that hadn't she brought all the grains from the field- even the ones which had fallen on ground. The woman realizes that parrot was hungry, and she also needed the grains very badly for her children. She asks the parrot to come home with her and share whatever she gives to her children. But the parrot flies away leaving the woman dumb founded.

It is also possible that parrot realized that if he delayed search for grains other people would also pick up whatever grains were left in the fields. He remembered his young ones who were waiting to be fed.

The song has several messages. It speaks about a cultural system in which the right of birds are being debated vis-a-vis the right of human beings particularly in the period of food crisis in a drought year. Perhaps there was some reasons why the traditional varieties of millets or sorghum had loose set grain which was easy for birds to pick. At the same time there were elaborate designs of birds scaring devices built to reduce the loss due to bird attack. Perhaps people knew that bird would kill insects some of which harmed the crops. How much of the contribution of birds was negative or positive would be reflected in the (a) technology i.e. selection criteria of local varieties, design and efficiency of bird scaring devices, (b) the spirit of co-existence with other parts of nature, and (c) collective consciousness as well as culturally approved behaviours.

other living beings are supposed to have a claim on the cake. When number of claimants increase (that is population size grows), some rules or norms for prioritization are necessary. The scientists or administrators or development planners responsible for developing efficient recipes might argue that their job was restricted to the delivery of cake. How could they influence its distribution. That is the subject which social scientists, policy makers and other stake holders must decide. But assume that cake was such that it would produce a particular flavour liked by the consumers only if it was cooked in a particular manner and in a limited size.

The French wine after all is indeed one such product which meets the requirement of small scale site specific production process generating the peculiar flavour. The market forces have not yet found a way of overcoming consumer preference for taste, and resultant biodiversity of grape gardens. The diversity of recipes and methods has also been maintained. Would such norms apply to only products of leisure oriented consumption. What about thousands of local rice, potato and bean varieties which would have disappeared but for the 'resistance to change' among the cultivating communities.

Even if the production of the cake could not be restricted in size or to site, can it be produced in stages or through semi-processed components so that different consumers can recombine the components or semi-processed recipe according to their taste, resources and preferences⁴⁴. It is quite likely that certain combinations of the cake components will be more tasteful/profitable than others. However, the variance between the combinations may be lesser than the conventional model of having uniform recipe with 'take it or leave it' option.

It is difficult to anticipate the preferences although market researches do make an attempt. If they cannot anticipate, they try to mould the preferences through advertising and media planning. Cake can be sold even if it is less nutritious. However, the trade off between long term demand versus short term viability is unlikely to be resolved only by manipulating the quality of cake.

Leaving this metaphor behind, let me illustrate some of the issues which emerge in the discussion on sustainability.

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How does one interpret this song would also depend upon how one conceptualised the right of different claimants over natural resources. If birds were also considered as legitimate stake holders in the natural resources, then the viability, sustainability and effectiveness of any institution would have to be interpreted very differently. Many times, resource scientists have taken a very limited view of human nature - a view which excludes the rights of other natural beings. The conservation ethic is seldom anchored on such a view. At the same time, giving primacy to any one constituent over the rest may violate the very foundation of eco-sociological knowledge system as argued by the Alaskan leader in part one of this paper.

A knowledge system which generates concern for various parts of eco-system obviously could not have evolved through just the individual innovations. It would have required evolution of cultural norms, folk lores cemented by various kinds of sanctions and rewards for socially approved behaviour.

44. Dr. Krishnamurthy, Former Director of All India Coordinated Research Project on Dryland Agriculture had coined in

1. Sustainable resource use requires inter-institutional linkages such that interventions in each resource market generate positive externality to the extent possible. Scientists cannot always take institutions as given. The technological choices in such a case may legitimize the given institutions. The linkages have to be forged between crop, livestock, tree, craft related institutions. In addition, linkages between formal and informal knowledge systems, political and technological lobbies, formal and informal sectors etc., would have to be conceptualised. To illustrate, the groundwater may be used through private institutions, power supply may be through public institutions, and the surface irrigation may also be through public institutions. The sustainability of conjunctive water use would not depend just on the agronomic water use efficiency models. It will depend upon the reliability of each system, the extent of costs for generating negative externality and ability to free ride. Linkage between the institutions, therefore, are concomitant aspect of linkage between enterprises, sectors and disciplines. Most of the studies on sustainability have neglected institutional aspect⁴⁵.

2. The sustainability of a resource use requires development and demonstration of an ethics which guides decisions regarding current versus future consumption of resources. The conception of nature and relationship between human and non-human, animate and in-animate, born and unborn etc., are defined if not determined by this ethics. The bio-ethics can raise following choices:

- a) Do I draw natural resources at a rate that the resource renews itself within a short cycle.
- b) Do I draw as much as I can till it is available and once exhausted, I shift or change the resource base.
- c) Do I draw less than what can be used without impairing the ability of resource to renew itself.
- d) Do I draw resources only as much as I need simultaneously ensuring that the genuine needs of others are also met and the resource is renewed before it drains down to its critical limits.
- e) Do I draw as much as possible, hoard it if feasible and then market it at a very high price to ensure some kind of rationing of its use.
- f) Do I develop an institution which through its inefficiency generates a constraint on the maximum sustainable yield.

3. Uncertainty and risks: problem of definition vis-a-vis the phenomena.

I have argued elsewhere (1988) that we may define a problem of risk as uncertainty when we want to absolve our responsibility. On the contrary a problem of uncertainty may be converted into risk when we want to exercise

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1971, a concept of 'tiers of technology'. It implied that in dry regions the package approach was unlikely to succeed and thus farmers should be offered recombinable components. Different combinations may offer varying advantages depending upon initial endowments of the households.

45. Exceptions are the following studies: Michael M. Cernia.1987, farmer Organizations and Institution Building For

control and justify an investment. Nuclear power plants are an example of technology where hazards are "unexpected" and risk is considered to be too low. The uncertainty about a technology in which we still do not have methods of safe waste disposal is converted into a problem of risk. On the other hand a natural hazard like drought or flood is converted into uncertainty even though over space, these hazards are very well known and probabilities can be easily assigned.

In nature several interactions are still not well understood. For instance, harvesting of a particular specie of say wood from a natural forest changes the ecological succession and consequent biomass supply and productivity. The long term cycles of single specie have shown drastic decline in productivity. Yet the so called scientific forestry continues in the form of monoculture cycles. Selective withdrawal of a resource without knowing enough about its consequence on the remaining biomass is a problem of converting uncertainty into risk. The choice is between appraising a technology in short or long time frame.

4. The time frame in which sustainable options may become feasible may depend upon the tenurial rights available to various resource users. I have discussed two kinds of assurances in the eco-institutional perspective given below.

i). Vertical assurances i.e. future returns from present investments. If I grow a tree today, will I be allowed to cut it tomorrow.

ii). Horizontal assurances i.e. others behaviour vis-a-vis one's own. If I don't graze my animals on common land, will others also not graze

Extending the time frame is a necessary condition for triggering development.

5. The right of the unborn.

Given extreme poverty and deprivation in most developing societies, the rights of the unborn are always discounted. It is seldom recognized that what we bequeath may often influence how we survive. The future can occur faster than we think. The hazards expected in the next generation often prepone their arrival. Declining biodiversity, increasing disease and pest hazard and consequent increase in vulnerability is a phenomena which we are witnessing right in our generation. We can relate the technological choices with these rights very precisely. For instance, the rate at which soil nutrients are mined may influence and be influenced by cropping pattern, intensity and partitioning efficiency of a crop plant.

We may not even estimate various consequences of the nutrient imbalance for the elements of which functions are not fully known. The rights of the next generation are thus negotiated through the assumptions made about the present resource use pattern and consequences thereof. The effect of soil mineral properties on disease and pest vulnerability is still being properly assessed. The right of the unborn can be argued not only on ethical grounds but also on efficiency ground. These rights imply a very long time frame and most sustainable technologies fail to prove their effectiveness in shorter time frames. For such technologies to be given a fair trial, invocation of the rights of the unborn thus is a pragmatic political strategy.

6. The sustainability of any technology cannot be assessed at a single enterprise (eve!). The portfolio of enterprises through which a household draws its sustenance offers the first level of analysis. However, sustainability of certain technologies

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cannot be assessed at the household level also. For example, the watershed based technologies would require appraisal to be made at catchment level. The upstream and downstream interests may not overlap. The proportion of land which different households have in a catchment may vary. Further, the quality of land and consequent share of surplus it generates for different categories of households may also vary. Generation of collective rationality would be sine qua non for developing sustainable alternatives. The theory of portfolio management at the household and community level remains to be properly articulated.

7. Survival is not just an economic question, The aesthetic, humour, poetry and drama are part of human repertoire which provides syntax for survival. The scientists cannot manipulate this. But they can understand these needs. Once we recognise these needs, we also mentally prepare ourselves for witnessing curious experiments being performed by farmers. And we do not look only for an economic explanation for all the experiments. Sustainability of experimental ethic of the people is very crucial if long term sustainability of resource management has to be assured. The tendency to provide finished product (seed - pesticide - growth hormone complex) tends to undermine this ethic. Studies have shown that problems always not only keep pace with but also move a few steps ahead of the solutions. The experimental ethics thus is subdued but not totally eliminated.

8. Sustainable technologies require a vibrant peer group which does not measure efficiency in only reductionist terms. The peer approval for low external input agriculture or for low or high return, low variance technologies may not always be available. If scientists cannot sustain their motivation, to expect them to develop technologies which are sustainable in nature may be futile.

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