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## Reckoning with Life

MADHAV GADGIL\*

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### THE THRESHOLD

FROM THE PERSPECTIVE OF life sciences, even more than that of economics or international affairs, we stand on the threshold of a new world. For over the last decade people have learnt to move genes — units of heredity — around at will, creating new life forms like tobacco plants into which have been inserted genes from a bacterium. A host of other technological breakthroughs have ensured that biotechnologies are getting all set to revolutionize plant and animal production, food processing, waste treatment and other applications as yet only dimly perceived. With biotechnologies emerging as major players on the world economic scene, all the rules of the game as to how life should be treated are being turned on their head. Living organisms were once treated as a common heritage of human kind, accessible to all, freely exchanged around the world. Today, GATT calls for patenting of micro-organisms and protection of varieties of cultivated plants developed by plant breeders. And the now operative International Convention on Biodiversity to which India is a party asserts national sovereignty on all genetic resources (UNEP, 1992). The state of Queensland in Australia has already enacted legislation giving force to this claim of sovereignty, and other states and countries would no doubt soon follow suit.

### HOPE AND DESPAIR

These developments have evoked two markedly different reactions. The prophets of doom foretell the living wealth of India coming under control of avaricious multi-national corporations, who would patent, exploit, poison and finally wipe it out, leaving us worse off than ever before. Others more optimistically view the times as an opportunity to rid the nation of the stranglehold of the iron triangle of greedy politicians — corrupt bureaucrats — unscrupulous businessmen, to inject some efficiency in our economic enterprises, to create wealth based on our biological heritage, to empower our people to serve as effective custodians of our natural resources and to share in the fruits of their utilization. The purpose of this paper is to

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argue that in the ambience of the new economic policy there is much merit in accepting this counsel of hope and working towards making it a reality

### VANISHING FORESTS

Permit me to narrate an experience to suggest why I see signs of progress in the jolts that the old order is beginning to receive. The living wealth of the Western Ghats, now considered one of the eighteen hot spots of biodiversity the world over, has been the focus of my scientific work over the last two decades. The green mantle of these hills has fared poorly over the last forty years, the hill tracts in Western Maharashtra having suffered worst. In many parts the only remnants of the pristine rain forest still to survive are tiny sacred groves, protected for generations by local communities abodes of their deities. I have therefore been involved in making inventories of such groves over many years ( Gadgil and Vartak, 1981 ). While so engaged, I one day received a letter from villagers of Gani, a small hamlet in Shrivardhan taluk of the Raigad district of Maharashtra. The letter stated that their village had a good sacred grove of some 10 ha, which was marked for felling by foresters, and could I help them save it. So along with my teacher and collaborator, V.D. Vartak, I reached Gani, after a trek of several kilometers over hills shaved clean as a head of a monk. And there at Gani was a pristine stand of magnificent old tree growth, through which flowed the only perennial stream for the village. The villagers told us that they had witnessed the destruction of forest and drying up of the hill streams one by one over the years, and were determined that this one last forest, saved by all as the residence of the goddess Kalkai shall not be destroyed. It was not only the source of the one perennial stream, but also of many medicinal herbs. But it was slated to be cut, and the local Ranger had pleaded inability to stop the cutting unless orders for its cancellation came from the top. But he was aware of our interest in the sacred groves because of an enquiry for the inventory that had reached him, and had suggested that the villagers try approaching his Chief through our good offices.

Convinced of their case, we met the Chief Conservator of Forests, who was an old friend of my collaborator, Dr. Vartak. He said that he would agree to our request as a friend, but failed to appreciate our interest in these "stands of overmature timber" as he dubbed the sacred groves. Indeed the forest authorities all over have been taking such a narrow view of the resources at their command, thinking of forest as so much grist for the paper or plywood mills and totally ignoring their value in performing ecosystem services or as storehouses of genetic resources. And the wood on forest department's estates has been given away to the industries at throw away prices. Thus in 1958, the Government handed over bamboo resources of the district of Uttara Kannada in Karnataka Western Ghats at Rs. 1.50 per tonne, when the prevailing market rate was over Rs. 3000 per tonne. The prices have now been raised to Rs. 600 per tonne while the market rates have climbed to over Rs. 12000 per tonne. The plywood industry too has been given whole giant mango trees for as little as Rs. 100, when the annual yield of fruit of wild mangoes, prized for pickling would fetch more than that for the local villagers. Pampered by such subsidies, the forest based industry has only concentrated on making quick profits, in the process wiping out its

own resource base through over exploitation. Thus, 1960's and 1970's saw the destruction of plywood species of Western Ghats, 1980's that of Assam and Nagaland, 1990's is witnessing that of the last strongholds of the forest in Arunachal Pradesh and Andaman and Nicobar Islands (Gadgil, 1991a).

### THE IRON TRIANGLE

Indeed over the last four decades the process of development has degenerated into a process of the state sponsoring subsidized fluxes of resources to a narrow elite comprising organized industry and services and the more influential landholders. These have received water, power, forest and mineral resources all at large public subsidies in various forms, as well as license to pollute the commons without paying for the damage it inflicts. This has created an atmosphere in which manipulating the state machinery to get access to such favours has become the focus of all enterprise, throwing to the wind considerations of efficiency and sustainability. It has also encouraged continual borrowal of technology, without investing in innovation. So we have seen the coming into being of an iron triangle with its three vertices being made up of (1) Organized industry, services and bigger landholders who benefit from state subsidies, (2) Bureaucracy administering these subsidies, and (3) Politicians deciding on who gets what level of subsidies.

The operation of this iron triangle has led to a liquidation of the country's base of natural resources — including its heritage of biological diversity to profit a few. In the process are hurt people like villagers of Gani, rural landless and artisans, small and marginal farmers, herders, countryboat fisherfolk, tribals, nomads.

### INTERNATIONAL LINKS

The constituents of India's iron triangle have strong links with organized industry and services abroad as well. This has added to the pressure of erosion of country's biological resources, often bringing little benefit to anybody within the country. This is well illustrated by the story of Sarpagandha, *Rauwolfia (serpentina)*, a herb of our humid tropical forests. This herb contains an alkaloid, reserpine, of considerable utility in treatment of blood pressure disorders. This use was known to some tribal groups in Kerala, and from them to some local Ayurveda practitioners. This came to the notice of the western pharmaceutical industry who went ahead and isolated the active ingredient. That created a tremendous demand for the herb, which was exploited from our natural forests without any regulation whatsoever, while the state machinery was busy organising subsidized supply of timber to the industry. The trade was banned only after natural populations of *Rauwolfia serpentina* had been nearly exterminated.

Indians evidently got little out of this, barring subsistence wages for tribals collecting the herbs, and small profits for traders exporting them abroad. No rewards have flown to the tribals whose knowledge was the basis on which the drug was discovered, no royalties have come to India as the country of origin of this genetic resource. That is a regime about to be changed under the new Convention on Biodiversity.

### EFFICIENCY, EQUITY, SUSTAINABILITY

Efficiency, equity and sustainability may be considered as three desirable attributes of any regime of management of natural resources. The old bureaucratic regime of state sponsored fluxes of resources at high levels of subsidies to influential segments of the society has failed on all three counts. Given that consumers are not being asked to pay a fair price, they have little concern for efficient resource use. Thus owners of irrigation pump sets paying no electricity charges have no interest in ensuring that state power corporations are running the electricity generation stations efficiently. The technocracy responsible for the power stations has a vested interest in running the operation wastefully, for that calls for less effort while enhancing the scope for misappropriation. Nor have the political masters been worried about efficient functioning of the state machinery.

The state was expected to look after the weaker sections, and subsidizing them at the cost of the rich might serve the cause of equity. But most subsidies have instead been cornered by the powerful, ensuring that landowners get cheap irrigation water and urbanites highly subsidized water in their taps, while the poorer peasants whose lands are submerged under river valley projects are inadequately compensated and pauperized. Where money is supposed to flow to the weak, as with tribal welfare schemes, much of it has been misappropriated by a corrupt bureaucratic — political machinery.

Sustainability too has fared badly in the process. The West Coast Paper Mill in Uttara Kannada district was expected to derive its raw material in perpetuity from the forests of that district. Within fifteen years it had exhausted bamboos — the most favoured raw material for paper making from the region. Our irrigation projects have been plagued by poor planning for drainage, so that as much land goes out of production through waterlogging as is brought under irrigation. Subsidized irrigation pump sets have driven aquifers down to hundreds of meters in areas like the Coimbatore district. There can be no doubt whatsoever that centralized, bureaucratic management of country's natural resources has been a dismal failure on every count.

### WHAT CAN MARKETS DO?

The recent moves in the direction of scrapping the old system can then be only welcomed. But what can the central element of the new system, the market achieve. One hopes that through doing away with a monopoly of the state bureaucracy it can enhance efficiency. It is unlikely however that markets could promote either equity or sustainability. Markets may at best efficiently produce what those with purchasing power want right away. They may organize quick efficient capture of prawn, their quick efficient packing, their quick efficient shipping to European or Japanese tables. But markets have no mechanism for looking after poor in India's coastal tracts, for whom prawns, once a cheap, easily accessible source of protein, is now completely out of reach. Nor have markets any mechanisms to ensure that overfishing does not wipe out prawn stocks. Indeed overfishing has been a serious problem, as much for

Canadians and Italians as for anybody else. The New Economic Policy cannot therefore bring about a really desirable pattern of natural resource use, although it may still be far superior to the old bureaucratic management through bringing about improvements in efficiency.

### ECOSYSTEM AND BIOSPHERE PEOPLE

The best bet for ensuring sustainability is to put the decisions on resource use regimes in hands of people who have a stake in sustainable resource use. Unfortunately this is not the case with any segment of the Indian population today. From a human ecological perspective one may recognize three categories of people; ecosystem people, biosphere people and ecological refugees (Dasmann, 1988, Gadgil, 1991b). The ecosystem people are those living close to the earth in their traditional habitats, meeting most of their needs by gathering natural resources, or producing them through subsistence agriculture or animal husbandry from their own environments. Tribals, artisanal fisherfolk, subsistence agriculturists, herders have lived in this fashion for generations, in the process evolving cultural traditions of prudent resource use. But most ecosystem people of India today have lost control over their resource base which has been overexploited and depleted to meet commercial demands. This has turned them into ecological refugees, as with basket weavers who have no more bamboo to ply their trade, or nomadic shepherds whose traditional grazing grounds have either been brought under the plough, or under forest plantations. Such ecological refugees have tended to lose their traditions of prudent resource use as fisherfolk start dynamiting river pools that were once set aside as refugia in form of sacred pools. The country's resource base is primarily devoted to meet the ever growing needs of the third segment of the population, the biosphere people. Biosphere people have been defined as those who can access the resources of much of the biosphere through market mechanisms; they are people like you and me who after a meal that has included wheat from Haryana and rice from Andhra Pradesh, coconut from Karnataka and fish from Goa, munch on an apple from Shimla while watching an American game of basketball on a Japanese television set. For us it matters little if the demand for crating apples has led to deforestation of Himachal Pradesh or overfishing in Goa has meant serious hardships for countryboat fishermen. We are far removed from where our resources come from, and have no feeling for extent of sustainability of their use. But it is the biosphere people who today govern the affairs of the country, and who would continue to have a strong say in the affairs under the new economic regime.

### PROTECTING FORESTS

It is the ecosystem people and the ecological refugees who must perforce gather resources they need with their own labor from environments they are intimately familiar with who suffer from non-sustainable resource use. And they would work towards sustainable resource use if only empowered to do so and relieved from the strong pressures of having to eke out a living somehow.

That this works has been demonstrated most convincingly recently by the experience of village forest protection committees of West Bengal. These committees comprise members from all households in a given village who share the responsibility of protecting a forest area assigned to them against tree cutting. Members of the committee harvest other usufruct, such as sal seed and sal leaves which brings them substantial income, though often lower than the incomes they used to realize by marketing fuelwood. The VFPC's have also been assured of a share in the income that will be realized by harvesting timber when it has grown to an adequate size. Beginning with a small scale experiment in the predominantly tribal area of Arabari, VFPC's now cover many districts of West Bengal. They have served as a model for the joint forest management schemes which are now accepted by most of the state governments. These experiments of course, do have antecedents in systems such as ban panchyats of Kumaon, many of which have been functioning successfully since late 1920's; and more significantly have led consequences such as the spontaneous establishment of thousands of village forest committees in the state of Orissa over the last few years (Malhotra and Poffenberger, 1989).

#### EMPOWERING PEOPLE

Conferring a measure of control over a forested area adjoining the village is but one instance of the whole series of measures that must be promoted to ensure greater sustainability in the use of natural resources and greater equity in sharing benefits flowing from them. The present day system of a centralized bureaucratic apparatus deciding on some appropriate measures and then spending public funds without any genuine public accountability must now be replaced by a decentralized system of decision making in which local communities are given untied public funds to use for natural resource development in ways they consider most desirable, ensuring that the entire local population can participate in monitoring how the funds are being spent.

Permit me to cite a relevant personal experience. I was involved in planning a basket of ecodevelopment projects in a village in coastal Karnataka as a part of the Western Ghats Development Programme (Gadgil, 1993). On the basis of our own studies and discussions with the local people we made a series of proposals accepted at the highest level of the state government. These included a number of small check dams beginning in the upper reaches of the hill streams down to the lower levels as part of soil/water conservation measures. But when the implementation started, the soil conservation wing of agriculture department set these suggestions aside and took up creating a number of bench terraces on the hill slopes. Now if carefully executed these bench terraces may have helped in soil/water conservation and created additional cultivable land. But they were most sloppily executed, so that the slope of the bench terraces was not against the general hill slope; rather it was in line with it. The concerned land owners had no role in deciding on the location of the bench terrace, nor in supervising the quality of its execution. If they had, they would have insisted on proper slopes. As it happened, when the rains came, the loosened soil of the bench terraces actually enhanced the rate of soil erosion. The farmers could not effectively use these poorly constructed terraces for cultivation, all the more because the absence



of any co-ordination between soil conservation and crop production wings of the Agriculture Department meant that they had no technical advice on an appropriate cropping pattern for the terraces. So the only parties to benefit from this whole exercise were the contractors who cut many corners to construct shoddy bench terraces.

Now if the local community had been handed the funds for soil conservation with the Gramsabha authorized to decide on the appropriate measures with only technical advice coming from the agriculture department, they could have devised a more appropriate mix of programmes, executed them at greater economy with local labour, and seen to it that these genuinely benefited the concerned land holders. I am convinced that despite the inequities and political factions in India's village communities, this would be the approach which would deliver far better returns, both in terms of sustainability of use of natural resources, and taking some benefits of natural resource use to the weaker segments of the community. The Panchayati Raj system now being organized throughout the country ought to serve the purpose of putting on ground such a system throughout the country.

#### ACCESS TO KNOWLEDGE

Such a programme should be linked to the "Land and Water Literacy Programmes" that have been initiated on a pilot scale in four districts throughout the country by the Bharatiya Gyan Vigyan Samiti as a part of the post-literacy activities following up on the Literacy Mission. This mission was one of the most progressive of the Government initiatives in recent years, and met with widespread positive response and involvement of NGO's over many parts of the country. The post-literacy programme visualizes involving people from local communities in mapping land, water, vegetation, habitation, each in their own panchayat areas on the basis of cadastral maps on 1:7000 scale. Such mapping could then be used to pinpoint problems such as gully erosion, water pollution, ground water depletion, or invasion by weeds in a highly site specific fashion to help in deciding on appropriate development interventions.

The Convention on Biological Diversity calls for giving respect to and conferring an important role on the knowledge and management practices of local communities. It would then be most appropriate to include inventorying and mapping of biological communities, and specific elements of biodiversity such as medicinal plants, varieties of cultivated plants and wild relatives of cultivated plants as an integral part of the Land-Water Literacy Programme. This would both generate an invaluable data base to help India foster indigenous biodiversity based enterprises, but would also provide us with a way to monitor the biodiversity conservation effort at a highly decentralized spatial scale.

#### IMPLEMENTING BIODIVERSITY CONSERVATION

It has been forecast that biodiversity based industrial activities — pharmaceuticals, cosmetics, seeds, food processing, waste treatment — would come to account for a third or more of the world economy in the twenty first century. India is one of the

world's top twelve megadiversity countries. It is to be hoped that India would seize the opportunities that have opened up with the recognition of national sovereignty over genetic resource to nurture vigorous growth of biodiversity based enterprises in the coming years. Hopefully the new economic regime would help catalyse such growth.

But such growth would not by itself ensure conservation and sustainable use of biodiversity, nor equitable sharing of benefits arising out of utilization of biodiversity. Two measures might greatly help bring this about:

- (1) Local communities must be given much more secure and meaningful rights over public lands and waters in their own localities, following the lead of joint forest management programmes
- (2) Local communities should be given substantial incentives to continue conserving biodiversity resources on private and public lands in their own localities by linking financial inputs, perhaps through the Panchayati Raj system, to the biodiversity levels. An open, transparent process of monitoring biodiversity levels, perhaps through the Post-Literacy Mission activities in collaboration with schools, colleges and research institutions could map the levels of biodiversity throughout the country. Payment from a National Biodiversity Fund could then be made in some proportion to biodiversity levels thus being maintained.

Finances flowing into such a fund could come from a cess on all biodiversity based commercial products like drugs and seeds, international grants for conservation purposes as from the Global Environment Facility, income from royalties from industry using Indian genetic resources, and Central and State Government allocations for conservation programmes.

## CONCLUSIONS

The new economic regime is a welcome development, hopefully promoting greater efficiency of use of natural resources. But in itself it will not promote more sustainable and equitable use of such resources. In the more open, democratic atmosphere that the new economic regime has fostered, we must now craft other people-oriented institutions to promote sustainability and equity. India's accession to the Convention on Biological Diversity could greatly help foster such initiatives. It is to be hoped that our country would in the coming years rise to this important challenge.

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