

ENVIRONMENT UPDATE

Conserving India's biodiversity: the societal context

by Madhav Gadgil*

India is one of the world's top 12 megadiversity countries. This reflects its position at the junction of Ethiopian, Palaearctic and Oriental realms of biogeography, and its rich variety of biological community types that includes coral reefs and alpine meadows, rain forests and desert scrub (McNeely *et al.*, 1990). India's cultural diversity is equally remarkable; with modes of subsistence ranging from hunting and gathering, nomadic herding and subsistence cultivation to intensive agriculture and modern industry. Given this heterogeneity of cultures, the pressures of large human and livestock populations and the substantial resource demands of the modern sector, conserving India's heritage of biodiversity is a daunting task. This paper analyses the challenge from the perspective of human ecology and suggests possible approaches to tackling it effectively.

Indian society

People of India belong to three major ecological categories. The majority live in villages, hamlets and nomadic camps much as their ancestors did, and depend on living resources gathered from their surroundings to meet many of their basic needs. To this category belong tribals and nomadic herders, peasants and agricultural labourers. Following Dasgupta (1988) we may call them *ecosystem people*. A significant proportion of these have been alienated from their traditional resource base, for example, by submersion of their lands under dams or have been deprived of it by compulsions of population growth. They have proceeded either to encroach on forests (as on Western Ghats slopes or Andaman islands) or, more often, have ended up in city slums. We may term these uprooted people with limited resource access *ecological refugees*.

A minority of India's people, around one-sixth, are larger landowners in tracts of intensive agriculture or work in organized industries and services. Together they hold all the power; economic, political, administrative and employ it to draw resources, often with high levels

of state subsidies from a wide catchment to satisfy their much larger resource demands (Fig. 1). Unlike ecosystem people, they suffer little from resource exhaustion in any particular locality. If the river Ganga is polluted, they can eat fish grown in ponds of Orissa; if the timber of the Western Ghats is exhausted, they can get it from Andamans. Devouring all manners of resources brought from everywhere, this component may appropriately be termed *omnivores*.

Of prudence and profligacy

The motivation of any segment of Indian society for sustainable or exhaustive resource use is governed by its relation to the resource base. People rooted in a locality dependent on resources drawn from a limited area that they are personally familiar with, are much more likely to identify their own interests with the health of their resource base. Their motivation to utilize the resources sustainably also depends on how firmly they are in control of the resource base and on whether they can exclude outsiders and regulate the behaviour of group members. This is because only such authority can ensure that they reap long-term benefits of prudent resource use. Furthermore, people are only likely to practice prudence if they perceive the resource base as finite and limited. If, on the other hand, they have open to them possibilities of access to resources of newer and newer localities or of newer and newer kinds, they are apt to use them in a profligate fashion (Fig. 2).

This suggests that the social group most likely to practice prudence is the ecosystem people in control of resources of their immediate vicinity. But in India, such a situation is presently an exception. By the large, the country's resources are under firm control of an alliance of industry—bureaucracy—landlords—politicians, the core of omnivores. Given the large catchment and perception of an ever-expanding resource base thanks to technological innovations, the omnivores have little reason to care for its sustainable use. Exhaustive patterns of resource use are also the rule with the bulk of ecosystem people lacking control over their resource base, including the uprooted ecological refugees. No segment of the Indian society is then presently motivated to use biological resources in a prudent fashion. This is the dilemma that underlies India's biodiversity crisis.

Current focus

The current Indian approach to biodiversity conservation is naturally moulded by the interests of those in power;

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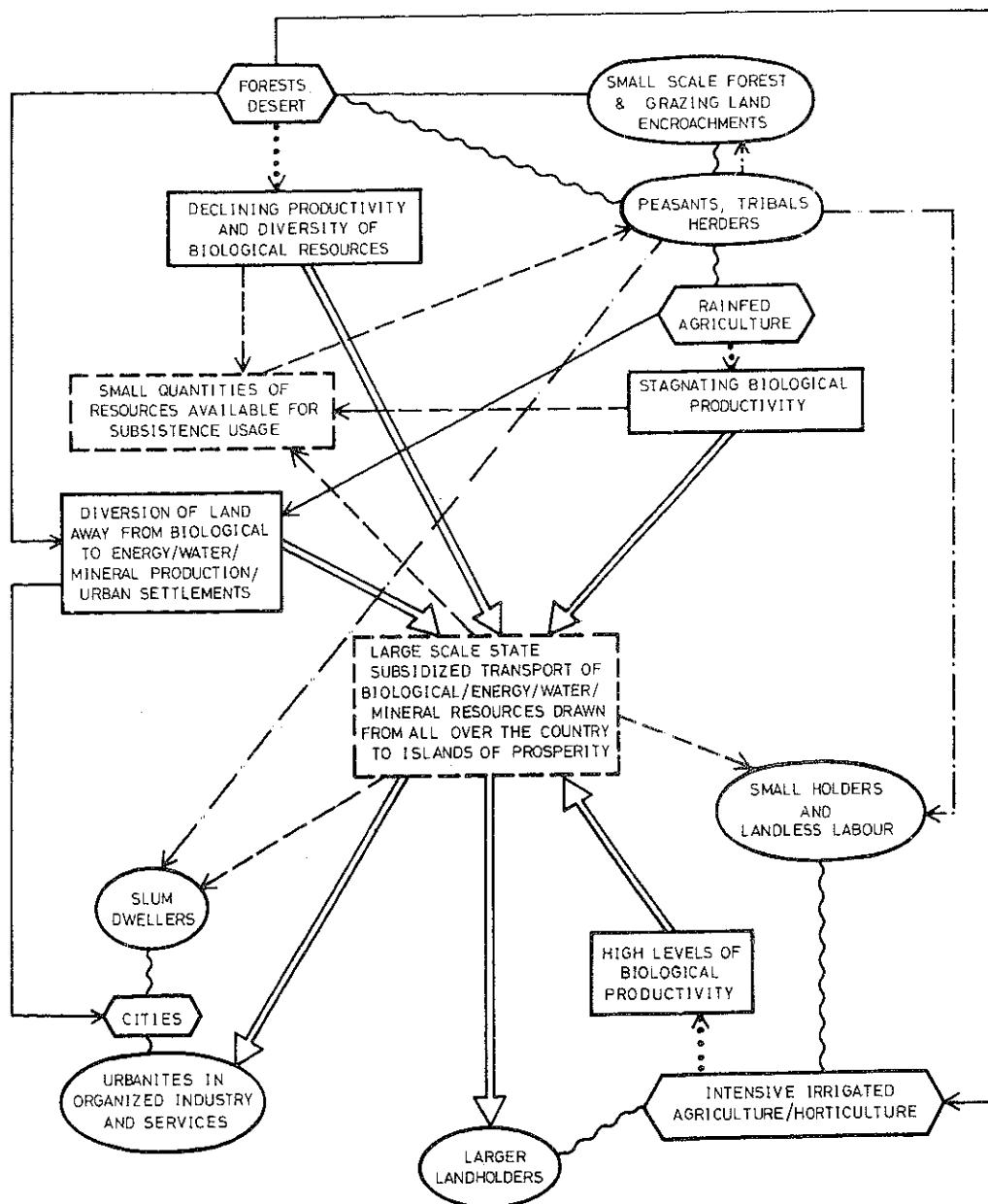


Fig. 1. Organization of Indian society in terms of resource use. The figure leaves out fluxes of marine and freshwater resources and fluxes into and outside the country. \square , land category; \circ , components of population; \blacksquare , resource production; \blacksquare , resource pools; \rightarrow , land transformation; \Rightarrow , intense resource flows; \rightarrow , weak resource flows; \leftarrow , flows of people; \sim , land—resource production links; \sim , land—people links

the omnivores. The official policy therefore focuses narrowly on establishment of a few large nature reserves that serve as centres of outdoor recreation. The omnivores prefer to gloss over the significance of the ever-escalating resource demands of the urban-industrial-intensive agriculture sector, and instead, attribute all environmental ills of the country solely to the population pressure of the ecosystem people and the ecological refugees (Gadgil,

1991, *in press*). The cardinal principle for the management of nature reserves therefore becomes the exclusion of all subsistence demands. Such blind prejudice can lead to tragedies such as that at the Keoladeo Ghana bird sanctuary in Rajasthan. This prime water bird habitat of India is a man-made wetland that had traditionally supported large herds of village buffaloes. Without any scientific evidence, this grazing was halted in the early

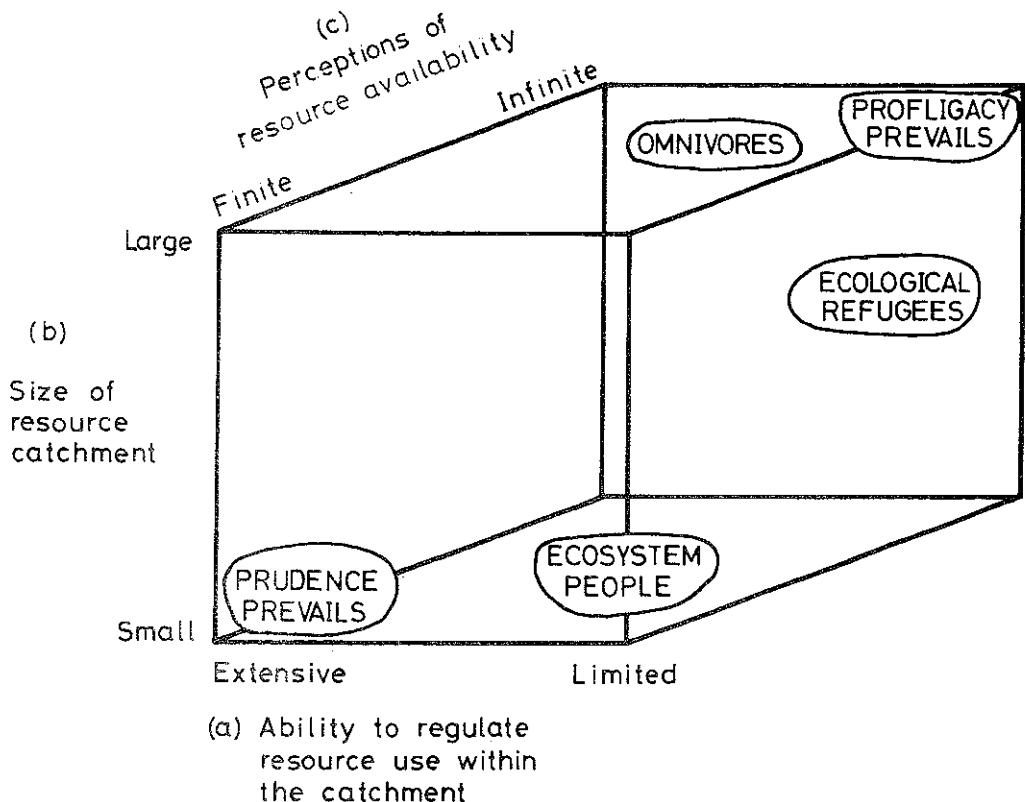


Fig. 2. Motivation for ecologically prudent or profligate behaviour by a human social group is related to (a) its ability to effectively regulate the use of the resource base on which it is dependent, (b) the size of the resource catchment from which it derives resources, and (c) its perception as to how finite the resource base is. The position of the three major components of Indian society; the ecosystem people, the ecological refugees and the omnivores in this space has also been indicated

'80s. The result has been rank growth of a grass, *Papsalum*, that has rendered the habitat far less suitable for the birds. The administration is now trying to remove the grass at great expense using bulldozers. This, however, is proving ineffectual (Vijayan, 1987)

India's biodiversity is by no means confined to nature reserves. Many areas outside the nature reserve system are rich in diversity, for example, some of the Andaman-Nicobar islands now threatened by pressures of tourism and forest-based industry. Furthermore, subsistence usage can often be compatible with conservation, as had been the case in Keoladeo Ghana bird sanctuary. India's conservation strategy therefore needs to broaden its focus to recognize the value of natural and semi-natural areas outside the nature reserve system as well as those inside them.

Traditions of conservation

India has rich folk traditions of conservation of biodiversity as well as sustainable use of natural biota to which its ecosystem people still adhere to varying degrees (Gadgil and Vartak, 1976; Gadgil, 1987; 1989). The most

widespread of these traditions is that of protecting trees belonging to genus *Ficus* that dot the countryside and are often the only large trees in the midst of towns and cities. Notably enough, *Ficus* is now considered a keystone resource genus in the tropical forests (Terborgh, 1986). Apart from individual species, whole communities may be protected as sacred ponds and groves (Fig. 3). The last population of the turtle *Trionyx nigricans* now survives in a sacred pond in Bangladesh (Reza Khan, 1980), and new species are being discovered in sacred groves of the densely-settled plains of Kerala (Mohan and Nair, 1981).

The system of sacred groves is largely intact in parts of the tribal hill state of Mizoram. These often adjoin or are surrounded by village woodlots subject to regulated use. Interestingly enough, locals refer to the sacred grove and the woodlot as the safety forest and the supply forest (Malhotra, 1990).

The state apparatus has been hostile to such traditions and forest departments have opened up, even clearfelled many sacred groves, as well as liquidated many village woodlots (Gadgil and Iyer, 1989). Indeed, a senior

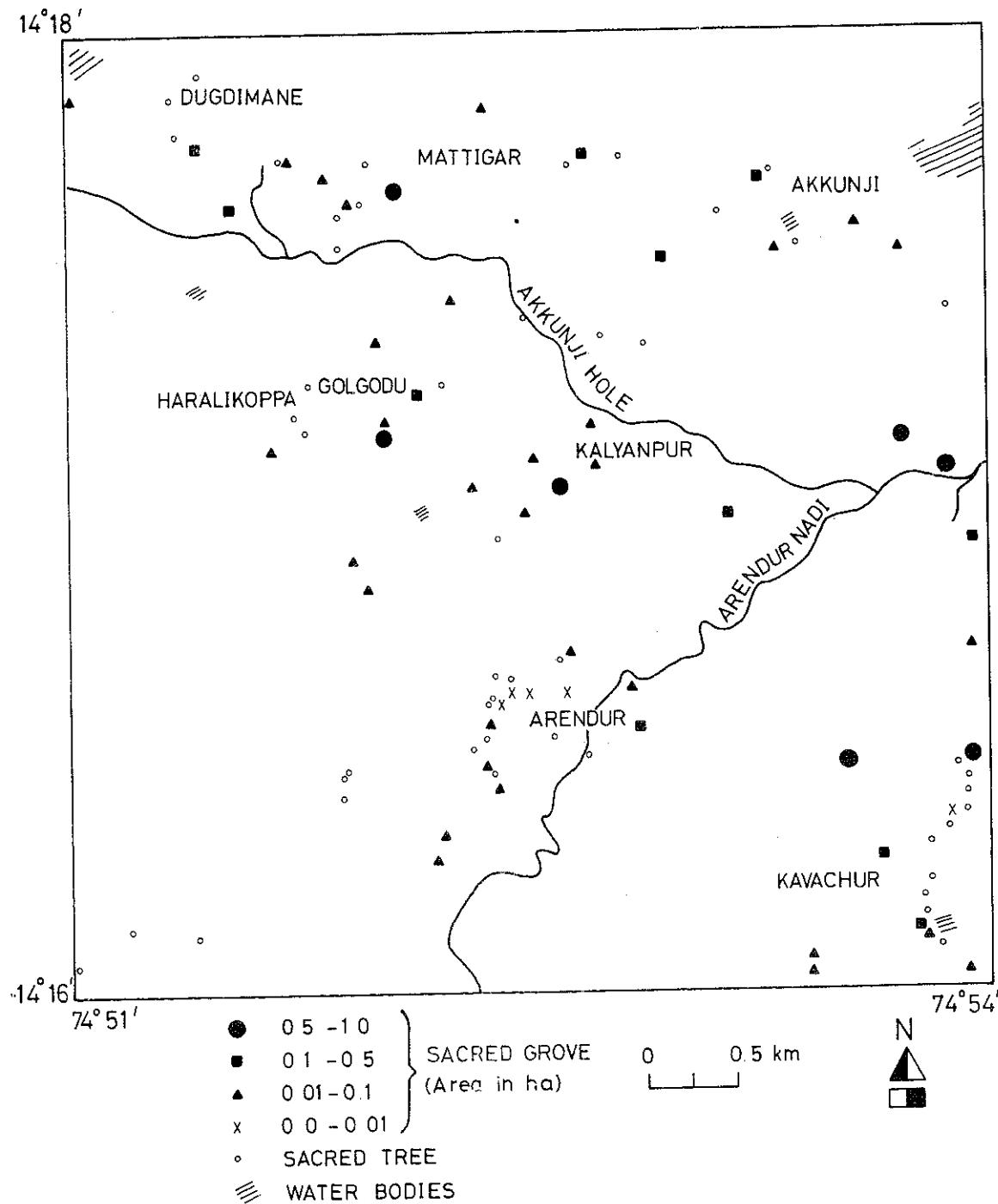


Fig. 3. Remnant network of sacred trees and sacred groves presently existing in an area of 25 km² on the Western Ghats of Karnataka state in south India. It is estimated that 6% of the land area was originally under sacred groves. This has now been reduced to 0.31% under 54 groves in addition to 45 sacred trees. These groves cover all the topographic elements from hill top to stream bank and harbour a large number of wet, evergreen forest species that have otherwise disappeared from the neighbouring forest areas

forester once explained to me the wisdom of releasing the locked-up capital of overmature timber in the sacred groves.

A new approach

It is then essential to improve on the current approach to conservation of India's biodiversity in more ways than

Table 1. Proposed changes in patterns of biological resource use that would simultaneously promote conservation of biodiversity, greater sustainability, enhance environmental services and benefit the weaker segments of India's tribal and rural population

Land category	(a) Hill slopes/arid lands under cultivation	(b) Non-cultivated lands adjoining human settlements	(c) Non-cultivated lands away from human settlements
Current ownership status	Privately owned or illegally encroached government land	State owned, often with user privileges but no rights of regulation assigned to local people; occasionally owned privately	State owned with few or no user privileges and no rights assigned to local people
Current dominant usage pattern	Subsistence agriculture responsible for continuing degradation of land, vegetation resources and biodiversity	Unregulated biomass harvests by local people and their livestock, encroachment for cultivation, leading to degradation of land, vegetation and biodiversity	Non-sustainable harvests to fulfil urban-industrial demands at highly subsidized rates not only from outside, but sometimes within nature reserves; all out attempts to exclude local people
Proposed management pattern	Privately managed with links to urban-industrial consumers; special incentives for conserving biodiversity	Well organized, community-based management with land ownership vested in the state, special incentives for conserving biodiversity	State managed with active involvement of local communities in sustainable use of non-wood-forest produce and in conservation of biodiversity
Expected vegetation cover	Mono- or poly-cultures of trees or pastures in small pieces forming a rich mosaic; good population of protected trees like <i>Ficus</i> and small sacred groves	Good standing crops of indigenous multiple use trees, shrubs and grasses with nuclei of protected forests on the model of safety and supply forests of Mizoram	Good standing crop of indigenous tree species enriched with a variety of species yielding non-wood-forest produce; larger, strictly protected nature reserves
Expected economic services	Supply of wood to urban-industrial consumers at prices fair to tree growers	Fulfillment of biomass needs of tribal/rural population; surplus (if any) for urban-industrial sector	Non-wood-forest produce for industrial needs; support to tribal/rural economy
Expected benefits for biodiversity conservation	Sacred trees like <i>Ficus</i> ; many small sacred groves, ponds	Protected, species diverse nuclei of community woodlots; sacred trees and small sacred groves and ponds	Larger nature reserves protected well with local co-operation and removal of commercial pressures; much more diverse composition of forests generating non-wood-forest produce
Other environmental services	Maintenance of tree cover on hilly, arid lands; better watershed protection; higher levels of carbon sequestration	Maintenance of tree cover on non-cultivated lands near human settlements; better watershed protection; higher levels of carbon sequestration	Maintenance of natural vegetation with good cover on all land away from human settlements; better watershed protection; higher levels of carbon sequestration

merely ensuring better coverage under the protected areas system (Gadgil and Meher-Homji, 1986; MacKinnon and MacKinnon, 1986; Rodgers and Panwar, 1988). This is because even areas already under the system are subject to a variety of threats. Kanha National Park, one of the best tiger reserves in Central India, is adversely affected by setting of fires and poaching by tribals who have been

displaced from the reserve. Dandeli, the largest wildlife sanctuary on the Western Ghats, now remains only on paper with the setting up of a paper mill and a series of dams in its midst (Rodgers and Panwar, 1988).

What is therefore now vital is to mould the societal forces to promote ecologically prudent behaviour on a broad front. Such an approach should focus on protected

elements on all scales (from individual *Ficus* trees and small sacred groves and ponds to the larger nature reserves) as well as areas subject to different levels of human usage outside the nature reserve system (Table 1 a,b and c). Although none of the segments of the Indian society practice prudence today, the ecosystem people are most likely to become motivated to do so. For their personal well-being is closely tied to the health of the local resource base, and they are the custodians of conservation traditions and folk knowledge of local ecology. They should therefore be empowered to set up effective community-based management systems to take care of their own biomass requirements, to handle non-wood forest produce as well as to protect biodiversity. Such measures would also help reduce the rate at which ecosystem people are becoming ecological refugees. Of these, those subsisting as encroachers on forests should be stabilized economically through involvement in tree farming and non-wood forest production.

Most importantly, the power of omnivores who today preside over a process of economic development that is both liquidating the capital stock of natural resources and lowering the quality of life of the bulk of the population should be drastically curtailed. This should be done by cutting out state subsidies favouring the rich and by genuine decentralization of power down to the level of the village assemblies. It is only such a restructuring of the power balance within the society that could steer the country on to a course of socially and environmentally sustainable development and promote conservation of its heritage of biodiversity on a long-term basis.

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