

# CONSERVING INDIA'S BIODIVERSITY: LET PEOPLE SPEAK

**Madhav Gadgil**

*(in collaboration with Samir Acharya, , Ratin Barman, P.C. Bhattacharjee, Smita Botre, Ashwini Chhatre, Kavita Gandhi, Anirban Ganguli, Utkarsh Ghate, Devashish Kar, Manas Misra, Rekha Panigrahi, P.Pramod, P.R. Seshagiri Rao, D.S. Srivastava Mamata Vardhan and other colleagues from Srishti Jigyasa Pariwar)*

Centre for Ecological Sciences  
Indian Institute of Science  
Bangalore 560 012 India

Telephone: (91-80) 3315453, 3340985, 3092507

FAX: 91-80- 3315428, 3341683

E-Mail: madhav@ces.iisc.ernet.in

## **1. ENVIRONMENT AND DEVELOPMENT**

I still vividly recollect a meeting of our garden city's elite committed to the cause of nature conservation on an evening twenty years ago. We were sitting on a lawn in one of the poshest localities of the city, and had two items on our agenda. One was the plight of elephants which move right up to the outskirts of Bangalore and were being killed by farmers when they raided their ragi fields. Our group was unanimous that there was no way to help some damage to the crops, and that the farmers must be educated to tolerate the losses. The second item on agenda was the menace of urban monkeys, protected by widespread religious feelings, who were causing so much damage to all our gardens. We were also unanimous that the monkeys must be trapped and released somewhere far in the countryside, possibly to inflict some damage on crops of some other farmers, who would no doubt also be educated by nature lovers like us to tolerate the losses in the larger interests of wild life.

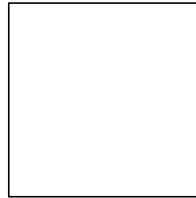
### **Blurb 1:**

#### **It is a folly to divorce nature from culture**

Consistency, says Oscar Wilde, is the last refuge of the unimaginative. I suspect that I was the only unimaginative member of this wildlife group troubled by the lack of consistency in this approach to elephants and monkeys, to urban elite and rural poor. These serious internal contradictions are of course a part of the widespread contradictions in our overall approach to problems of environment and development. This approach is characterized by fragmented sectoral thinking, by a wholly inappropriate disjunction of conservation and development. It aims to pursue conservation on 4% of the country's landmass set aside as protected areas, i.e., wildlife sanctuaries and national parks, completely ignoring the development aspirations of millions of people who have for generations been tied to these lands. And on the remaining 96% of the country's lands it pursues development at all costs, totally oblivious of the vital role that the natural resources of these tracts play in the well being of the vast majority of our people. The story of Sone Beel in the Barak Valley of Assam, is one such example of inappropriate development brought out by our studies (Box 1).

### Box 1

#### Damming blindly



**1. Photo 1 : A view of the blind dam on Sone beel of Assam, blasted by local people to free their waterways (Photo: P. Pramod).**

Sone beel, with a water spread of 35 sq. km. in the Karimganj district is the biggest wetland of Assam. The principal water source for the beel is river Singla originating in Mizo hills; its major outflow is river Kachua, a tributary of the river Kushiyara. Sone beel harbours 70 species of fish yielding over 300 tonnes of harvest per year. This is the principal source of livelihood for people of 19 villages flanking the beel. Good management of this diversity of fish and their habitat therefore ought to be a very significant objective of all development efforts around Sone beel.

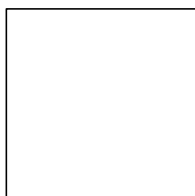
This has not been the case. Floods are a part of the natural water cycle of Assam and the damage they cause has to be contained through careful action. Instead the region has seen a series of inappropriate measures, probably more geared to create business for the civil contractors than to help the people or the nature. First of such interventions was the blockade of the major outlet of Sone beel, the river Kachua by a blind dam in 1950s, with the water being diverted by a canal to the river Longai. This resulted in tremendous siltation of the beel, and serious disruption of migratory paths of fishes. It also adversely affected water transport. So the local people took matters into their own hands and blasted the blind dam. In 1964 the authorities responded to the navigational difficulties by replacing the blind dam by a lockgate, the first of its kind in Assam. But this has never operated properly, nor is there any provision for fish ladders and fish passes, so that the siltation goes on unabated as fish populations continue to decline, both in variety and in abundance.

The approach we have adopted for nature conservation in independent India is modelled on the National Parks movement of the United States. This movement was a response to the wholesale destruction of the natural world unleashed by the Europeans across the American continent spanning over three centuries. It arose in a new society that had crystallized by the end of 19th century, a society that was largely equitable, provided we ignore blacks and Amerindians. National Parks came to be constituted in this society on vast tracts of lands that had little human presence with the decimation and displacement of the indigenous people that once occupied them. They catered to the broad based demand for outdoor recreation, and were

administered by a bureaucracy answerable to the wilderness enthusiasts. This is not a system that can be easily transplanted in our highly inequitable society dominated by rural people deriving a subsistence by drawing on resources of the natural world, and governed by a bureaucracy that refuses to accept any accountability to the masses of Indian people. Yet this is what we have attempted to do, blindly borrowing from the West, dismissing our own indigenous traditions, and belittling the strengths of our masses to sustain life under great adversities. Our approach to development too is equally flawed, driven by an obsession to catch up with the industrial nations. But we have ignored the fact that in the west the benefits of industrial production reach out to the vast majority of the people, through employment, and through a social welfare system. Quite to the contrary, in India dams and mines have rendered millions homeless, while the benefits of the minerals, the irrigation water or power produced are cornered by a tiny minority. Box 2 recounts one such experience from Darlaghat in Himachal Pradesh.

## **BOX 2**

### **Bypassing People**



**Photo 2: Tira Ri Jan, a patch of forest supporting five hamlets of Darlaghat, has been ruined by limestone mining (Photo: Ashwini Chhatre).**

Darlaghat is a growing township about 50km from Shimla, the capital of Himachal Pradesh. Darlaghat was notified as a wildlife sanctuary in the early 60's. However, its status as a wildlife sanctuary could not protect the woods from the forest department. In Pammad village, there is a sacred grove called Baadidhar that is venerated over a large area. The local villagers believe that they are prohibited from using most of the resources of the grove by divine sanction. Only leaf fodder is allowed to be extracted but without using any tools. These sanctions had protected the thick oak forest for centuries. In 1967, the forest department clearfelled one third of the sacred grove. This has been a major cause of the breakdown of the customary regulation and in the ensuing years, the sacred grove has become an open access resource for fuelwood and fodder. As if the logging was not enough, the clearing of natural forest was followed by monocultural plantation of chir pine in the grove leading to further erosion of local taboos.

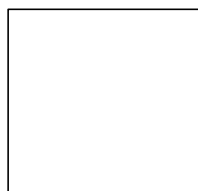
In 1992, Darlaghat WLS was denotified to make way for a mega cement plant. The mining for limestone for this factory has in a short span of three years not only wiped out a forest area, tira ri jan, held in common by five hamlets, but has also seriously affected the water cycle. Villagers report that traditional water sources such as springs and rivulets are drying up and there is heavy siltation in the rivers. Local medicine men lament the reduced availability of medicinal plants. In just three years, the mining has destroyed biodiversity as well as common lands of five hamlets. In the next phase, it will expand to three neighbouring panchayats, helplessly awaiting their destruction.

### **Blurb 2:**

**People must be fully involved in both conservation and development efforts**

## **2. A GRASSROOTS PERSPECTIVE**

Inevitably, our conservation programmes have run into manifold difficulties. They have tended to create islands of diversity surrounded by oceans of devastation. This is a double tragedy, for the diversity that lies outside the protected areas and plays a vital role in the well being of the people; and for the diversity within the islands of protected areas, now under assault on many fronts. It is time then to dispassionately assess what we have been doing and what we have achieved. Often the best way to get at the truth is to view it from a different perspective - and in this case this different perspective would most appropriately be that of the masses of Indian people, of people who are constantly in touch with the natural world in their day-to-day efforts to derive a subsistence. So a group of us involved with the Biodiversity Conservation Prioritization Project of World Wide Fund for Nature- India decided to try and approach a cross section of rural Indians from all over the country and let them speak of what they know of, how they related to, and how they would like to protect the rich heritage of our country's living diversity. This has been a co-operative effort of a number of us working in eight states - Himachal Pradesh, Rajasthan, Bihar, Assam, Orissa, Maharashtra, Tamilnadu and Karnataka, and the Union territory of Andaman and Nicobar islands. We are a group of people mostly drawn from colleges, universities and research institutions and from development and environment oriented NGOs, as also some officials, especially from the Forest Departments. We call ourselves an alliance (pariwar) of people driven by curiosity (jigyasa) about the natural and the social world (srishti). Young women and men, either students or NGO activists have constituted the backbone of our investigatory teams. They have found this opportunity of interacting with the real world, instead of merely learning by rote from books, a most valuable educational experience. Together we have covered over fifty village clusters representing a wide spectrum of environmental regimes and social organization in our complex society. The study sites have ranged from the seacoast to the peaks of Himalaya, from humid islands of Andamans to the arid desert of western Rajasthan, from floodplains of Brahmaputra to the salt lake of Chilika. They have spanned forest villages deep inside the Tiger Reserve and tribal hamlets being engulfed by the city of Ranchi. The investigating teams have often included members of local communities, they have all through worked closely with all segments of people from the study sites. Photo 3 illustrates one example of such involvement of local people in this exercise.



**Photo 3: Saharia tribals of Rajasthan discussing strategies to conserve biodiversity (Photo: P. Pramod).**

**Blurb 3:**

**Education may be greatly enriched by involving students in first hand monitoring of biodiversity**

The study has been an almost year long process of talking to people, individually and in groups, in their houses, in public places in the villages and while walking with them all over the landscape. It has involved ten modules : (1) Identification of different groups of people in terms of their relationship with the living resources of the region from over which they meet the bulk of their resource requirements such as fuelwood or grazing for their livestock; (2) Mapping the mosaic of ecological habitats of the study site; (3) Recording the different species of plants and animals and their uses known to local people; (4) Recording the abundance and distribution of these living organisms in the different habitats of the study site; (5) Documenting the ecological history of the study site, especially for the last two decades for which people have excellent recall; (6) Recording the ongoing patterns of utilization of the living resources of the study site, to meet subsistence as well as commercial demands and the extent to which different groups of local people as well as outsiders benefit or lose from these uses; (7) Documenting ongoing attempts at regulation of uses of living resources, or their conservation, both on part of Government agencies, and in form of efforts by local communities;(8) Recording the development aspirations of local people and how these relate to the diversity of living resources of the region;(9) Documenting the agreements as well as differences in the approaches of the different sections of the local communities in their prescriptions for the management of living resources of the study sites; (10) Documenting the various emerging options for managing the natural resources of the study site, with a particular focus on conservation of biodiversity. We owe a debt of gratitude to Anil Gupta, Kailash Malhotra, M.K. Prasad, Madhu Sarin, Darshan Shankar and Shekhar Sing for their contributions to the development of the concept and the methodology. All this information has

been recorded in a document called “People’s Biodiversity Register”. Many of these documents in the states of H.P. and Rajasthan were prepared in Hindi; others have been or are being translated in local languages. Copies of the PBRs have been presented to the local communities in special functions and are being maintained in local Panchayats, schools and colleges. Throughout the attempt has been made to faithfully record what people say, not to put words in their mouth, certainly not to preach to them.

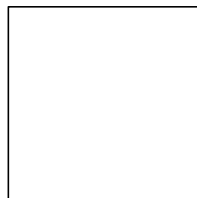
**Blurb 4:**

**A good way for the environmentalists to access truth is to view it from a different perspective: that of the ecosystem people**

The response to this initiative from all over the country has surpassed our expectations. We often have prejudices, for instance, that nothing works in Bihar. Contrary to this stereotype, our programme has done exceedingly well in that state, with active involvement not only of teachers, students and workers of NGOs, but also of officials of Forest Department (see Box 3). The local people too have responded well everywhere. Their enthusiasm has grown as they have come to realize that for the first time they are working with people who genuinely respect their knowledge and perceptions and are seeking their suggestions and eventual involvement in taking good care of the natural resources of their localities.

**BOX 3**

**Voluntary Efforts**



**Photo 4: Gaur of Palamau Tiger Reserve, the mascot of Nature Conservation Society (Photo: P. Pramod)**

All over India there exist highly motivated groups dedicated to nature conservation working at the grassroots. These could come to play a valuable role in organizing decentralized,

people-oriented conservation efforts throughout the countryside. One such group is Nature Conservation Society (NCS) in Bihar.

NCS is based in Daltonganj, the commission headquarters of the Chhota Nagpur area of south Bihar. It was founded in 1976 by a group of college and university teachers and forest department officials. Later on more members from other cross sections of society were added. Its primary purpose was to help the newly created Palamau Tiger Reserve in the field of awareness building among general masses, in anti-poaching activities and in interaction with local communities. It works in full collaboration with the forest department. It has organized college and school students in the form of Nature Clubs in urban as well rural areas. The Nature clubs have surveyed tribal villages, run competitions on wildlife and forests, and sponsored camps in forest areas. The documentation by these clubs since 1978 is now the basis of monitoring the biodiversity of Palamau Tiger Reserve. NCS has encouraged college teachers to undertake wildlife research and has helped eight of them to complete their doctoral degrees.

NCS has been associated with the World Bank in eco-development activities in the Palamau tiger Reserve, with the Bihar state government in watershed development programme, and with WWF in the Tiger Conservation programme. NCS served as the co-ordinating agency for the PBR project for the state of Bihar.

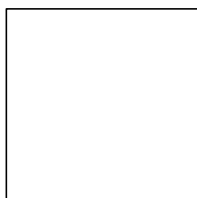
### **3. BIOMASS BASED CIVILIZATION**

What then are the main points that emerge from the wealth of material that this exercise has generated ? It very much confirms that India remains a biomass based civilization. Across the length and breadth of our country, a large proportion of the people subsist as ecosystem people, greatly dependent on local natural living resources to fulfill their manifold requirements. Many cook with fuelwood gathered from forests or scrublands, graze their cattle, sheep or goat on natural vegetation, collect tree leaves to manure their fields, employ herbal medicines to heal themselves or their livestock. Many tribal families of Central India live on Mahua flowers for several months of the year. Yet others earn a substantial proportion of their small income by collecting forest produce such as canes, beedi leaves, sal seeds or wild mango fruit for sale on markets. Many landless, and therefore the weakest of rural populace supplement their incomes by weaving baskets or mats in the months when there is no employment as farm labourers. Yet others depend entirely on fishing. There is thus a substantial dependence on natural living resources. This relationship is especially strong in case of women who often assume the major responsibility for collection of water and fuelwood, dung and fodder. Cultivation and animal husbandry is even more significant to the livelihoods of a majority of Indians. These husbanded plants and animals in turn interact with a number of species of pollinators, pests, parasites, weeds and fodder plants. The farmers and the farm labourers, the shepherds and cowherds therefore not only relate to a whole spectrum of varieties or land races of husbanded plants and animals, but a large number of other plants and

animals affecting them as well. This relationship between the human and the natural world is reflected in the diversity of livelihoods present across the country. This diversity in turn has supported the continued protection of biological diversity and the various habitats where it occurs. Box 4 narrates the story of one such biomass based community from the state of Bihar.

## BOX 4

### Ecosystem people



**Photo 5 : Villagers of Manjharia in Bihar depend extensively on local biomass (Photo: P. Pramod).**

In West Champaran district of Bihar lies Sariyaman, a horse shoe shaped lake with a spread of 9 sq. km. formed by a shift in the course of the river Narayani. Manjharia is on the bank of the lake, harbouring 250 families of refugees from East Pakistan, primarily of Das and Namasudra communities that were resettled in what was scrubland with scattered paddy fields. They remain totally dependent on locally produced biomass for all of their requirements; the one school shed in the village being the only brick, cement and asbestos structure. The village is surrounded on three sides by the lake, and on the fourth by the forest. This permits them to raise three crops of paddy, that is supplemented by fish from the lake for their food. The naturally growing bamboo is excellent construction material, and the elephant grass serves to thatch the roofs. They stall feed the cattle on grass collected from the lake shore and use the dung and straw as fuel. So they have no need of fuelwood. They neither poach on the wild animals in the forest, nor encroach on it for cultivation. As a result large flocks of waterfowl take refuge in the lake adjoining Manjhari. Their only problem is the damage that wild pigs and cheetal inflict on their crops. They are also concerned at the overfishing and poaching of wildlife by other villagers on the bank of Sariyaman.

Development efforts over the past 50 years have been pursued in total disregard of this vital relationship between different livelihoods and the nature. In Upraila village in Himachal Pradesh, for instance, displacement of traditional multiple crop agriculture by commercial vegetable seed production has had profound implications for nature as well as the people. The consequent complete absence of green fodder collected as weeds and dry fodder from crop residues has led to severe fodder shortages. People have responded to these shortages by cutting down on livestock. There has in turn been a decline in manure supply leading to growing dependence on chemical fertilizers. Heavy pesticide use is severely affecting traditional bee-keeping reducing the household production of honey. In other areas, it has wiped out important pollinating agents affecting the production of apples. Farmers are now completely dependent on an uncertain and fluctuating market not only for sale of their produce but also for food grains. As

a result the ability of the community to absorb shocks has drastically declined. This, of course, is why the current disjunction between environment and development is such a mistake. Indeed insensitive development has led almost everywhere to a decline in the quality of life especially of the weaker segments of the society.

**Blurb 5:**

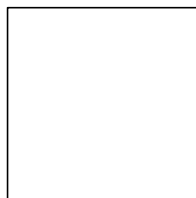
**“Herders, hunters, sages and other forest dwellers subsisting on roots and tubers are knowledgeable about medicinal plants:” Susrut Samhita.**

#### **4. POVERTY AMIDST PLENTY**

A significant majority of the Indians are then intimately tied to their natural setting in the pursuit of their livelihoods. But Indians not only relate to plants and animals of immediate utility or nuisance value. In almost every one of the study sites people venerate and protect plants like peepal or banyan and animals like peafowl or hanuman langur. In several sites the protection extends to whole patches of forests or grasslands, or pools along streams as well. However, the number of species thus related to in religious or cultural contexts is relatively small. A vast majority of the one to five hundred species of plants and animals recorded as known to people from the various sites are species of practical significance in the lives of people. So are almost all of the species listed as being of conservation interest to the people (see Box 5).

## BOX 5

### Losing touch with life



**Photo 6: Local youth of Upraila in Himachal Pradesh monitoring biodiversity of alpine pastures (Photo: Ashwini Chhatre).**

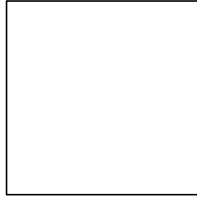
As markets penetrate and nature retreats Indians are increasingly losing interest in and knowledge of the living diversity in their vicinity. In village Kaihad in Mandi district of Himachal all people put together know of around 450 species of plants and animals. But there is a clear pattern of decline in this knowledge amongst the youth. Thus those older than 50 years can identify about 70% of the flowering plants, characterize 40% and mention uses of 5%. In the age range of 30 to 50 years, the ability to identify is down to 25%, to characterize to 4% and knowledge of uses to 1% of the flowering plants. The youth below 25 years of age are almost totally ignorant.

This erosion of knowledge seems related to loss of application of the knowledge, as, for instance, allopathic medicine overwhelms the use of herbal medicines. Indeed one of our study sites, that of Devli Machan in Kota district of Rajasthan used to be called Vaidyo ki Devli . But with extensive deforestation it has lost both the medicinal plant resources and practitioners of herbal medicine, so that the very name of the village has been changed by dropping the epithet “Vaidyo ki”. In yet another study site, that of Neralkoppa in Chikmagalur district in Karnataka the local medicineman decided to pass on his knowledge, earlier transmitted along male line, to his daughters because his sons were not interested.

However this decline of knowledge and use is not universal. In Mala village in Dakshina Kannada district of Karnataka, herbal medicines are still in vogue. The knowledge of living resources is also much better retained amongst fisherfolk. Thus many young fishermen around Chilika lake are well educated, yet continue fishing and retain traditional knowledge of fish and their behaviour.

Our studies emphasize that the roots of the ongoing tragedy of the Indian environment lie in the inverse relationship between economic and biological wealth. Per capita incomes are amongst the lowest in the biologically rich districts of the Chhota Nagpur plateau; they are amongst the highest in the districts of Punjab and Haryana that support the lowest levels of natural as well as husbanded biological diversity. Tribals of Chhota Nagpur plateau maintain a rich variety of crops in their small holdings; they have to migrate to the monocultures of Punjab

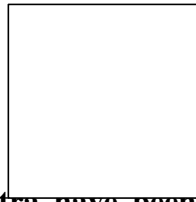
to eke out a living for half the year. Universally, the more dependent and along with that the more knowledgeable a person is about biodiversity, the poorer he or she is. The bigger landholders, the traders, the public servants are everywhere better off than the small holders and the landless. These marginal farmers and farm labourers subsist on farm produce or wages for only four to eight months of the year. They have either to migrate to cities or to tracts of green revolution, or to turn to natural living resources to keep them going for the rest of the year. The latter may take the form of collection and sale of fuelwood or other forest produce such as bamboos, bark of cinnamom trees or seeds of sal, supply of medicinal herbs to agents of pharmaceutical companies, weaving mats from reeds or grasses, or fishing. Occasionally some of these produce may fetch very high values, such as morrel mushrooms of Himachal Pradesh (photo 7). A significant proportion of people at every one of the study sites is engaged in such activities. Without exception they are poor, often illiterate, unorganized and without any control over the living resources they depend on. What others are willing to pay for the produce they have collected or mats they have woven is governed by the level of wages they earn through labour during the agricultural season; and this is what they receive regardless of the eventual market value of the biological produce (Box 6). The few attempts at getting them a better deal by organizing societies such as forest labour co-operatives have by and large been unsuccessful. Even highly knowledgeable dispensers of herbal medicines are often very poor. This complete disjunction of the level of earnings of people intimately tied to biodiversity resources from the market value of those resources has important implications. It means that these people have nothing to gain from sustaining the stocks of these resources.



**Photo 7: These morell mushrooms from coniferous forests of Himachal Pradesh fetch upto Rs. 4,000 per kilogram (Photo: Ashwini Chhatre).**

### **BOX 6**

#### **Tribals and Traders**



**Photo 8: Western Ghats of Maharashtra have been extensively deforested (Photo Satish Amberkar)**

Nestled amongst the hills of Maharashtra Western Ghats in Pune district is the village of Shilimb. It lies in a tract of heavy rains near the origin of Pavana, whose waters eventually drain into river Krishna. People of Shilimb depend on cultivation of paddy in the valley, of millets on the hill slope, husbanding livestock and collection and sale of a variety of forest produce. Its inhabitants belong to 13 different communities, including Katkaris who are a tribe traditionally dependent on hunting-gathering, Dhangars who herd buffaloes, and now some cattle and sheep as well, and Brahmins, traditionally priests, but also landowners and traders. Put together members of these 13 communities have narrated 226 distinct uses of 173 plant species. Listed below are uses in 10 major categories known to all or most of the 13 communities, and more specifically to Katkaris, Dhangars and Brhamins. Katkaris clearly know much more than the other two. They are aware of very many medicinal uses not known to most other communities. Brahmins on the other hand have no special knowledge, they merely share in what members of most other communities know.

## USAGE OF 173 SPECIES OF PLANTS IN SHILIMB

USE	ALL 13 COMMUNITIES	MOST COMMUNITIES	KAT-KARIS	DHANGARS	BRAHMINS
Human medicine	2	9	57	16	9
Veterinary medicine	1	1	1	3	1
Food	45	46	56	49	45
Fodder (cattle)	0	0	0	5	0
Fodder (sheep)	0	0	0	4	0
Agricultural implements	2	13	8	13	13
Ropes	3	4	4	4	4
Fuel wood	4	4	4	4	4
Fish poison	0	0	4	0	0
Other sale on market	0	1	7	1	1

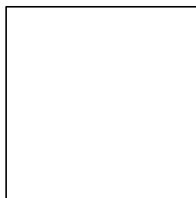
But it is the Brahmins who share formal learning and have market savvy. So it is a Brahmin from this village who has organized the trade in medicinal plants. He has set up a shop in the city of Pune after obtaining information on the identity of medicinal plants in demand in the urban market by practitioners of Ayurveda. He also manufactures in the village one of the commonest Ayurvedic medicines, triphala churna. Katkaris collect these plants in lieu of very low wages; all the value added goes to the Brahmin entrepreneur.

### Blurb 6:

#### **Knowledge of biodiversity is inversely related to material gains from its utilization.**

The situation is worsened by the fact that neither do they have any rights over these resources. In almost no study site do members of local community have any control over resources of public lands and waters. Traditionally they often did have such control, as in the case of Orans of Rajasthan. These Orans are large tracts - often as much as several hundreds or thousands of hectares of vegetation dedicated to some local deity. The rights of use of the vegetation of the orans were historically limited to members of the local community, who resorted to regulated use, monitored by other community members. But these orans are today taken over as Government property converting them into no-man's land since the Government merely takes away the authority of exercising any control from the locals, without its own agencies assuming this role. As a consequence, traders, graziers, fuelwood collectors from all over have had a field day ruining the orans (see also photo 9). In other tracts of public lands constituted as reserve forests, the Government agencies do in theory maintain strict control over the harvests. But in practice this does not work. The Government agencies are at once under

pressure from the rich and powerful who can profit from excessive exploitation and from landless poor who often have no way to earn a living other than, say, by selling fuelwood. People from each and every study site contend that the Government machinery is unable to withstand the vested interests of the powerful, as well as incapable of resisting the temptations of collecting bribes from the powerless. In consequence, a great deal of utilization of a diversity of living resources goes on all over the country as illegal activity, conducted in a thoroughly indisciplined fashion.



**Photo 9: An oran from village Rasla of district Jaisalmer in Rajasthan (Photo: Yogesh Gokhale).**

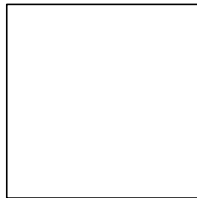
#### **Blurb 7:**

##### **Value addition invariably takes place far from where biodiversity occurs**

Not only is the diversity of natural biological communities on retreat all over, so is that of crops and livestock. This loss of crop and livestock diversity is in part driven by economic forces, with modern high yielding varieties fetching better returns and attracting farmers to switch over. But such a switchover is also prompted by Government subsidies for irrigation, fertilizers and pesticides. The higher economic returns from monocultures of modern varieties often turn out to be non-sustainable, as soils deteriorate under chemicalized agriculture, as pests explode with extensive areas coming under single varieties, or as subsidies are withdrawn. Such problems are now facing farmers of Dhikonia from Baran district of Rajasthan. This is a dry tract where a traditional variety of wheat, called “Katya” was being cultivated. Farmers now find the yields from hybrid wheats that replaced katya to be lower than what katya produced. But they cannot now bring back katya cultivation on soils degraded by chemicalised agriculture.

Replacement of the diversity of traditional crops has other implications. Thus in and around Bhitara Kanika Wildlife Sanctuary in Orissa, the replacement of traditional tall varieties

by dwarf hybrid rice has led to a reduction in availability of thatching material. In turn this had led to an overharvest of leaves of a wild ground palm. But while traditional crop and livestock diversity has indeed been eroded in many places, this is not without exception. In Kolar district of Karnataka farmers continue to grow traditional rice varieties on a small scale as they consider them more nourishing for their children. On Majuli island in Brahmaputra river in Assam over 20 traditional rice varieties continue to be cultivated as the hybrids failed to do better in local soils with problems of silt and low chemical inputs. At the same time, the Agricultural and Animal Husbandry experts have completely ignored on-farm conservation, solely concentrating on maintenance of germ plasm in ex-situ collections.



**Photo 10: Majuli, the largest island in course of Brahmaputra, is a treasure trove of rice germplasm (Photo: P. Pramod).**

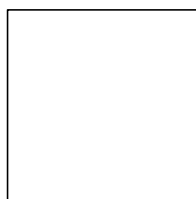
#### **Blurb 8:**

**In absence of any rights over land and waters, people gain little from the biodiversity wealth of their localities.**

The ongoing erosion of India's biological diversity is also promoted by the narrow focus of the official management as well as conservation efforts on a handful of plant and animal species; teak and pine, tiger and Siberian cranes. Thus only a handful of the fifty odd species of medicinal plants and other non-timber forest produce collected from the study site of Mala in Karnataka are subject to forest department regulation in the form of auctions for contractors. The vast majority are collected by locals, sold to agents that ultimately deliver them through unorganized markets on the pharmaceutical or biocosmetics industry, or to the individual consumers (see Box 7). At the same time, the official conservation efforts such as National Parks pay attention to only a few charismatic animals, be they rhinoceros or crocodile with almost total neglect of the great variety of other living organisms, even of considerable immediate economic significance such as medicinal plants.

## BOX 7

### Rewarding Folk Knowledge



**Photo 11: Felicitation of Kunjeera Moolya, an outstanding herbal medicinal practitioner of Mala village in Karnataka as a part of the PBR exercise (photo: K.P. Achar)**

The village Mala, adjoining the great forest of Kudremukh National Park in Dakshina Kannada district of Karnataka is notable for continuing extensive use of herbal medicine. The most knowledgeable of the dispensers of herbal medicines is Shri Kunjeera Moolya, who does not charge for his services, but makes a living as a farm labourer. His talents were recognized by our study team, and as a result he was felicitated, along with Shri Kadare Srinivas Prabhu, a knowledgeable healer of livestock in a special function during the wild life week of October 1996. This felicitation brought to fore many others from the village who were encouraged to talk of their knowledge.

Shri Kunjeera Moolya was approached in March 1995 by an agent of some pharmaceutical firm to disclose his knowledge of local medicinal plants. He went around the forest for two days and shared this information, for which he was paid a sum of Rs.200/-, equivalent to his normal earnings over 4-5 days. This agent possibly worked for Hoechst Marion Roussel India, a subsidiary of a multinational company of German origin.

Hoechst runs in Mumbai a research unit established in 1972 and described as a “target oriented lead discovery centre from natural origin”. It employs some 70 Ph.D. holding scientists; all but the Director being Indian citizens. Indigenous information, obtained from people like Shri Kunjeera Moolya, as well as from published literature including that of Ayurveda and ethnobotany which has no tradition of giving credit to folk healers and other knowledgeable individuals, and electronic data bases is used to provide clues to rationalize the search for plants with interesting bio activities. Only 3 of the scientists employed by the research centre are engaged in collecting samples of plants, fungi and microorganisms, others are busy with screening, toxicology and investigations of chemical mode of action.

Obviously Hoechst would pay very many people like Shri Kunjeera Moolya small sums like two hundred rupees, and then pool together all the information generated with other public knowledge such as of Ayurveda, and inputs from many scientific disciplines to eventually develop a small number of products. The process may take many years, perhaps decades, and of course particular pieces of information provided by a specific individual may or may not yield any product; and in any case every product will use many other inputs in its development. It is therefore difficult to design a system of either regulating collection and use of such knowledge or ensuring payment of royalty to a particular individual in case his/her knowledge had provided an

important clue. The only solution may be in the form of documentation such as these “People’s Biodiversity Registers”. We believe that the PBRs may then one day come to play a useful role in organizing effective systems of sharing of benefits with holders of folk knowledge. This would of course depend on the Government of India as well as state governments enacting suitable pieces of legislation bearing on conservation and sustainable use of biodiversity and related knowledge.

## **5. NO ONE'S CONCERN**

As may then be expected, our studies highlight that no segment of the Indian society seems to be motivated today to prudently manage, or conserve biodiversity resources. The rural populace relating with these resources on a day to day basis perceive material welfare flowing not from living in a biodiversity rich milieu, but from access to man-made capital; roads, bridges and telephones, hospitals, schools and colleges, markets and factories. Our investigations show that everywhere, all segments of rural people mention enhanced access to such man-made capital as their basic aspirations for development. None of them put better conservation of biodiversity resources high on the priorities for what they would like to see happen in coming days. There is a contradiction here. For all the studies also report a steady deterioration of natural habitats and of natural living resources especially over the last two decades for which people have excellent recall (see Box 8). These developments include steady privatisation of erstwhile public grazing lands and woodlands, incursion of outside commercial interests resulting in massive fellings of trees or dynamiting of rivers, continuous unsustainable levels of harvests for fuelwood or grazing of cattle by local people leading to steady degradation of living resources. These are also everywhere reported to imply a deterioration in the quality of life of the people, and when discussing these facts all segments of rural people, especially the poor do concur that it would be most desirable to put a halt to this degradation. When asked which species and which habitats should be protected on a high priority, their response invariably focusses on species of utility to them, for instance, mahua and cane, as well as on habitat elements of utility such as forests or even paddy fields which are now being converted to arecanut plantations or shrimp farms on the Western Ghats.

### **BOX 8**

#### **Medicinal Plants in Decline**

**Photo 12: Berberis roots stockpiled in Karsog, Himachal Pradesh (Photo Ashwini Chhatre)**

There is a long tradition of use and trade of medicinal plants from western Himalaya. However, commercial extraction began to adversely affect the distribution and abundance of various medicinal plants only in the 20<sup>th</sup> century. Heavy extraction and local processing by traders of berberis roots from the Mandi district led to local scarcity in some areas. Similarly, unregulated harvest of Taxus baccata leaves and bark in the Sainj valley of Kullu in the 60's led to disappearance of the tree in some pockets. Both berberis and taxus extractions were a result of increased market demand. While a number of species were known and used locally in Himachal Pradesh, escalating consumer demand in the 70's for medicinal and cosmetic products in urban India and outside, has led to commoditising of many species in the last 25 years. Shinglingli (Dioscorea deltoidea) has been the worst affected by this onslaught. While parts of Chamba report local extinction of this herb following heavy extraction, it has also become rare throughout the rest of the state. In the last 4 years, berberis and Taxus baccata have faced heavy extraction once again. The collection of the plants is carried out by local villagers on the basis of rights over forest produce, whereas the ownership of lands over which these occur rests with the government. Traders are also involved in illicit collection through migrant labor resulting in conflicts with local collectors. Lack of security of tenure for the local collectors is a major reason for breaking down of customary regulations for sustainable harvests. While earlier, gram panchayats had the powers to levy collection fees for harvesting medicinal plants, the power was discontinued with the constitution of Himachal Pradesh as a full state in 1971. As of now, neither the local collectors and local bodies, nor the traders have any say in ensuring sustainable harvest. The government machinery, on the other hand, has failed to rise to the occasion.

However the entire cross section of people from all the study sites stretching across the length and breadth of India are at a loss on how to address this complex problem. The American writer, H.L. Mencken remarks that "for every complex problem there is a simple solution ---- and it is invariably wrong". In India, we have decided that the simple solution to all the complex problems of the country is --- to give more money or more power to the bureaucracy . In case of nature conservation, this is equated to establishment of protected areas brought under the control of the forest department, and managed on the principle that the most important step to be taken is the exclusion of subsistence uses of living resources by local communities. Our studies amply bring out how wrongheaded this unthinkingly accepted simple solution is to the truly complex problems on the ground.

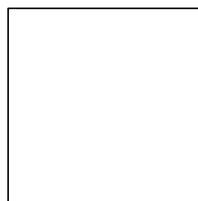
**Blurb 9:**

## **Merely giving more money and powers to bureaucracy will not conserve biodiversity**

### **6. FALSE PREMISES**

This simplistic solution is based on six propositions into which our studies provide many insights. These six propositions are that: (a) Only state machinery can protect biodiversity; (b) Conservation of biodiversity is no concern of development agencies; but is a monopoly of Forest Departments (c) Creation of new protected areas will enhance prospects of protecting biodiversity; (d) Existing protected areas do effectively conserve biodiversity; (e) Exclusion of subsistence demands is essential to biodiversity conservation; and (f) Bureaucratic and technical experts know best how to conserve biodiversity.

Contradicting the notion that only state machinery can protect biodiversity are many examples of traditional and often still living community based conservation practices such as Orans of Rajasthan. Indeed these constituted an extensive network of well maintained natural vegetation subject to regulated grazing through much of the state. The decline of orans in recent decades can in large measure be attributed to the state takeover of these lands. In the same state of Rajasthan the highest antelope densities are to be found not in the wilderness but in villages dominated by Bishnoi community, thanks to their religious sentiments. And in every part of the country fresh water biota is best conserved in sacred ponds and sacred stretches of rivers.



**Photo 13: Fishes in a sacred stretch of river Tunga near Sringeri in Karnataka (Photo: Subramanian).**

### **Blurb 10:**

**We need to build effective social institutions if we are to take good care of our biodiversity**

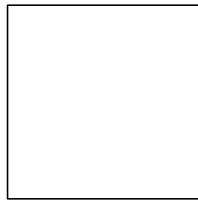
The notion that conservation is the sole prerogative of the Forest Departments springs from the narrow, sectoral approach of the Government apparatus. True, forests are amongst the richest repositories of biodiversity. But coral reefs are equally rich, and the alienation of Fisheries Departments from conservation concerns has meant endless difficulties in management for areas such as the Gulf of Manaar Biosphere Reserve. Moreover biological diversity elements of great value such as wild relatives of cultivated plants occur in a whole variety of habitats often outside forest areas. Thus wild relatives of paddy are to be encountered in village irrigation ponds and as weeds in paddy fields with low levels of management inputs. Many green leafy vegetables that serve as excellent suppliers of leaf protein, especially for farm labourers also occur as weeds along with many other crops. Wild relatives of yams frequent highly disturbed habitats such as road verges. A number of medicinal plants also occur outside forests. Furthermore, modern scientific advances imply that even seemingly insignificant life forms may turn out to be of great economic value. Thus spiders possess poisons affecting nervous systems. Pharmaceutical companies are now screening them for potential applications in nervous disorders. So one day an important therapeutic product could come out of a creature lurking in the cobwebs that we regularly sweep out with our brooms. Given this scenario, protection of biological diversity ought to be a far broader concern than that of national parks, or even of reserve forests.

The experience of the Kigga village near Sringeri in Karnataka is pertinent to the third proposition, namely that constitution of a new protected area helps in biodiversity conservation. A forest area called Narasimhaparvata, traditionally used very lightly by people of Kigga and neighbouring villages, was incorporated a few years ago in the Kudremukh National Park. The villagers' immediate reaction to this move was to greatly step up their rate of exploitation of the forest, to stockpile large quantities of timber before their access was abridged (see Photo 14). In effect this probably meant greater degradation than might have happened if the area was left out of the National Park. The experience of Keoladev Ghana National Park near Bharatpur in Rajasthan also calls into question the belief that National Parks actually help protect biodiversity. This is one of our study sites and it is the contention of local people that their exclusion from the area on constitution of the National Park has meant more destructive exploitation of the vegetation by outside commercial interests working in collusion with some of the corrupt officials. The experience of this National Park is also pertinent to the proposition that exclusion of local subsistence uses such as grazing is the

key measure required to conserve biodiversity. The locals reinforce what scientists have also documented, namely, that banning of buffalo grazing from Keoladev Ghana has led to the rampant growth of a grass, *Paspalum*, and consequent deterioration of the wetland habitat for waterfowl, the main focus of this protected area.

**Blurb 11:**

**People may spontaneously come together to protect nature as in the case of thousands of village forest committees of Orissa.**



**Photo 14: Narasimhaparvata in Karnataka Western Ghats was subjected to increased levels of extraction as soon as it was made a part of Kudremukha National Park (Photo: Ashwini Chhatre).**

These insights suggest that the whole institutional set up directed towards biodiversity conservation in India is grounded in assumptions that are inappropriate. At the heart of these is the assumption that bureaucratic and technical experts always know best. But the systems that need to be managed for conserving biodiversity are incredibly complex natural and social systems, highly variable in space and time. The science of ecology has, to this day, failed to come up with any universal laws that help us arrive at practical management decisions. These management decisions need therefore to be taken on a case by case basis, with an overall systems view and making use of all the available location specific information. The so-called experts have little competence to do this, because of their lack of familiarity with most particular situations. Our studies throw up many examples of this. Thus on the B.R.T. hills near Mysore in Karnataka the researchers have focussed on the impact of harvesting practices of amla or gooseberry, *Phyllanthus emblica*, an important constituent of Triphala-churna, one of the most widely used Ayurvedic medicines, on the regeneration of the species. The local Solliga tribals contend that the researchers have a wrong focus; that the regeneration of amla

principally depends on forest fire, and not on the level of harvesting of the fruit. The experts have an even weaker understanding of the social context in which conservation has to be implemented. Thus villagers of Lata, on the border of Nandadevi National Park contend that banning of summer grazing of sheep in the alpine pastures of this protected area has not only meant a spread of weedy plants such as Rumex resulting in a decline of the medicinal herbs, but also an incursion of poachers from across the border in Nepal defeating the very purpose of the National Park.

### **BOX 9**

#### **Judicial Activism**

Citizens of India are increasingly turning to the courts to force the state apparatus to act in a responsible fashion. But neither those who file Public Interest Litigations, nor the judges can be familiar with the many nuisances that operate on ground in our complex society. Very well intentioned court judgements could therefore turn out to be counter-productive. One such possibility became evident during the course of our studies in the Palamau Tiger Reserve area. This concerns a Supreme Court judgement ordering the Government Authorities to settle all claims as to rights and privileges of local people living within the protected areas within a period of one year. Given that hundreds of thousands of families are involved, and that most of these are illiterate, settlement of such claims cannot simply be finished in a short time. Moreover there are serious issues as to what the settlement of such claims entails. For there have been grave injustices to the forest dwellers, especially tribals right from the time of land settlements by the British in the 19<sup>th</sup> and early 20<sup>th</sup> century. Many of their hamlets were converted into forest villages where the people were forced to contribute free labour to the Forest Departments. Today the only compensations that may be offered for these people is for land taken over by the Forest Department, none will be offered for all other resources, such as grazing or mahua flowers or bamboo that they will lose. Now, the Supreme Court directive to settle all claims in a year has been interpreted by Government authorities as a directive to move all the tribals and others out of wild life sanctuaries and national parks. This is an incorrect interpretation. The directive merely asks for all rights and privileges to be examined and formalized as required, instead of kept hanging fire for years as is the case in many places today. But the Government machinery is not willing to do this justly and properly as it would involve too much effort. It is easier to kick people out. This is bound to further alienate people from conservation concerns. Our study suggests that we should be moving in exactly the opposite direction. We should indeed be engaged in creating institutions for involving all the forest dwellers positively in conservation efforts.

#### **Blurb 12:**

**Our society has rich and still vibrant traditions of nature conservation, such as Saranas of Chhota Nagpur, Deva Vanas of Himachal and Orans of Rajasthan**

Indeed, the dominant tradition of government departments has been one of devaluing and destroying the diversity of life in favour of artifacts such as dams or buildings, or of a small number of economically important species such as eucalyptus or wattle or tiger prawns. In our study site of Holanagadde at the mouth of Aghanashini river in coastal Karnataka for instance, the local herbal medicineman, as well as forest produce collectors complain that the local medicinal plant resources were decimated when the natural scrubby vegetation of the rocky hills was replaced by Casuarina and Acacia auriculiformis plantations. In the same village the Marine Products Export Promotion Council has promoted conversion of traditional brackish water paddy cum prawn farms into single species tiger prawn aquaculture. This prawn culture did in the short run bring high economic returns to the farmer, but the regular, intense applications of chemicals depletes the fertility of the fields. The prawn farmers are also in difficulty because of the outbreak of a viral disease and a court ban on prawn farming. It then appears quite inappropriate to hand over the entire responsibility of managing the country's biodiversity to the by and large insensitive Government apparatus. Nor are the local people happy with the intervention of the court (see Box 9). They agree that the prawn aquaculture practices ought to be changed in ways more friendly to the environment; but believe that the blanket ban is counterproductive. Indeed it is likely to lead to new legislation that would greatly hurt the cause of conservation.

## **7. A DIVIDED SOCIETY**

In study site after study site the people not only contend that the experts and managers have little understanding of the natural and social systems, but that they are not neutral agents pursuing broader national interests. Instead they believe that the bureaucracy and technocracy is intent on pursuing its own vested interests, often against those of biodiversity conservation. Universally, then, in all the study sites people feel that the present state sponsored system of management of biodiversity resources does not and will not deliver the goods. People are however equally skeptical of themselves taking on this responsibility. They perceive and report numerous divergences of interests amongst themselves, rendering it difficult for local communities to act cohesively in long term group interests. Table 1 attempts to summarise the whole series of such conflicts reported from the state of Himachal Pradesh.

**TABLE 1**  
**The variety of conflicts recorded in Himachal Pradesh**

Context	Benefit Sharing	Usage	Control and access
Within village	Distribution of existing scarce resources	Between different uses like fodder, grazing, fuel, implements, herb collection	Non-inclusion of minority groups in decision making
	Distribution of increased resources due to regulation and plantations	Future use of landscape especially choice of plant species	
With outsiders	With neighbouring villages	With government departments for use of landscape – roads, choice of plant species	Exclusion of neighbouring villages or migrant graziers
	With FD over forest produce such as Khair	With migrant graziers	Exclusion by National Parks, Sanctuaries or plantations
		With industry for mining etc.	Control over unauthorized access to contractors – medicinal plants, slate quarrying etc.

The difficulties due to internal divisions are rampant even in a village like Doli of Barmer district so notable for its conservation ethos (see Box 10). It is because of these conflicts that many of the local people are also doubtful of the capabilities of Panchayat Raj institutions which are expected to provide the machinery for decentralized development

planning and natural resource management to take on the responsibility of conservation of biodiversity.

### **BOX 10**

#### **Guardians of Nature**

The Bishnoi community, distributed over the Barmer, Jodhpur and Jaisalmer districts of Rajasthan is enjoined by tradition to abide by a set of twentynine principles, one amongst them being the duty to protect some elements of nature. Among the species, which the Bishnois consider sacred are the Khejri trees, the peafowl and certain mammals like the chinkara, nilgai and the black buck.

Our studies of the Doli village cluster in the Barmer district bring out the many dimensions of this conservation practice. The early settlers of this cluster were Rajpurohits who had received the land from the princely ruler of Marwar as a Jagir. The jagirdar had effective control over common village land, including sacred patches of pastureland called Oran, usually dedicated to a temple or a deity, where a socio-religious taboo on felling of green trees prevailed. The Bishnois started settling in the village around the beginning of this century but enjoyed little political and economic power at that time. Soon after independence, the jagirdari system was revoked and the control of the common land shifted to the State Revenue Department. With population rapidly increasing and people clearing land for cultivation and habitation, a sharp decline in the area of protected patches followed.

This trend showed a marked change – indeed a reversal – since the 1970s as the Bishnois gained in political and economic power and were in a position to insist on their conservation practices. They now fiercely protect the oran against any kind of commercial activity. Specifically, they accord total protection to the species they consider sacred; for example, they do not collect even leaf fodder from Khejri trees in the oran nor allow others to do so. A section of the other communities, notably the sheep-rearing Meghawals and Raikas did want access to the oran, as in neighbouring villages, but were not strong enough to stand against the dominant Bishnois. Over the years, these communities too have come to accept such restrictions as a way of life. In fact, they now allow nilgai and black bucks, which are sacred to the Bishnois, to freely graze in their fields, even though they may cause considerable crop damage.

Thus, while orans in many neighbouring areas dominated by Rajputs, Rajpurohits and other castes have been degraded due to the erosion of the religious ethic, those in the Doli cluster have remained largely intact. The Doli landscape thus presents a picture of biodiversity spread over fields and patches of the sacred areas and indeed, over the village as a whole. The Doli case is a unique example of a situation where conservation practices are enforced by the dominant community in a stratified society.

### **Blurb 13:**

#### **Sweeping court Judgements will not solve environmental problems**

That seems to leave us with votes of no confidence in the formal machinery at both the centralized and decentralized levels. What can then take their place? There are reports of encouraging experiences from a few sites, such as Dhani in Nayagarh district of Orissa. At this site the local people have successfully organized themselves to protect the forest and wildlife. This self-organized system of resource management emerged spontaneously in 1987 in response to severe degradation of the local forest resources on which this predominantly tribal community depended for a variety of resources and services. The community managers have delineated the boundaries of the resource patch being protected and the people who should have access to the patch. They have also worked out an effective set of rules for permissible levels of harvests from the protected forest patch, a monitoring machinery to ensure implementation of these regulations and a series of flexible sanctions to promote adherence to these regulations. Over and above protection and regulated harvests of forest resources of utility, the community is also promoting protection to the wildlife. In fact the Dhani Forest Committee was planning to propose to the Orissa Government that their area be declared as a wildlife sanctuary. They are however having second thoughts on this proposal on realizing that this may merely mean their losing their current, carefully self regulated access to the area.

These still surviving as well as newly emergent cultural traditions of conservation reported from many of our study sites suggest a complementary model to that of protection of a small number of relatively large protected areas. This is a model of conservation at all scales, from individual banyan and peepal trees and small sacred ponds and groves to larger protected areas dispersed throughout the countryside. Not only banyan (Ficus bengalensis) and peepal (Ficus religiosa), but many other species of the fig genus Ficus are venerated and protected over much of India. Ecologists now recognize Ficus as a keystone resource; i.e. a living resource that supports the continued persistence of a large number of other species. These range from highly specialized species of fig wasps whose entire lives centre around fruit of particular species of figs to many species of fruit eating birds, monkeys, squirrels and bats. Many large Ficus trees also shelter day time roosts of thousands of giant fruit bats, Pteropus giganteus. While these bats may be trapped for consumption at a distance from the roosts, they are left unmolested where they are most vulnerable at their daytime congregations. India's countryside remains dotted with hundreds and thousands of Ficus trees and associated insects, birds, mammals

entirely thanks to our cultural traditions. In many Indian towns and cities too, the only surviving large sized trees are such Ficus trees.

At the next larger scale, are traditions of protecting a clump of a few trees as a sacred grove, or a small temple tank as a sacred pond (see Box 11). Some of these sacred groves and ponds may be as large as tens, or even hundreds of hectares; one of the largest and most famous being the sacred forest of Ayyappa at Sabarimala in Kerala. In fact it was a traditional practice in Kerala to leave 1/7<sup>th</sup> of the area totally protected as groves dedicated to serpent deities when bringing new lands under cultivation. Such traditions must once have covered the entire landscape of India with patches of natural biological communities, accessible to each and every human settlement. This is an attractive alternative of creating a biologically rich matrix dispersed throughout the country to embed the few larger islands of diversity protected as wildlife sanctuaries and national parks.

## BOX 11

### Sacred Groves



**Photo 15: A Sarana of Baraset village in Palamau Tiger Reserve of Bihar (Photo P. Pramod)**

Mundas, Oraons and Santhals are tribal groups spread over many forested districts of Madhya Pradesh, Bihar, Orissa and West Bengal. Several of our study sites in Bihar and Orissa fall in their tract. Here the tribals still display many traditional conservation practices. These include protection to sacred groves from which no plant material is removed. These sacred groves are called Saranas, and harbour their deities in natural forms such as stones. These Saranas fulfill a variety of functions – welcoming entrants to the village, favouring good harvest of crops, protection against wild animals, protection against epidemics, guarding against evil spirits. Many tribals festivals are linked to plants; sal (*Shorea robusta*) with sarhul, karam (*Adina cordifolia*) with Karama, semal (*Bombax malabarica*) and seedha (*Lagerstroemia parviflora*) with weddings. They traditionally practice an annual ritual hunt after worshipping the forest god; in this hunt they spare pregnant females and all immature animals. The herbal medicine men belonging to these communities promote protection of medicinal plants from overharvest, fire and grazing.

These traditions are now being eroded due to two forces – organized religions like Hinduism and Christianity and harvests by outside commercial interests, often helped by the Forest Department. Our investigations suggest that about 90% of the total harvests of plant and animal material from the area are for export; and that those engaged in such export have little concern for sustainability.

## 8. INVOLVING PEOPLE

Admittedly, today there are only a few cases of successful community based systems of conservation and sustainable utilization of biodiversity resources. But they point to significant possibilities, endorsed by people in every one of our study sites. However, the inputs from the people suggest that the alternative should not be designed as a system exclusively dependent on any one kind of agency. The self-organized systems for forest protection from Orissa such as that of Dhani described above today exclusively depend on the local community. But this has its distinct limitations. As the protected forest patch at Dhani has regenerated, people from

neighbouring villages whose own forest patches are degraded want to access it, leading to conflicts. Managers of the protected patch are therefore seeking assistance of Government authorities to help neighbouring villages organize protection in their own areas, as well as to keep out others from encroaching on their own patch. Indeed discussions in all study sites suggested that people favour a broad based system of joint management involving local people; along with the Forest Department, Panchayat Raj Institutions as well as NGOs and educational institutions.

The involvement of state machinery is also essential to solve problems that may arise far away. Thus part of the problem of siltation of the Sone beel wetland of Assam arises from deforestation in its catchment in the neighbouring state of Manipur. Similarly siltation and flood problems at two other study sites of Assam, Majuli island and Dibru Saikhowa wild life sanctuary arise from deforestation in Arunachal Pradesh. Human migrations are another problem that needs to be tackled at a larger scale with the involvement of appropriate government structures. Thus the influence of migrants from Bangladesh has been a key factor driving environmental change at several study sites in Assam.

#### **Blurb 14:**

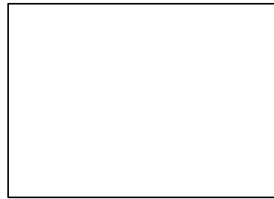
### **People do want Forest Department to play a positive supportive role in conserving biodiversity**

The clear consensus emerging from our studies is that it is the local people who have a real stake in the health of local environment (see box 12). Therefore in any broad based alternative system, people want members of local communities to play a major role in management of local biodiversity resources. They suggest that the community groups involved as units of management be relatively small in numbers and fairly homogeneous, and that such groups be given a substantial measure of control over a resource patch with clearly defined boundaries. They would like the help of agencies such as Forest Department, Panchayat Raj institutions, NGOs and educational institutions to monitor that the resources are being managed properly, to co-ordinate with neighbouring villagers and to help in enforcing regulations. They would also like technical inputs from such outside agencies, especially in form of information on opportunities of local level value addition and marketing. They do, however,

want the outside groups to pass on much of the authority for day to day resource management to local communities.

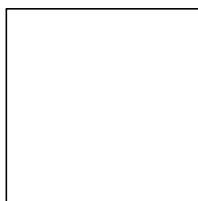
**BOX 12**

**In Defence of Nature**



**Photo 16: Rain forests of Andamans and being mercilessly plundered (Photo: Harish Bhat)**

The story of Andaman and Nicobar islands brings out starkly the total disjunction between development and conservation. At the same time it brings home the lesson that it is the local communities intimately dependent on natural resources and not Forest Departments that are likely to be the real champions of conservation. The British attempts at colonization of these islands were staunchly resisted by the indigenous tribals, especially of Central Andamans, till they were finally overwhelmed in 1859. This colonization was followed by near extermination of the Great Andamanese tribe and subjugation of Onges. But the Jarwas still hold on to their territory. It is notable that the finest surviving examples of the natural biological communities of the rain forests of Andamans are in the areas maintained as Jarwa Reserves, defended with bows and arrows by the tribals who resist all incursions of the officials, as well as of local and Myanmarese timber smugglers. The Forest Department, on the other hand, seems to be intent on promoting utterly unsustainable levels of exploitation of forest resources. A device to accomplish this involves converting areas of Jarwa Reserve into Reserve Forest. Another important device to break down Jarwa resistance and open up their territory for exploitation of biological resources is the Andamans Trunk Road which has prompted liquidation of some of the finest rain forest. Today Jarwas are struggling to prevent this road overrunning their territory.

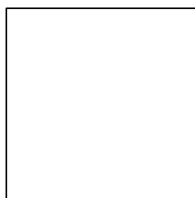


**Photo 17: A mammoth gathering of tribal panchayat members of Orissa to discuss the provisions of Bhuria committee report (Photo: P. Pramod).**

Recent years have witnessed more and more space opening up for the development of such systems of participatory management in India. The Constitution of India in its article 40, enjoins the state to enable the gram panchayats to function as village republics. However, precious little was done in that direction till the 73<sup>rd</sup> amendment to the constitution in 1993. This amendment asks for the setting up of State Finance Commissions to allocate resources to the panchayat bodies, makes it mandatory for the states to conduct panchayat elections every 5 years and provides for the constitution of a State Election Commission to oversee them. More importantly, one-third of the seats are reserved for women and panchayat bodies were given powers of planning (see Box 13). In a parallel development, the forest policy in 1988 encouraged the involvement of local communities in forest management. Subsequently, this was operationalized throughout the country under the Joint Forest Management Programme, wherein village committees in collaboration with the forest department have begun protecting and regulating the use of nearby forests. The provisions of the Panchayats (extension to Scheduled Areas) Act 1996 goes even further. Based on the recommendation of the Bhuria Committee, the Act is presently applicable only to selected tribal areas notified under the fifth schedule of the Constitution, in the states of Madhya Pradesh, Bihar, Orissa, Andhra Pradesh, Maharashtra, Rajasthan and Himachal Pradesh (see photo 17).

### **BOX 13**

#### **Women to the Fore**



**Photo 18: Women inspecting a patch of protected forest in Karsog, Himachal Pradesh (Photo: Ashwini Chhatre)**

In rural India, women are primarily responsible for collection of resources from nature. Consequently, they also have proportionately greater knowledge on the status of such resources and are affected more by scarcity. In Himachal Pradesh, women have been at the forefront of local conservation initiatives. Responding to the scarcity of fodder, women's groups or Mahila Mandals have successfully protected patches of forest all over Karsog in Mandi district. Similarly, Mahila Mandals are protecting forests in Chuhar valley of Mandi from timber smugglers and sometimes from their own men. When the tubewell dug by a cement company led to the drying up of the traditional water source in Darlaghat, women of the village got together to shift the tubewell elsewhere. In neighbouring Kashlog panchayat, the woman panchayat pradhan has been steadfast in her opposition to limestone mining in her panchayat, in the face of threats from vested interests. At the same time, in Kangra district, women have come together to process wild fruit into pickles and chutney for value-addition, increasing their stake in the conservation of those species in the wild. The women in panchayati raj institutions, elected for the first time due to reservations, are also slowly gearing up to the challenge of leadership.

The Scheduled Areas Act has made significant advances in terms of opening up space for greater participation of local people in processes and decisions affecting their lives. It marks a shift towards direct participatory democracy at the village level by defining the grama sabha at the hamlet or village level and empowering it to take decisions instead of the elected representatives. Moreover, the Act reinstates the concept of community property by transferring the ownership of minor forest produce to the grama sabha. The provisions of the Act, even though restricted to seven states, provide the necessary space for trying out new mechanisms of harmonizing environmental concerns and development aspirations.

## **9. SHARE AND INFORM**

Today local communities pay most of the costs of conservation efforts, either directly as when they have to tolerate crop destruction by elephants or killing of livestock or even people by tigers. Uniformly people complain that the compensation offered by Forest Department to offset such losses is inadequate, and even such inadequate compensation fails to reach them fully or in time. Instead people would like to see installed a system, not only of adequate compensations for losses, but of positive rewards for effective participation in conservation efforts. It is suggested that such a system of rewards could involve several elements. The rewards could be funds to local communities or their institutions such as Panchayats to adopt measures to cut down on costs of conservation such as electrical fences to halt elephant movements into crop fields or to enhance resource use efficiencies, such as more fuel efficient cooking stoves. They could be additional untied development grants. They may take the form of either social recognition or cash rewards for small groups or for individuals, for instance, for maintaining a sacred grove, or a large variety of cultivars of fruit trees on their private lands. People suggest that such positive incentives should be made available in a transparent fashion on the basis of monitoring by independent agencies such as NGOs or educational institutions to ensure that there is no misappropriation.

#### **Blurb 15:**

##### **Rewards, rather than regulations may better serve the cause of conservation**

Publicly accessible documents prepared in a participatory fashion such as the People's Biodiversity Registers may be an appropriate tool for such monitoring. The PBRs document the status of local biodiversity resources, they also record knowledge of uses of these resources. They could form the basis of local level management of these resources, on lines of Forest Working Plans or Watershed Development Microplans. They could serve as records of individual or community level contributions to conservation of biodiversity such as protection of sacred groves, maintenance of cultivars of fruit trees, or sustainable use of medicinal plant resources. They may serve as evidence of people's knowledge of uses of biodiversity resources, as therapeutics, as cosmetics, as pesticides and so on in relation to benefit sharing in the context of intellectual property rights issues. To realize these potentialities, India needs to put in place an effective piece of Biodiversity Legislation. A draft of such an act was released for public debate by Shri Saifuddin Soz, the Union Minister for Environment and Forests in late 1997. This draft is

clearly deficient in many ways. Dr. M.S. Swaminathan, Chairman of the committee established to draw up this legislation outlined in a talk at the International Conference on Medicinal Plants at Bangalore on February 19, 1998 his vision of what a more complete piece of legislation should incorporate (see Box 14). The picture that has emerged from what people have suggested throughout the country is happily in agreement with Dr. Swaminathan's vision.

**Box 14**

Draft National Biodiversity Act as presented by Dr.M.S.Swaminathan on 19 February 1998 at the International Conference on Medicinal Plants, Bangalore

**Goals:**

Conservation, sustainable use, equity and ethics in benefit sharing.

**Institutional Structures:**

Village/Block: Biodiversity Council of village bodies

State: State Biodiversity Board

National: National Biodiversity Authority

**Responsibilities**

Village/Block level Biodiversity Council: People's Biodiversity Register, prior informed consent, community benefit sharing, conservation and revitalization of herbalists' traditions, heritage trees and sites, integrate agriculture and forestry in health care system, mobilization of local resources.

State Biodiversity Board: Conservation – participatory habitat and forest management, trust for the management of biosphere reserves and national parks with stakeholder involvement, saving endangered plant and animal species.

Sustainable use – wood based industries, non-wood forest products, sourcing of medicinal plants, domestication of threatened species.

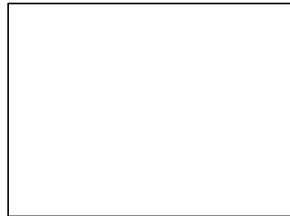
National Biodiversity Authority: Standing committees on access, benefit sharing, conservation and sustainable use, commercial use of biodiversity including agrobiodiversity – guidelines and regulations, revitalization of the in-situ on-farm conservation traditions of tribal and rural families, CBD, WTO-TRIPS, transnational corporations, collaboration with foreign universities/institutions/agencies/companies, state of India's biodiversity reports, monitoring and evaluation, early warning and timely action, information empowerment – information villages and internet kiosks, research on new chemicals and cures, national biodiversity fund – royalty and cess(national and international), case by case agreements, bilateral and multilateral donors, tax incentives for local contributions.

There thus emerge from our grass-root studies excellent suggestions for the kinds of institutions that may be established to create a broad-based, people friendly programme of biodiversity conservation and management in the country. That such a programme would greatly

benefit from the wealth of location specific understanding of the ecosystems available with people is underscored by the many concrete suggestions and experiments for natural resource management coming from our study sites (see Box 15). One such happy experience comes from Himachal Pradesh. Situated on the banks of river Sutlej, village Nanj has witnessed a novel community initiative during the course of our study. The village was an active participant in the literacy movement during 1992-93 and the people had been exposed to a variety of issues related to natural resource management. As a consequence, a heavily degraded patch of forest was enclosed by consensus. The regeneration has been extremely good and promising. During the literacy campaign, a blackboard had been painted on a wall at a public place in the village for open classes and dissemination of information. Over the last few years, the black board had fallen into disuse. It was revived again during the PBR documentation to display the gist of the information collected. It resulted in public debates on the issues raised by the information and in turn to conservation actions.

## BOX 15

### Plight of Chilika



**Photo 19: Chilika lake is a treasure trove of aquatic diversity (Photo: P.Pramod)**

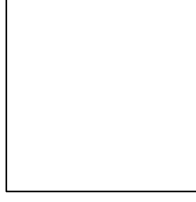
Chilika, the largest brackish water lagoon of south and southeast Asia is today under manifold threats. These arise because of the escalation of the pressures on natural resources, be they forests in the catchment that have been felled; surrounding fields that are sprayed with pesticides; or fish stocks that are caught in increasing numbers with mechanized boats and fine meshed nylon nets. Obviously it is impractical to think of going back to the old days when most resources were used for less intensively. But it is essential to manage the resources far more carefully. In this the sons and daughters of the soil, such as the fisherfolk of Chilika can provide valuable inputs, for they are the people with a serious long-term stake in the health of their environment. The ecosystem people of Chilika identify the following issues and suggest the measures listed opposite to tackle them.

### Conservation Issues and Suggested Protection Measures

Issues	Measures
Siltation	Dredging of inner and outer link channels. Soil conservation involving plantation and embankment.
Weeds	Increase in the salinity level of Chilika by opening the mouth and link channels. Biological control by introducing carps.
Water Pollution	Limited use of motor boats. Ban on chemical food mainly used in prawn culture. Embankment around Chilika. Checking industrial pollution – Jayashree Chemicals etc.
Prawn Culture	Banning of spawn collection. Involvement of Coast Guards. Ecological training to the prawn culturists.
Increased fishing intensity	Alternate income sources to the locals. Revitalizing/ involvement of existing cooperative institutions. Check on the immigration of refugees. Check on the use of fine mesh nets.
Encroachment	Survey and resettlement. Eviction of the encroachers. Restoring the traditional rights of the locals.

#### Blurb 16:

**A new culture of share and inform is needed to involve people in conservation efforts.**



**Photo 20: Regenerating Kambal trees in village Nanj, Himachal Pradesh (Photo: Ashwini Chhatre).**

One such debate centered around the species Kambal. Kambal is a multipurpose tree found upto the mid-Himalaya. It is considered to be a good fuelwood and its leaves are used as green manure in ginger cultivation. It was pointed out on the black board that due to excessive pressure of both fuelwood and manure collection, Kambal has been reduced to a bush in the forest, leading to declining availability of both fuelwood and manure. After many days of discussion in front of the black board, it was decided that leaf manure for ginger was a higher priority. Since other fuelwood species were available in the forest, the extraction of Kambal would be restricted to leaves for green leaf manure and the bushes would be pruned in such a way that one or two shoots would be permitted to grow. At the same time, a few progressive farmers decided to experiment with agricultural crop residues as a substitute for Kambal leaves for manure. Over one year, it was demonstrated that there was no difference in the yields from the two kinds of manure and subsequently more farmers turned to crop residues as it meant far less labour inputs. As a consequence, Kambal is now flourishing in the forest and due to careful pruning and good rootstock, would grow back to trees in a few years time. This experience underscores the great value of access to and exchange of good information. It suggests that enacting a progressive piece of legislation on right to information may in the long run be one of the most useful contributions to conserving India's natural resources.

Nature conservation is not new to India, being integral to our folk cultures. It was a part of the Mughal culture; with nobles maintaining huge areas under hunting preserves. It is a significant component of the Sanskrit tradition as well. Indeed a verse in Mahabharata anticipates the philosophy of the modern Project Tiger :

*Nirwano wadhyate wyaghro,  
Nirwayghram chindyate wanam  
Tasmat wyaghro wanam rakshet,*

*Wanam wyaghram ca palayet.*

Without a forest cover the tiger is slain, without the tigers the forest is felled. Hence a tiger should protect a forest and the forest nurture tigers.

**Blurb 17:**

**Every Indian child, woman and man must have a right of access to a milieu rich in diversity of life**

Time has surely come to advance beyond this age old vision and organize systems of mutualism not only between the forest and wildlife, but amongst people and the whole spectrum of biodiversity. For such an approach, too, we have old traditions. Along many rivers of India are maintained sacred pools which harbour high densities of fish. Downstream of these pools, people get excellent fish harvests. This is a system of sustainable use and conservation, good for the river, the fish and the people. We must now take clues from the perspectives made available by this study and work towards devising such win-win systems throughout the country, to replace what are today's lose-lose systems that only benefit in short term a narrow cross-section of the Indian society with vested interests served by misappropriation and liquidation of the country's rich heritage of biodiversity. Such new systems would be decentralized, participatory, pro-people systems primarily relying on positive incentives awarded in a transparent fashion. They would include state interventions, but in ways that ensure that the state machinery is rendered accountable to the people. These new systems would replace the culture of control and command appropriate to a bygone colonial age, by a culture of share and inform that would allow our country to prosper in the new information age. They would be systems appropriate to a more humane, more equitable, more democratic society that we would hopefully usher in in the coming decades.

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*Srishti Jigyasa Pariwar would like to promote People's Biodiversity Register activities in all parts of India. Readers who would like to associate themselves in such a programme are*

*welcome to Madhav Gadgil at Centre for Ecological Sciences, Indian Institute of Science,  
Bangalore 560012, or send an e-mail message to [utkarsh@ces.iisc.ernet.in](mailto:utkarsh@ces.iisc.ernet.in).*

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