

Social Restraints on Exploiting Nature: The Indian Experience

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Ecology has been an inherent part of many ethnic cultures. For 200 years, the Indian Society has been capable of maintaining its needs in balance with the natural environment. A set of culturally meaningful limits prevented over-utilization.

The continued existence of populations of all species of animals, including man, depends on the availability of a variety of resources. The population can crash and run the risk of extinction if the availability of any of the critical resources falls below a threshold value. But the availability of a resource will itself be affected by the animal population utilizing that resource. It may therefore happen that the utilization of a resource by an animal population may reduce it to levels at which that animal population can no longer sustain itself and may go extinct. In a book that has provoked such debate, Wynne-Edwards (1962) suggested that most animal species have evolved mechanisms of holding their populations at a level at which the resources are not reduced to such low levels, and Slobodkin (1968) further raised the question of whether animals behaved as 'prudent predators' concentrating their hunting on prey of low reproductive value. The prevailing consensus, however, is that natural selection, acting as it does at the level of an individual, does not favour the evolution of such restraints on population growth or prudence in resource utilization except under very special circumstances (Williams 1966, Dawkins 1976). What happens, in fact, appears

to be that animal populations tend to reduce the availability of various resources that they utilize to levels at which the population may occasionally go extinct, but more commonly exists in a balance such that it cannot increase any further (Lack 1954, Hutchinson 1978).

Human populations appear to behave in a basically similar fashion, increasing in size till the resources they depend on are depleted to a level at which the population cannot increase any further. This is however not the whole story, for with his symbolic language and cultural transmission of knowledge, man has acquired a vastly greater capacity of deliberately manipulating nature around him. This has enabled him to tremendously augment the resources which he can put to his own use, and it has also permitted the cultural evolution of socially exercised restraints on the utilization of resources (Harris, 1974, 1977). Man has in fact behaved from time to time as a truly prudent predator.

However such prudence is far from a universal feature of human societies which have often totally wiped out the resources which sustained them, and in fact we seem today to be headed towards a global destruction of the resource base which sustains humanity

(Martin and Wright 1967, Brown 1978, Ehrlich 1980). An understanding of the conditions under which human societies did evolve effective methods of prudent utilization of the resources, and of the circumstances under which these practices broke down is therefore of vital importance in our endeavour to steer ourselves on to a course of sustainable utilization of the earth's resources (Gadgil, 1983). The present article is an attempt to review this problem in the context of the Indian experience.

Social Organization

The Indian society is made up of thousands of closed, self-governing communities or castes. Each of these castes still is, or till recently used to be, characterized by the following four significant attributes:

(1) Each caste is an endogamous group, i.e. all marriages are restricted within the caste. This is still by and large true particularly in the rural areas.

(2) Each caste is distributed over a restricted geographical region. This is also still by and large true except that a few major urban-industrial centres have brought together a large number

of people of all castes outside their traditional range of geographical distribution.

(3) Each caste is governed by a caste council which settles all disputes within the caste. This always was and continues to be more so with the lower predominantly rural castes. However the power of caste councils is being rapidly eroded.

(4) Each caste possesses a hereditary way of making a living. This again was and is much more true of the lower, predominantly rural castes. These are the castes which depend most directly on the natural resources and traditionally each caste had a particular and often rather restricted way of utilizing the natural resources over its range of distribution. For example, in a region, one caste may catch freshwater fish, a second keep sheep, a third keep ducks, a fourth make salt from the sea water, a fifth maintain coconut orchards and so on. In addition, there would be castes of specialized artisans, entertainers, priests etc. Each small geographical region is a mosaic of populations of a number of sedentary castes, on the order of ten to fifty, living together, yet independently, within that region. The same region would be visited by another ten to fifty nomadic or semi-nomadic castes of artisans and entertainers. These wandering castes would also have a very fixed geographic region over which they would move. All these castes had set up relationships of barter with each other.

This rural society was to a large extent self-sustaining. It produced most of its own requirements within its own limits. Its interaction with the urban society was restricted to surrendering a fraction, sometimes moderate but sometimes exorbitantly high, of the surplus of agricultural production.

This social mosaic had developed over several centuries of interactions amongst a large number of tribal groups which had migrated into India at different times, the endogamous castes being very likely derivatives of endogamous tribal groups (Karve 1961). While the lower rural castes undoubtedly slowly changed their modes of subsistence over the centuries, each one came to occupy a rather well-defined and often quite narrow ecological niche in adjustment with the other castes sharing the locality with them. It is in this context that we must understand the cultural restraints on resource utilization that the Indian society had evolved.

Cultural Practices

The Indian subcontinent abounds in a variety of traditions of restraints on the exploitation of wild plant and animal resources. These traditions relate to the territory over which a given human group may exploit the plants and animals, the season in which the exploitation is permitted, the sex and stage in life history for which exploitation is permitted, the method of exploitations and quantum which may never be exploited, the species or the biological communities which may never be exploited by some or all castes, and the species in the exploitation of which a given caste may be specialized. We shall discuss below several specific examples of these various practices.

(a) Territoriality

For most of the evolutionary history human societies have been organized in hunting-gathering tribes each with its own exclusive territory (Lee and DeVore 1968). This territoriality persisted in one form or the other with all Indian castes till recent times. Thus the beach-seine fishermen of Goa on West Coast report that seines from each fishing village would operate on the coast within a well-defined limit. Similarly, Nandivallas are nomadic caste of entertainers of Western Maharashtra. They also engage in extensive hunting with the dogs for porcupines, monitor lizards, wild pigs etc. Each group of the Nandivallas entertains and hunts within a well-defined territory (Malhotra 1974). Similarly, pastorals like the Dhanger shepherds of Western Maharashtra wander extensively grazing over an area defined for and hereditarily controlled by various groups of shepherds (Gadgil and Malhotra, 1983). This territoriality had two significant consequences. Firstly, the pressure of exploitation was evenly dispersed over the exploited plant and animal populations. Secondly, each group had an awareness that the resources of its hereditary territory had sustained it for generations, and were to sustain their descendents, who would inherit the territory and their mode of resource exploitation, for generations to come. This facilitated the cultural evolution of a variety of other restraints on the exploitation of living resources.

(b) Closed seasons

The Hindu month of Sravana (roughly August) which coincides with the peak of the main rainy season over most of India is a period during which many castes abstain totally from consumption of fish, poultry, meat and consequently suspend all hunting as well. The harvest of certain wild plants is ritually restricted to certain days of the year. Thus in the Jakhol-Panchgai area of Uttarakashi district of Himalayas the tubers of a plant, locally known as Nakhdul may be harvested only at the time of a religious festival, as is also the case with flowers of *Brahmakamal* a herb of alpine meadows near the Nandadevi peak in Chamoli district of Himalayas (Bahuguna 1980, Bhatt 1981 b).

(c) Life history stages

The famous Indian epic, Rāmāyana begins with the scene where the poet — a member of a hunting tribe — is inspired to compose poetry for the first time in his life on witnessing the killing of one of a pair of copulating cranes; such a killing being strictly against the prevailing ethic (Shastri, 1959). In fact heronaires — breeding colonies of storks, egrets, herons, ibises, cormorants, pelicans, etc — almost invariably receive full protection from the village closest to the heronary. For instance, in the Bangalore district of South India is a village known as Kokre-Bellur (literally village of the storks) where painted storks and grey pelicans have bred on trees lining the village streets since time immemorial. The villagers not only chase away the hunters, they even chase away photographers if they disturb nesting birds. The villagers are often quite rationally aware of the value of the bird guano as fertilizer for their fields.

In Bhandara district of Maharashtra the traditional fishing castes never disturb the spawning aggregations of freshwater fishes in the hill streams (Chitampalli 1981), while the hunting tribe of Phaseparadhis of Ahmadnagar district of Maharashtra whose main quarry is the blackbuck report, that they traditionally let loose any fawns and pregnant does caught in their snares (Khomne, Malhotra and Gadgil 1983).

(d) *Method and quantum of exploitation*

The freshwater fishes of the river Yamuna in its upper reaches in the Jainpur tract of the Himalayan district of Tehri-Garhwal are exploited through netting as well as poisoning. Traditionally netting was permitted at any time of the year, but poisoning was permitted only at one time of the year for a few days in conjunction with a communal festival known as Maun Mela. This festival is at a time when the river is in spate and the effect of the poisoning is probably quite restricted in time. The fish are poisoned and consumed by all the meat-eating castes of the tract as a communal endeavour (Bahuguna 1980).

Many Indian villages maintained a village forest on communal land. The village forests were protected and carefully exploited by the village community as a whole. There were often well specified limits on the quantum of exploitation for material such as fuel wood from these village forests. Thus, only one member of each household gathers fuelwood once a week from the village forest of Gopeshwar in Chamoli district of Uttar Pradesh Himalayas. In consequence, this village forest is still well preserved, although most of the neighbouring land has been completely deforested.

There occur throughout India patches of vegetation, or sacred groves which receive special protection from the local community on grounds of their association with some deity. As will be explained below, most of these sacred groves were traditionally free from any exploitation. There are however groves known as *Orans* associated with the goddess Jogmaya in the Aravalli hills of Western India where it was permitted to take away wood for fuel so long as the collection did not involve the use of any metal implements (Ishwar Prakash 1980).

(e) *Sacred groves, pools and ponds*

As Gause's (1934) classical experiments have shown, a very effective way of preventing the extinction of prey populations in a predator-prey system is to provide the prey with refugia or regions in which the prey is immune from predation. Such a traditional system of refugia in India was the network of sacred groves, ponds and pools in the courses of rivers and streams (Gadgil and Vartaks, 1976 and 1981). These were

patches of land or water which were dedicated to some deity and were kept free of all exploitation, both of plant and animals. They ranged in extent from fifty hectares or more to a few hundred square meters. Where the network of sacred groves has remained intact till recent times, as in the South Kanara district on the West Coast, one can see that they formed islands of climax vegetation at densities of 2 to 3 per km² ranging in size from a small clump to a hectare or more, and originally covering, perhaps 5 per cent of the land area (Karanth 1981). This must have been a very effective way of preserving tropical biological diversity for we are still discovering new species of plants, species which have disappeared from everywhere else, in these sacred groves, as for instance the recently discovered woody climber, *Kunstleria keralensis* (Mohannan and Nair 1981).

In Bangladesh every shrine has at least one pond attached to it, and the animals in such ponds are inviolate. Two of such sacred ponds are of biological interest for they harbour populations of endangered species; the Byazid Bostami has a turtle *Trionyx nigricans*, and Khan Jahan Ali has marsh crocodile. The former is of particular interest since it is the only known population of this turtle in the world. It is notable that the Muslim shrine of Byazid Bostami was apparently built around 800 A.D. at a spot which was earlier occupied by a Buddhist shrine. Thus the tradition of protection of the turtle and the sacred pond is likely to be an ancient tradition assimilated by Islam (Raza Khan 1980).

(f) *Sacred plants and animals*

In India a variety of plant and animal species have been considered sacred by one or more communities and therefore never destroyed (Presler 1971). The most widely protected of such organisms is the peepal tree (*Ficus religiosa*), found depicted on Mohanjodaro seal of around 2000 B.C. Other species of the genus *Ficus* are also considered sacred, and were not felled traditionally by all Hindu castes. It is notable that *Ficus* is now considered a genus of particular significance in the overall maintenance of tropical biological diversity — a keystone mutualist (Gilbert 1980). In particular, its preservation may have helped maintain high levels of populations of highly edible frugivor-

ous birds, especially pigeons and doves.

Monkeys are a group of animals held as widely sacred as the *Ficus* trees over most of India, except for Coorg, Kerala and the Northeastern tribal tract. They are never hunted even if they do considerable damage to the cultivated plants, but merely chased away. Unlike the *Ficus* trees, it is difficult to see any rationale in their protection which may relate more plausibly to their close resemblance to man.

Other plants and animals receive less universal protection, being sacred only in particular locations or to particular castes. The peafowl, for example, is sacred to Lord Kartikeya and is never hunted, and is consequently abundant around Kartikeya temples, in the southern state of Tamilnadu. It is more widely protected all over the Western states of Gujarat and Rajasthan (Personal observation). The blue rock pigeon (*Columba livia*) is considered sacred to the saint Hazrat Shah Jalal and is protected and encouraged to breed in artificial nest baskets in rural Bangladesh (Raza Khan 1981). Even the rodents are protected and abundant in the famous temple of Karnimata goddess in the state of Rajasthan (Ishwar Prakash 1980).

Two notable animals which receive such localized protection in the vicinity of temples of certain deities are the two most feared animals of India: the tiger and the cobra. Within a few kilometers of the temple of the tiger goddess Waghjai of Maharashtra, for example, no tiger or panther is hunted. In turn, it is believed, that the tiger or panther will never kill any man or domestic animal within that locality. In a similar fashion, no cobra is killed near certain temples and it is believed that no snakebite will ever be fatal in the same locality (Personal observation). These taboos may help to remove the fear of these very dangerous animals and may have survival value as, for example, if many deaths from snakebite are due to fear of death rather than from the poison.

Many castes or clans within the castes have certain totemic plants or animals which they do not destroy or let others destroy if they can help it. Thus the Maratha clans of Mores and Ghorapades from Maharashtra derive their clan names from their totemic animals — peafowl and monitor lizard respectively — and will protect these animals, although other clans of the same Maratha caste will hunt and eat them (Personal observations).

By far the most remarkable examples of protection to certain species is that of the Bishnoi sect of Western India (Ishwar Prakash and Ghosh 1980, Gadgil 1980a). This Hindu sect, founded in 1485 A.D. enjoins its followers never to cut a green tree, or kill any animal. They hold as specially sacred the khejdi tree (*Prosopis cineraria*) which is by far the economically most valuable tree in the desert tracts in which this sect originated. It is recorded that in 1630 A.D. 363 Bishnois sacrificed their lives to prevent the king of Jodhpur from cutting down *P. cineraria* trees to furnish the fuel for the lime-kilns to build a new palace. The Bishnois also protect the wild animals including blackbuck and chinkara. To this day, the tradition is very much alive and the Bishnoi villages are a refreshing scene of greenery and plentiful wild life in the Indian desert.

(g) *Niche specialization*

The various castes living within a small geographical region showed everywhere adjustments in their utilization of natural resources so that each caste specialized in the use of some narrow range of resources and overlapped little with other castes of the same region. The consequence was that a given resource of a given locality sustained one relatively small homogeneous endogamous and self governing group over a long time span. These conditions must have facilitated the cultural evolution of restraints on overexploitation of living resources.

Two specific examples of such niche diversification may be cited here. The region of the crestline of the Western Ghats in Maharashtra around lat. 18 N. is inhabited by two major castes, Kunbis and Gavlis. Of these the Kunbis practice paddy cultivation on the hill slopes. They indulge extensively in hunting. They barter their cereal grains for butter produced by the Gavlis. The Kunbis keep only a few cattle for draft purposes. The Gavlis on the other hand live on the upper hill terraces on which they do a little shifting cultivation. Their major occupation is keeping buffaloes and cattle. They curdle the milk, consume the buttermilk at home and barter the butter for cereal grains from the Kunbis. The Gavlis get their protein supply from the buttermilk and do no hunting. Thus the cultivation of valleys and lower hill slopes is restricted to Kunbis and the

cultivation of upper hill slopes and of hill terraces to Gavlis, maintenance of domesticated animals and exploitation of all fodder and grazing is restricted to Gavlis and hunting of wild animals to Kunbis (Gadgil and Malhotra 1982a).

Another interesting instance of niche diversification is provided by three nomadic hunting communities of semi-arid tracts of Western Maharashtra; Nandivallas, Phaseparadhis and Vaidus (Khomne, Malhotra and Gadgil, 1983). The primary occupation of Nandivallas is entertainment and fortune telling, that of Vaidus dispensation of herbal medicines, while Phaseparadhis are specialist huntergatherers. The Nandivallas and Vaidus, unlike the settled castes, do a great deal of hunting in addition to their primary occupations. It turns out that the three castes use distinctly different hunting techniques and specialize on different prey species. Thus Nandivallas concentrate on hunting with dogs and go for wild pig, porcupine and monitor lizard. The Vaidus use baited traps for hunting smaller carnivores such as mongooses, civets, jackals and cats, while the Phaseparadhis specialize in snaring blackbuck, deer and birds.

(h) *Protection by rulers*

The ruling classes of India collected agricultural surplus from the rural areas of their own territory as tax and from territories of other rulers as tribute or loot. Their demands on the wild plants and animals were minimal and largely restricted to items of special value such as cardamom, sandalwood, musk and ivory. An edict of the Maratha King Shivaji dated around 1660 A.D. forbids the cutting of fruit-bearing trees such as mango and jackfruit for use in building ships for his navy, on grounds that this would result in considerable suffering for the peasantry in his kingdom. Much more common were the attempts to protect special hunting preserves for the princes and the forest habitats of elephants which were particularly valuable for the armies. Kautilya's Arthashastra, the 4th century B.C. manual of statecraft, prescribes the preservation of elephant forests near the borders of the kingdom, their strict supervision including periodic censuses of elephants based on their spoor, and death penalty for any poacher (Kaugle 1969). The use of elephants for war de-

clined only in the 18th century with the large scale introduction of gunpowder, while the practice of maintenance of hunting preserves for princes continued till 1950's (Gee 1964, Ishwar Prakash and Ghosh 1980, Gadgil 1980b).

Historical Developments

The Indian subcontinent was probably colonized by hunter-gatherers as early as 50,000 B.C., and continued to support this mode of subsistence till the beginnings of agriculture in the river valleys of northwestern India around 3000 B.C. The hunter-gatherers were presumably organized into tribes with their own territories and may have evolved cultural traditions of protecting resources within these territories. Restrictions on seasons of hunting and hunting of particular stages of life history are likely to have been the most primitive of such restraints. We know nothing of the impact of early agriculture and the Mohanjodaro-Harappa civilization on these practices. Our knowledge of history really begins with the invasion of primarily pastoral Aryans equipped with horses and iron weapons from Central Asia around 1500 B.C. With their iron axes, the Aryans had the ability to clear thick forests and the next 1000 years record a long struggle between the pastoral-agricultural society of invaders with the native hunter-gatherers. At the end of this phase all arable land was taken over from hunter-gatherers who were forced to accept a low status in the caste system, or to retreat to less productive terrain. The gradual spread of agriculture and pastoralism did continue till present times at a slow pace although the settlement of the vast Indo-Gangetic plains was over by about 500 B.C. (Kosambi 1965, Karve 1967).

The caste society which crystalized out of this interaction in the first millennium of the Christian era developed the whole system of sustainable use of living resources and must have remained ecologically in an approximate steady state till the beginning of the British rule in the late 18th century. By this time Britain had largely exhausted its own forests and was hungry for forest raw materials, particularly teakwood for shipbuilding. They therefore strove

to establish their hold on the natural resources of the country as quickly as possible, regarding the indigenous cultural traditions of restraint as mere obstacles in their way. This attitude is beautifully illustrated by Buchanan, reporting from the west coast of India in 1801: «The forests are the property of the gods of the villages in which they

are situated, and the trees ought not to be cut without having obtained leave from the... priest to the temple of the village god. The idol receives nothing for granting this permission; but the neglect of the ceremony of asking his leave brings vengeance on the guilty person. This seems, therefore, merely a contrivance to prevent the government

from claiming the property». (Buchanan 1802; reprinted 1956)

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