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## Sacred Woods, Grasslands and Waterbodies as Self-organised Systems of Conservation

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### INTRODUCTION

Humans are by far the most dominant species of living organisms on the earth today. As a result people have dramatically affected, and often greatly depleted the abundance and diversity of other organisms. But humans are also the only species endowed with foresight, with an ability to appreciate their impact on the environment, and a potential to take deliberate measures to bring under check what may be perceived as negative developments. When so motivated, people formulate rules of behaviour and organize social institutions to further their implementation. Our particular focus in this paper is on rules and institutions that promote long term persistence of communities or individual populations of living organisms, through imposition of restraints on human activities, such as harvesting. We may visualize in this context two broad objectives, namely conservation and sustainable use. These, of course, grade into each other, but conservation primarily emphasizes persistence for its own sake, while sustainable use pertains to maintaining long term harvests.

Rules and institutions focusing on conservation and sustainable use of living resources-as also non-living resources such as water-are known from societies at all stages of technological developments. They change as

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societies have changed, primarily in response to technological developments that have tremendously enhanced capabilities of production of food, harnessing of energy, material and informational resources, and of transforming and transporting them over the surface of the earth. Our focus in this paper is on systems of conservation of living resources, and how they have changed and continue to change in the context of these broader changes. These systems have passed through three major phases, namely (1) sacred sites, (2) hunting preserves and (3) wild life sanctuaries and national parks. The sacred sites are characteristic of hunter-gatherer and horticultural, largely tribal societies; the hunting preserves are characteristic of agrarian states; and wildlife sanctuaries and national parks are characteristic of industrial nations. It is notable that the spatial scale of these conservation systems is correlated with the spatial scale of resource catchments - or area from over which are garnered the bulk of the material and energy resources employed by a society (Gadgil, 1996) (Fig.1).

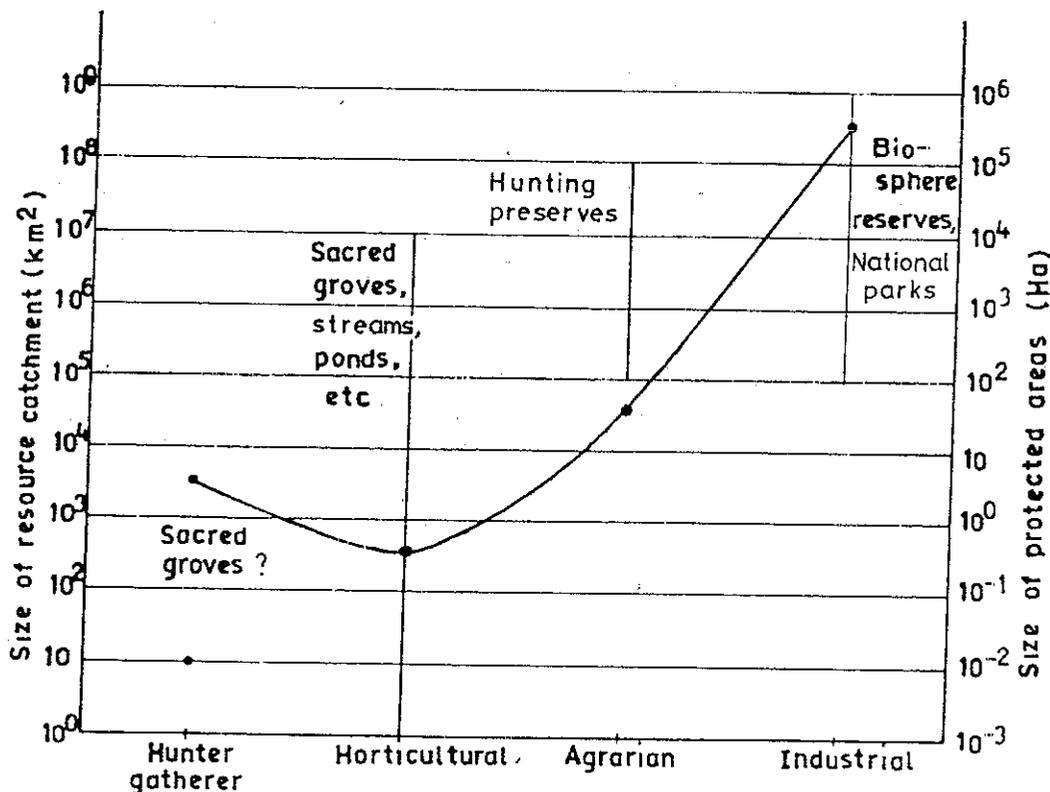


Fig. 1 Relation between sizes of resource catchments and sizes of protected areas. Pure hunter-gatherer societies have catchments of the order of 5000 km<sup>2</sup>. It is not certain if they maintain any protected areas. Slash and burn and low input settled cultivators (i.e. Horticultural societies) have somewhat smaller resource catchments around 500 km<sup>2</sup> and maintain protected areas ranging in size from around 0.01 to 100 ha. More advanced agrarian societies have larger resource catchments of the order of 50,000 km<sup>2</sup>, and they maintain hunting preserves of the order of 100 to 100,000 ha in size. The modern industrial societies have resource catchments spanning the whole biosphere and concentrate on protected areas of a hundred to a million hectares.

The first category, that of sacred sites (groves, grasslands, pond, pools, stretches of streams and rivers, lagoons, coastal areas) is typical of small scale societies largely practicing subsistence economics (Johannes, 1981; Johannes and Ruddle, 1985; Gadgil and Berkes, 1991). These may be characterized as self-organized conservation systems, as opposed to hunting preserves of the elite, or wildlife sanctuaries or national parks which are conservation systems organized by a state apparatus. Other self-organized systems of resource management include village woodlots, pastures and irrigation tanks (Ostrom, 1990). The state societies, especially the modern industrial societies have tended to dismiss the self-organized resource management systems characteristic of small-scale, subsistence societies, as primitive, unscientific, inefficient. A majority of such systems have indeed been swept aside, even deliberately destroyed by the growing centralized powers of agrarian and industrial state. However, times are changing, and there is an increasing realization of the built-in advantages, especially of cost-effectiveness and adaptability to local conditions, of the self-organized systems (Singh, 1994). This has prompted serious interest in the possibilities of persistence, revival or new emergence of such self-organized systems for managing irrigation water, woodlots and pastures. This has catalyzed a series of excellent studies, especially with reference to the irrigation systems, of the principles on which long-enduring self-organized systems of resource management have been designed, by different societies, in different parts of the world. These principles, best summarized by Ostrom (1990,1992) provide an excellent framework for viewing sacred sites as well.

We have been involved in a series of studies on sacred sites of the Indian subcontinent beginning in 1972 (Berkes, et al., 1995; Chandran and Gadgil 1993; Gadgil, 1985; Gadgil, et al., (in press); Gadgil and Vartak 1975, 1976). These earlier studies, primarily focusing on Western Ghats of Maharashtra and Karnataka and the Manipur hills, have recently been complemented by a project covering the states of Himáchal Pradesh, Uttar Pradesh, Rajasthan, Bihar, Orissa, Assam, Meghalaya, Karnataka, Tamilnadu and Maharashtra. This project was undertaken in collaboration with 13 conservation oriented NGOs and NGIs. Volunteers of these NGOs initially identified a total of around 150 sacred sites and collected information relating to location, topography, vegetation, animal life, local human society, belief systems and practices pertaining to the sacred sites and impact of outside economic, political and other factors on the pattern of these practices. This was supplemented by actual field visits by Yogesh Gokhale and Raghunandan Velankar to about 50 sites. This paper draws on the results of earlier published studies, as well as the current country wide investigation (Fig. 2).

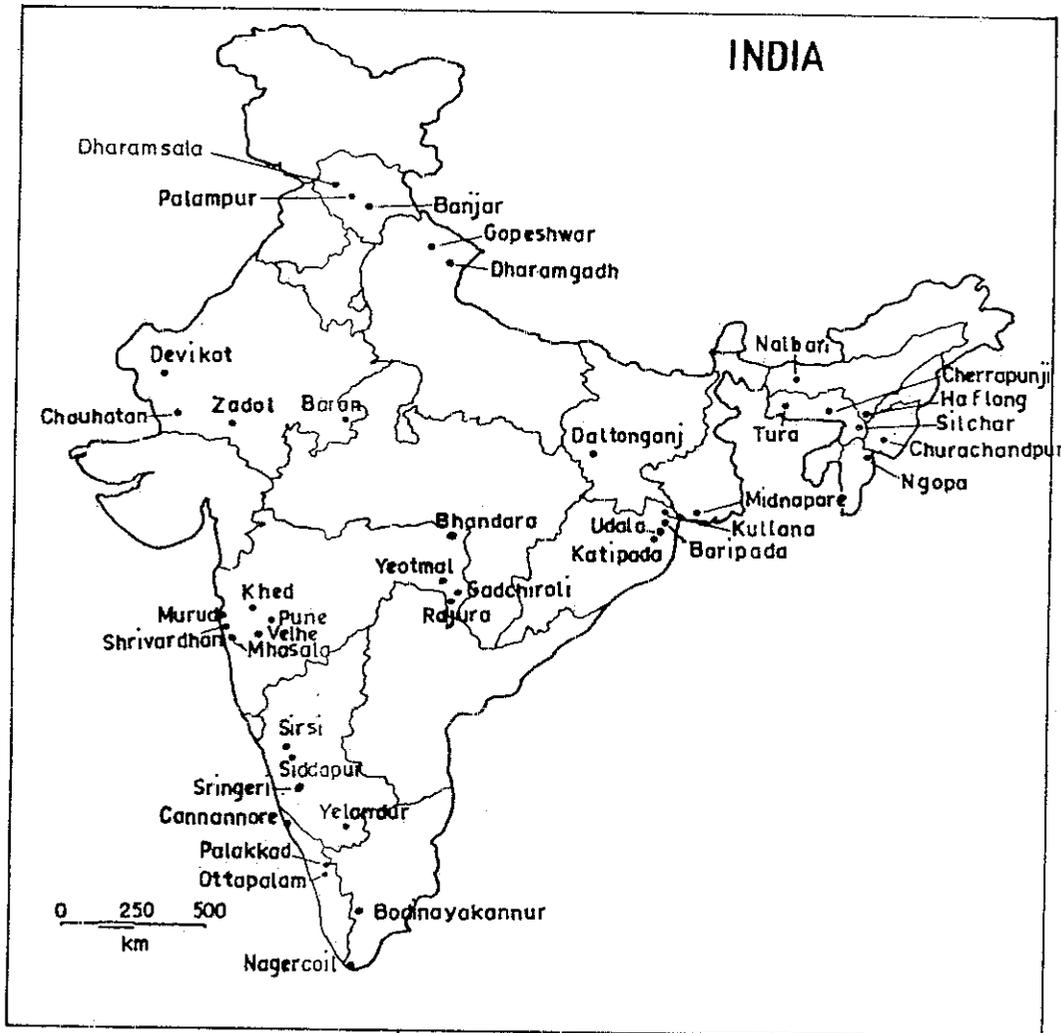


Fig. 2. Geographical locations of the full set of earlier and current study sites.

### SMALL SCALE SOCIETIES

Till about 10,000 years ago humans everywhere were organized into small scale hunter-gatherer societies with bands of 50-60 individuals making up endogamous tribal groups of 1000-5000 in numbers. This organization is largely preserved in horticultural societies, dependent primarily on low input, often shifting cultivation (or nomadic herding) coupled to extensive hunting and gathering (Lenski and Lenski, 1978). Some hunter-gatherer or horticultural societies continue to this day in India, as with Sentinelese islanders of Andamans. Most others have however been gradually brought under the influence of larger scale agrarian or industrial societies, beginning first with the Indus Valley civilization five thousand years ago, and at an

increasing rate in recent decades (Gadgil and Guha, 1992). The self-organized conservation systems of sacred sites originated amongst and have been characteristic of hunter-gatherer or horticultural societies largely insulated from the influence of larger scale agrarian or industrial societies.

Such societies tend to be largely self-sufficient in their requirements of biological resources, though some living resources such as honey, ivory or grain may be exported. Their own requirements of food, fodder, fuelwood, small timber, plant or animal based medicines are however almost wholly met from resources produced locally through low input cultivation or herding, or gathered from within a radius of a few, at most tens of kilometers. The catchments from over which these resources are obtained may often be under very firm control of local communities. In northeastern India, for instance, people may have had to risk their lives when venturing into territories of alien tribes in older times; and even today Jarwas of Andamans repel outsiders with bows and arrows. Elsewhere the traditional rights of local communities to prevent aliens from harvesting resources from certain well defined areas was widely recognized and respected, with other traditional rights assigned to groups like nomadic herders. With long standing familiarity with their immediate environments, such communities would have access to considerable information on how varied forms and levels of harvesting have influenced the local stocks of living resources. Such communities would have been entirely or largely self-governing with community level institutions permitting collective choice to prevail in a transparent fashion. Those violating community based norms of behaviour-including those pertaining to living resources-would be subject to sanctions, imposed flexibly, often in a graduated fashion.

## DESIGN PRINCIPLES

Elinor Ostrom (1990, 1992) in an insightful analysis of self-organized systems of resource management suggests that many of these features of small scale societies tend to favour long term persistence of such systems. These are captured in the seven principles of design of such systems suggested by her (Fig. 3).

### Design Principle One

*The Long Term Benefits Flowing from the Restraints on Resource Use Should be Commensurate with the Costs Incurred by the Community*

The benefits could take many different forms: (a) Provision of ecosystem services such as watershed conservation: The villagers of Gani (Shrivardhan taluk, Raigad district, Maharashtra) wished to save their Kalakai sacred

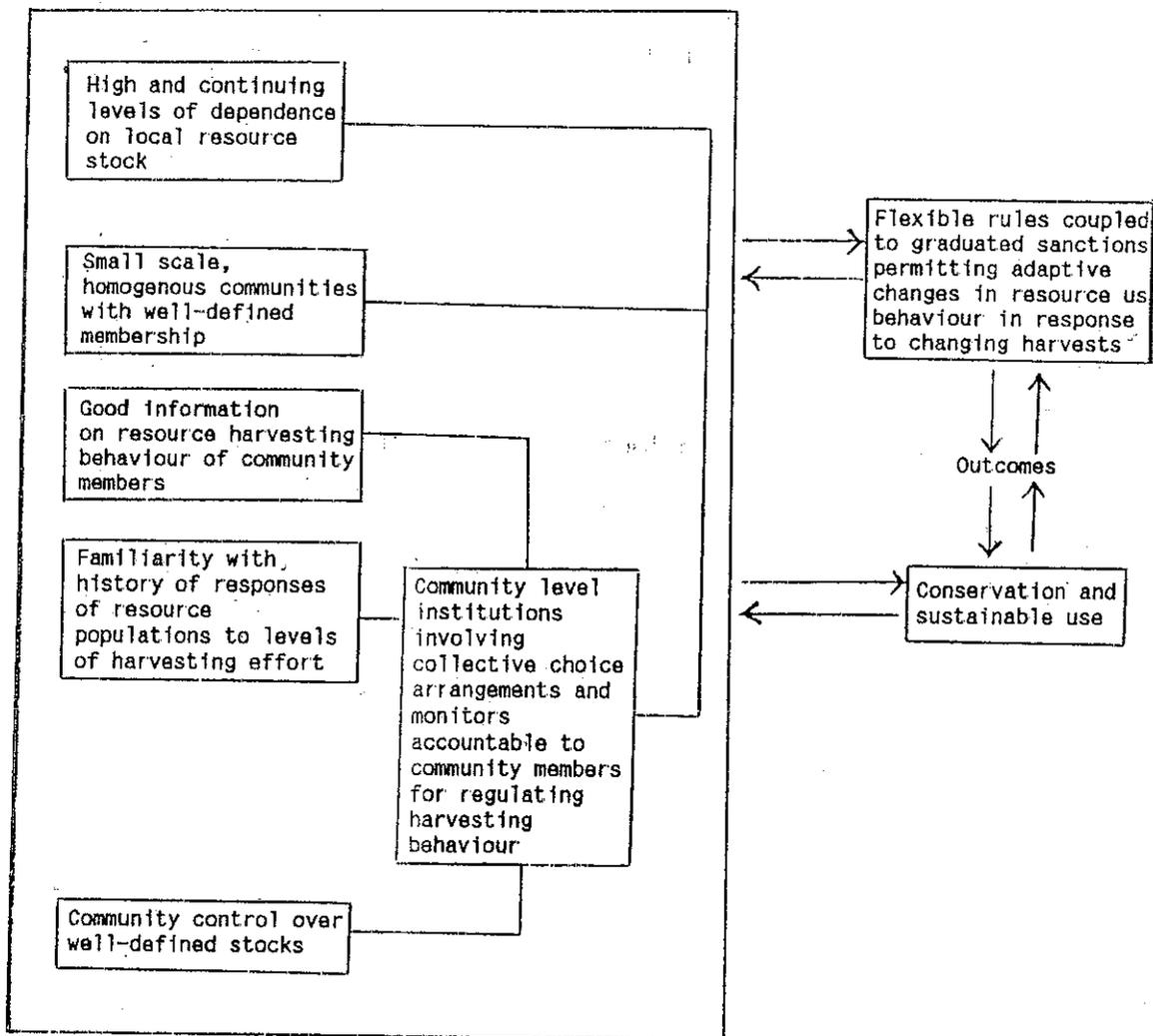


Fig. 3 The organization of resource management systems of small scale societies.

grove of 10 ha as forming the catchment of the only remaining perennial stream (Gadgil and Vartak, 1975). (Wingate, 1888) noted that the Kans or sacred groves of district Uttara Kannada in Karnataka were of "great economic and climatic importance. They favour the existence of springs, and perennial streams, and generally indicated the proximity of valuable spice gardens, which derive from them both shade and moisture." Many major sacred groves are located in the catchments near the origins of rivers, e.g. Bhimashankar (Khed taluk, Pune district, Maharashtra) harbours a large grove of over 700 ha at the origin of Bhima, a major tributary of Krishna (Borges and Rane, 1992). (b) Ecosystem services as firebreaks: These may be especially important in tracts otherwise under shifting cultivation where the slashed forest is burnt prior to cultivation. Indeed realization of benefits of sacred groves as firebreaks has led to the revival

of protection to groves that had been destroyed in Churhandpur district of Manipur (Gadgil et al., in press). (c) Other ecosystem services such as provision of shade: A sacred grove of goddess Shilai located amidst paddy fields at Supegaon (Murud taluk Raigad district, Maharashtra) is preserved for the shade it provides to people and cattle (d) As a refugium that helps reduce the chances of extermination of resource populations: The chances of long term persistence of any exploited population are considerably enhanced by providing complete immunity to a part of such population in some protected habitats. Thus in the classic experiments of Gause, (1939), on an experimental prey-predator system involving two species of protozoa, it was found that the predator population always overexploited the prey population leading to its extermination, followed by a crash in the predator population. This could however be averted by creating for the smaller sized prey species a habitat into which the larger predator could not enter. A certain level of prey population could then persist in this refugium. The predator had access to the prey population outside of this special habitat. Such a set up permitted long term coexistence of the prey-predator populations. Many sacred sites serve such a function. Thus in the Dharamshala district of Himachal Pradesh certain stretches of hill streams are fully protected against fishing, providing an excellent refugium for fish populations. These fish populations are then fished beyond a distance of 100 meters on either side of the sacred pool. Similarly in village Mangaon (Velhe taluk, Pune district, Maharashtra), barking deer are not hunted inside the Janni sacred grove of 10 ha; but hunted outside (Gadgil and Vartak, 1975). The local villagers report that they have much better chances of hunting barking deer compared to neighboring villages which provided no such refugium. Apart from mobile animal populations, these refugia may also serve as seed sources that promote regeneration of plants outside the sacred sites. (e) As a biological community subject to much lower levels of exploitation than elsewhere and hence much more likely to continue to provide certain resources on a long term basis: Sacred woods or grasslands need not be totally protected from all harvests. Thus in Aajivali (Mawal taluk, Pune district, Maharashtra) villagers have revived protection to a sacred grove that harbours several *Caryota urens* palm trees that are tapped for toddy. A sacred grove near village Gani (Shrivardhan taluk, Raigad district, Maharashtra) is valued as a source of *Entada pursaetha* used to treat cattle against snake bite. (f) As a resource that serves as an insurance to be exploited only in an emergency. Thus in Ghol, (Velhe taluk, Pune district, Maharashtra) the sacred grove is otherwise left undisturbed, but furnished timber for rebuilding after many huts were destroyed in fire (Gadgil and Vartak 1976).

Apart from these more tangible benefits, sacred sites may serve other aesthetic, cultural, religious functions. (g) A sacred grove of the B.R.T. hills (Yelandur taluk, Mysore district, Karnataka) harbours a *Michelia champaka* tree of enormous proportions, famous over a large region, and once regularly worshipped by the Maharaja of Mysore as well. Humans may thus protect sacred sites that inspire awe and wonder. Indeed many mountain peaks such as Nandadevi in Himalayas are also worshipped. Along with mountain peaks, the surrounding areas for approaching the peak are also considered as sacred. In Garhwal Himalayas while approaching the Nandakhat-one of the sacred peaks, various places in between are considered as sacred one of them is Devi ka Aangan. Local people have their rituals associated with all such sacred places. People maintain strict norms about human behaviour like, they go to these areas bare footed for worship, plucking of flowers before specific time is not allowed etc. (h) Other sacred sites may be set aside as a mark of respect for organisms disturbed by humans. Thus it was a tradition in Kerala to set aside a portion, sometimes reported as 1/7th of land being newly brought under cultivation and habitation as a sacred grove dedicated to snakes driven away from the remaining part of their habitat (Nayar, 1987; Unnikrishnan, 1995) (i) Humans may also protect sacred sites in the belief that this would please supernatural forces and attract bounties such as enhanced fertility of fields, or of humans themselves. This seems to be the benefit expected of sacred groves called saranas in many parts of Chhotanagpur plateau in states of Orissa, Bihar and Madhya Pradesh. Similar tradition is followed by Dimasa tribe in northeast India where the sacred grove 'Madaico' is used to please supernatural forces. (j) In case of Aasahpoorna Devi Ki Oran at Devikot, (Fatehgad taluk, Jaisalmer district, Rajasthan) the actors i.e. the old people used to predict the climate for coming season, year according to condition of Oran at the time rituals. Local level management about crops, cattle etc. was regulated on the basis of these predictions. Thus, Oran-the sacred grazing land used to play an important role for villager's economy.

The costs to be weighed against these benefits would be opportunity costs of diverting land or water to other uses, or of harvesting resources at greater rates. The balance would change depending on the values placed on different forms of benefits and costs, at the moment and in future. The balance would tend to tilt against conservation under a variety of conditions: (a) If resource scarcities mount, the opportunity costs of conservation would be considered to be higher. Thus as pressure on cultivated land has increased, sacred groves have been felled to make way for either cultivation, or habitation. (b) If values of resources being conserved go up, as with remoter areas being connected with roads, the opportunity

costs of conservation would be perceived as having increased (c) If resources earlier valued are now obtained from elsewhere, or in other ways, as for instance, with use of medicinal herbs being abandoned in favour of allopathic drugs, or of leaf manure being given up in favour of chemical fertilizers the opportunity costs of conservation would be considered to have increased (d) Lastly, if future is discounted, with immediate interests being given more weight, the opportunity costs of conservation would be perceived to have gone up. In general, rapid technological progress has favoured such discounting of future value of resources, in the belief that technological solutions would always be available to deal with any resource scarcities

### **Design Principle Two**

*The Conservation System Should Deal with a well Defined Resource Under Reasonably Secure Control of a Well Defined Social Group*

In India the tribal and the subsistence rural societies probably had considerable *de facto* control over a well defined area near their settlements in pre British times, and therefore met this condition. In post independence times, the provisions for Schedule Areas also create such a situation. In north-eastern state of Meghalaya, by constitution people have rights on their natural resources. At Cherrapunji the earlier sacred forests of Khasi people are under control of local councils as per their traditional system of administration. Due to Christianity, the sacred status of forest is now no more, but the local authority-Siem of Sohra (king of Cherrapunji) has maintained the earlier utility status of specific forest patch; which is called supply reserve- 'Law Adang' Earlier ownership of sacred groves used to be with the Siem Darbar i.e. the higher authority for administration. But after Christianisation the rituals associated with sacred groves were stopped resulting into loss of faith with the sacred grove. Hence, people started cutting trees from it. To prevent this higher authority took the decision that village Darbar i.e. lower authority will also take care of these earlier sacred groves. It is reported from far villages around Haflong that 'Madaico' of Dimasa tribes were encroached by outsiders. Outsiders did not have respect for the tradition, so they cut plants from the sacred grove. The local people were not organized to resist outsiders from encroaching the sacred grove.

### **Design Principle Three**

*The Group Responsible for the Conservation System Should be Effectively Organized to Administer the System*

Traditionally tribal and caste groups had such social organization;

there were also effective organizations at the multi-caste village community level in pre-British times. These community level organizations were largely dismantled during the British reign. There have been some attempts to rebuild appropriate organizations at the community level following independence. These are now gathering strength following the 73rd amendment to the constitution relating to the Panchayat Raj and the 1996 Act extending Panchayat Raj institutions to Schedule Areas. It is reported that during 1970-75 in Rajasthan, commercial extraction of *Acacia senegalensis* gum and *Commifera vitae* was done with the help of commercial contractors. The contractors were also allowed to extract from the Orans or sacred groves, now owned by the government. For extracting Acacia gum the contractors probably used some chemicals which increased the productivity but the tree used to die in a short period. This extraction badly affected both these species and vegetation in Oran was thinned. Since for many Orans, ownership of lands was with government, nobody could resist to stop this exploitation of resource

#### **Design Principle Four**

##### *Existence of a Monitoring Machinery Accountable to and Respected by the Actors*

Effective implementation of a conservation or other resource management system requires monitoring of the behaviour of actors affecting the resource stock by some machinery which will be accountable to the actors, and respected by them. For the self organized systems of sacred sites this function is served by the local deities, nature spirits and ancestral spirits, as well as by the whole local community, especially the priests and leaders who take on the role of enforcing the will of the gods and the community. The earliest religious beliefs of humanity include belief in spirits specific to particular localities, the *sthaldevatas* (*sthal* = locality, *devata* = deity) concerned with the well being of nature and people in that locality. People tend to believe such deities to have the interests of the local environment at heart, as well as to be omniscient, so that no action, even intention can escape these monitors. These monitors are often believed to punish violators with a variety of undesirable consequences. But additionally, all members of local communities who tend to be intimately familiar with all local happenings also take on the function of monitoring. The priests and other local leaders are then expected to take appropriate action on behalf of the deities against any infringement of prescribed behaviour. The local community and leaders may also serve as monitors on their own, not necessarily on behalf of deities. Such monitoring tended to be quite efficacious in small scale societies. In case of Viratra Ki Aan

or Oran at village Dhok (Chauhatan taluk, Barmer district, Rajasthan) people and priests have themselves been monitoring the area. The Oran is spread on a huge area about 13 sq. km. People can graze their cattle and with prior permission are allowed to use deadwood. In 1971, the war refugees across the border from Pakistan came to settle in the village. They violated the traditional restriction of Oran for getting wood. Local people warned the refugees and gave an idea about the wrath of the goddess. But refugees kept on violating. As a tradition people believed that goddess would punish the violators. After some years the refugee colony caught fire due to unknown reason and people considered it as wrath of goddess. In this case, one can notice the warning given by local people who were monitoring such a large area on the India-Pakistan border having very sparse population.

### **Design Principle Five**

#### *Collective Choice Agreements*

The actors affecting the sacred sites would themselves be involved in relevant management decisions. This would be possible in relatively small scale societies where the whole group would be directly or indirectly involved in the decisions

### **Design Principle Six**

#### *Flexible Rules Relating to Resource Use Patterns*

Long term viability of conservation system is promoted by flexibility, accepting uses otherwise prohibited in emergencies; for instance extraction of timber for house construction in case of fire. In informal, community based systems of small scale societies such flexible arrangements are possible. In village Irani located very remote in Chamoli district of Garwhal Himalaya at about 2500 meters people have to face exacting climate. They have protected a small sacred grove, which can be useful to them for fodder to their cattle at the time of emergency in winter. Hence, in winter if snow fall is heavier, they can get the fodder from a nearer place from the village instead of going far away.

### **Design Principle Seven**

#### *Graduated Sanctions Against Violation of Management Rules*

Community based management systems may incorporate flexible sanctions taking into account the overall record of the violator and circumstances of the violation, promoting long range endurance of such

systems. In the north eastern state of Mizoram many villages have still protected safety reserves around their villages serving as fire breaks. Due to Christianity people do not have any sacred relation with the safety forests which they had in the past. But shifting cultivation is going on and hence they need fire breaks. To protect safety reserves the local village councils in villages namely Hrianmum and Teikhang which are in Sialkal area of Aizwal district are charging fine according to the nature of violation; for big trees fine is more, for climbers less fine is charged.

### **SOCIAL TRANSFORMATIONS**

Figure 3 attempts to depict the organization of resource management systems of small scale societies. It is evident that the system conforms to the seven design principles discussed above, suggesting that the conservation systems such as sacred sites, of these societies may have been both effective and long enduring. This is not to contend that there were no instances of extermination of living resources in such societies. Indeed there were many such accompanying the colonization of new territories such as Americas, Pacific islands and Madagascar (Diamond, 1991). It appears however that as people settled down and acquired a deeper understanding of the living environment they developed much more effective conservation systems such as sacred sites (Gadgil and Berkes 1991; Gadgil et al., 1993; Gadgil, 1995; Heywood, 1995).

Such small scale societies and their conservation systems have been radically altered by a whole series of technological developments that have absorbed them, first into agrarian states and subsequently into industrial nations. This emergence of larger scale societies is grounded in access to ever increasing levels of material, energy and informational resources. Thus productivity of agriculture is increased initially by input of animal energy through bullock and horse power and of water through irrigation systems, and later by input of fossil fuel energy for a whole range of agricultural operations and for pumping water, and by inputs of synthetic fertilizers and pesticides. This permits the production of increasingly greater levels of agricultural surplus by cultivators. Technological developments also facilitate transport of this surplus over long distances with the use of bullock power, wind power and then energy of fossil fuels. These possibilities of large surpluses of food being transported over substantial distances catalyse extensive division of labour and growth of towns and cities. The emerging occupational specializations include priesthood, bureaucracy, military, trade and artisanal activities. This new social organization creates larger scale social, economic, political units in the

form of chiefdoms, kingdoms, nation states (Service, 1975). These larger scale societies depend upon large outflows of natural resources from rural hinterlands; resources such as surplus grain, wild spices, timber, wood charcoal, bamboo, animal skins, ivory, coal and other minerals. These outflows are often against the interests of forest dwelling and rural populace, and require a loosening of the control of local communities over their territories. The centralized states therefore take measures to strengthen the authority of the state apparatus and their allied economic and political interests and weaken that of local communities.

The centralized machinery and its allies controlling the resources are not dependent on the resources of any particular locality. They always have other options if the natural resources of any particular locality are exhausted. Furthermore, the pace of technological developments also picks up, especially in the industrial societies; and new technologies open up the possibilities of substitution when a resource is exhausted. Thus, the West Coast Paper Mill at Dandeli (Haliyal taluk, Uttara Kannada district, Karnataka) could successively bring in bamboo from further and further away, from Andhra Pradesh, Garhwal, Assam and Nagaland as these stocks are exhausted; as also switch to using eucalyptus as bamboo supplies dried up. These possibilities have promoted a pattern of sequential exploitation and exhaustion of resources, with commercial interests concentrating at any given time on the kinds of resources, and on the localities which yield maximal levels of profits; shifting to others as these are exhausted (Fig. 4).

Such exhaustive resource use does prompt corrective responses in large scale societies, responses that are primarily guided by the recreational interests of the elite. In agrarian kingdoms they take the form of hunting preserves of aristocrats. The two thousand year old manual of statecraft, Kautilya's Arthashastra prescribes the maintenance of such preserves (Kangle 1969). The Mughal emperors also maintained huge areas as their hunting preserves. The British planters in Western Ghats set up similar game preserves. On independence, as populations of the larger wild animals and birds declined many of these hunting preserves have been converted into wild life sanctuaries and national parks. These tend to emphasize the preservation of flagship species like tigers, and concentrate on elimination of all demands of local tribals, herders and peasants through a guns and guards approach as their main concern.

## IMPACT ON CONSERVATION TRADITIONS

The process of absorption of small scale societies into large scale societies has progressed to different degrees in different parts of the world. It has

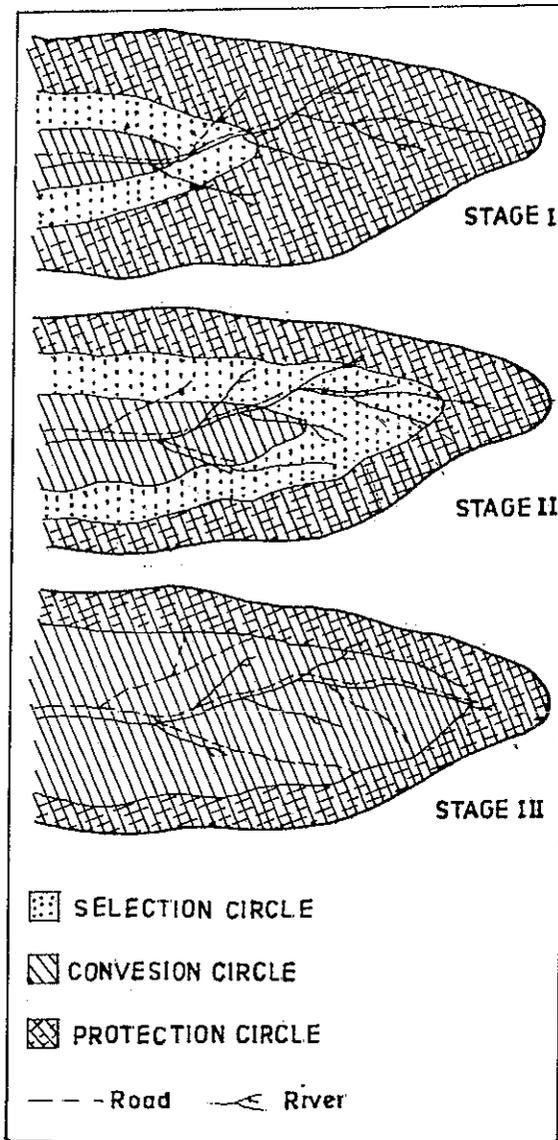


Figure (4a).

a. Working plans of the Ranni forest division of Kerala, 1950-80. This Figure shows that the protection zone (set aside for watershed conservation), selection zone (earmarked for extraction of a limited number of trees on a sustainable basis) and conversion zone (devoted to clearcutting and raising of monoculture of commercial species) have kept on shifting in response to exhaustive resources use (after FAO, 1984).

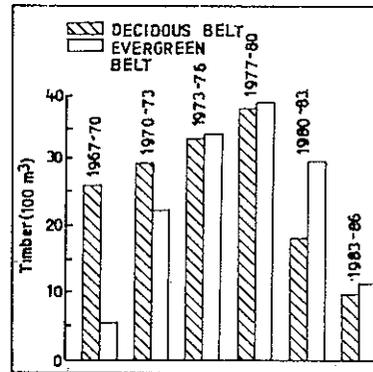


Figure (4b).

b Timber harvests by the plywood industry from the Uttara Kannada district of Karnataka State, 1967-85. It is evident that pressures of non-sustainable use have forced this industry to shift from more accessible deciduous forest tracts to less accessible evergreen forest tracts, and that timber supplies from both zones have fallen off.

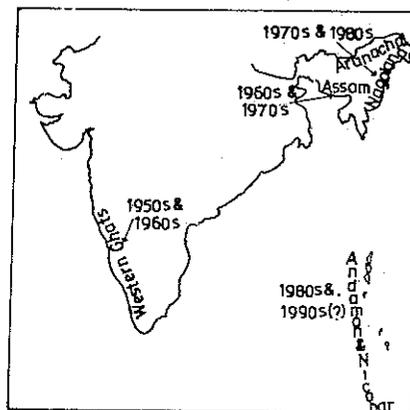


Figure (4c).

c. Geographic shifts of the plywood industry in India. The non-sustainable resource use methods of this industry have kept it shifting over time to more and more remote areas of the country as resources from more accessible areas near exhaustion.

Fig. 4. Patterns of sequential exhaustion of resource use at different spatial scales.

gone farthest in countries of western Europe where industrialization was first set in motion over two centuries ago. It is just beginning to take off in countries like New Guinea. Within a country too the process may proceed at variable rates. Thus in India, it has gone relatively far in the industrial belt of Punjab and Haryana, the least in parts of northeast such as Arunachal Pradesh. India may indeed be remarkable in harbouring within a single nation state the greatest range of variation in terms of transition from small scale to large scale societies. Thus, some 7% of the Indian population is classified as belonging to scheduled tribes. Hunting-gathering and shifting cultivation characteristic of horticultural societies, still remain significant in the economy of these tribal populations. The tribal communities also retain many features of the social organization of small scale societies, including the role of community based decision making in prescribing norms of social behaviour in relation to the members of the community. However these tribal communities are no longer self sufficient, nor are they in full control of their own resource base, barring special exceptions such as Sentinelese islanders of Andamans. Almost everywhere they are now linked to the larger economy; the forest produce they gather (or fell with their axe) are largely for sale; they also buy many commodities from the market. They have variable, and rather uncertain, level of control over the living resources in their own localities. On the peninsula, this control has largely passed to the hands of state authorities; in the northeastern states it is still to fair extent vested with local communities, or individuals or tribal chiefs. Even here however there is a lack of clarity as to exactly who controls what resources, so that there is little of firm community control. The cultures, religions of these tribal communities have also changed substantially on contact with the large scale society. These changes include conversion to Christianity or absorption into mainstream Hinduism. These tend to weaken the belief in '*sthala-devatas*', spirits, deities, rooted in particular localities. Other, non-tribal, rural communities have changed similarly, to a greater or lesser extent, beginning, in particular, with the British rule, and at an accelerating pace in recent years. These changes have, by and large, tended to erode the self-organized systems of conservation, the systems of sacred sites, throughout the country. These processes of erosion may best be assessed in terms of their consequences for the seven principles of design considered above.

### **Design Principle One**

#### *Balance of Benefits and Costs*

The continuance of conservation systems would evidently be affected

by the relative levels of benefits and costs perceived by local communities. The benefits may be tangible; as ecosystem services (e.g., watershed conservation, firebreaks) or as resources obtained occasionally or at low levels of harvest (e.g., grass rather than wood). They may also be intangible (e.g. respecting deities or gigantic trees). The value ascribed to such benefits would vary with how dependent the local communities, as well as others with access to the locality are on such resources.

For a variety of reasons values of these benefits have substantially depreciated in the perceptions of people with access to the sacred sites and their resources. Modern technological developments have prompted changes in resource use practices of local communities, as well as brought to them access to newer kinds of resources and resources from elsewhere reducing their dependence on local resources. Thus, Gangtes, a group of Kuki tribes of Manipur have traditionally depended on shifting cultivation. During the slash and burn operations involved fires may spread, and sacred groves surrounding the habitations have traditionally served the function of firebreaks. However, in villages close to towns, such as Koshbong (Churchandpur district, Manipur State), pineapple cultivation on terraced hill sides has replaced shifting cultivation. Sacred groves are therefore no longer of significance as firebreaks. In consequence the practice of protection to sacred groves has been discontinued, in part for this reason.

Yet another reason that has contributed to the disappearance of the sacred grove of Koshbong is that it would no longer serve the function of showing respect to the local deities. This is because the tribal animist beliefs are now replaced by acceptance of Christianity. Christianity prescribes faith in a supreme god who is everywhere. As a corollary the god does not reside in any particular locale, and cannot be associated with any particular patch of forest, or spring, or tree. In effect, religions like Christianity and Islam desacralize nature and eliminate the rationale for respecting a sacred site (White, 1967).

Hinduism too does this, though to a lesser degree. It is a more eclectic faith based on absorbing the local deities of small scale societies, as incarnations of deities of Hindu pantheon, particularly the god Shiva and the goddess Durga. Unlike Christianity, Hinduism can therefore accept the continuing veneration of sacred groves, or ponds, or of trees like peepal or animals like hanuman langur as a part of legitimate religious practice. However the more formal Hinduism, also tends to emphasize the worship of idols and temples over tree and forests. Hindu priests therefore often encourage the liquidation of a sacred forest to be replaced by a temple to the presiding deity. Indeed the priests may do so on behalf of timber contractors assuring the local people that they would perform appropriate rites to placate the deities of the sacred forests, who might otherwise be

offended at the cutting down of the forest (Nayar 1987). Furthermore veneration of sacred sites tends to be a function of local generally non-Brahmin, priesthood. As small scale societies come in contact with the larger society, the Brahmin priesthood is replacing this rural non-Brahmin priesthood and with that the tradition of respecting and protecting sacred sites. Thus in Mensi village (Sirsi taluk, Uttara Kannada district, Karnataka), the sons of priest officiating are not inclined to carry on the tradition, the grove has been permitted to be encroached upon by a neighbouring farmer belonging to the Brahmin caste.

Escalation of perceived costs is, of course, the obverse of depreciation of perceived benefits. Contacts with large scale societies in many ways contribute to such escalation of perceived opportunity costs of continued protection to sacred sites. These opportunity costs may involve foregoing uses of living resources, such as timber from sacred groves, or foregoing alternative uses of land or water, as for cultivation or aquaculture. Indeed the yields from arecanut orchards in Uttara Kannada depend on the availability of substantial amounts of leaf manure from forests. The clamour for leaf manure for arecanut gardens made the British allot sacred Kans as 'betta' or leaf manure forest, following forest settlement in Sirsi and Siddapur in early part of this century. Where individual bettas were not granted some of the kans were thrown open as commons for extraction of leaf manure and other biomass. In eastern Sirsi, according to Collins (1922) 769 ha of Kans were added to the minor forest. The demand for such manure has escalated with development of marketing facilities and higher prices for arecanuts. An arecanut orchard owner has therefore converted the sacred grove of Mensi (Siddapur taluk, Uttara Kannada district, Karnataka) into a patch of forest dedicated to supply leaf manure for his orchard.

It is, of course, not just the opportunity cost of protecting the living resources for local communities that is of relevance. Often what is more relevant is the opportunity cost to the outsiders, including the government agencies and commercial interests. All over India state controlled forest resources have been made available to forest based industries such as plywood manufacture at highly subsidized prices. They have then been overexploited and sequentially exhausted. The plywood resources of Uttara Kannada district of Karnataka had been subject to such overuse and depletion following 1940's (Fig. 4). With plywood resources of reserve forests largely depleted by early 1970's, some of the larger sacred groves of the district harboured the only surviving good stocks of well grown trees suitable for plywood manufacture. Many of these sacred groves had been taken over as part of reserve forests in the forest settlements of late 19th century, but not subjected to extraction. In early 1970's the Karnataka Forest Department clearfelled several of the larger ones, such as a 21 ha sacred grove at

Menisi in Sirsi taluk and planted them with eucalyptus. The district Coorg of Karnataka also had several large sacred groves, commented upon as among the best he had seen by Dietrich Brandis, the first Inspector General of Forests of British India (Brandis 1897). Many of these were also felled by the forest department in early 1970's; as well as encroached upon for coffee plantation and habitation (Kalam 1996).

Sacred ponds, often attached to temples met the same fate when the technology of freshwater fish culture became available. The Government Fishery Departments then took over many of the larger sacred ponds, poisoned and removed the diverse aquatic communities that they supported and converted them to fish culture. The fish so cultured were auctioned to traders with revenue accruing to the Government. This for example was the way Devikere, a large sacred tank of the town of Sirsi (Sirsi taluk, Uttara Kannada district, Karnataka) was treated in 1970's.

Sacred sites may also be affected when the land or water bodies concerned have alternative uses that become more attractive with time. Population growth and commercialisation of agriculture have greatly increased the demand for land for cultivation. This has often led to encroachment on sacred groves, as for example, at Golgodu (Siddapur taluk, Uttara Kannada district, Karnataka). In fact a farmer of Golgodu who has thus encroached on the sacred grove has done so against the wishes of many other members of the community. However the community is no longer in a position to enforce its will on the encroacher. Such pressures have also affected devara-kadus of Coorg.

Pressures for alternative uses from outside the local community may also affect sacred sites. These include construction of reservoirs for hydroelectric or irrigation projects, leading to submergence of lands, including sacred groves. A large number of sacred groves have thus been submerged under the Panshet dam west of Pune city (Velhe taluk, Pune district, Maharashtra). Many other sacred groves that remained above the submersion zone were cut down by farmers whose cultivated lands were been submerged and who expected to be settled in alternative sites several kilometers away (Gadgil and Vartak, 1976). In Mayurbhanj district of Orissa, Subarnarekha Irrigation project has destroyed about 62 'Jahiras' -sacred groves recently. The main canal of the project is also going to threaten many more Jahiras.

### **Design Principle Two**

#### *Well Defined Resource Boundaries and Social Boundaries*

The development of larger scale agrarian or industrial societies demands dissolution of resource boundaries on smaller community controlled scale

to facilitate extensive resource transfer. Along with the resource fluxes come migrations of people blurring boundaries between communities. Both these open up sacred sites to influences from outside and lead to their erosion. Thus fishing in the more hilly areas was earlier a monopoly of members of local community, especially those belonging to fishing castes. This is no longer so with the opening up of transport routes, so that fishermen from outside, and others such as army people may come and fish in streams everywhere. They may also employ highly destructive methods such as dynamiting.

The outsiders do not respect practices such as sacred sites either. Thus in village Machiyal (taluk Nagarotta ? district Dharamshala, Himachal Pradesh) the army people were reported to have fished in the sacred pond. "On 26 May 1996, tragedy struck the congregation of mahseer fishes at Shishila near Sulya, a small village in Dakshina Kannada district, Karnataka. The entire lot of fish, all mahseers, zealously guarded and protected by the local villagers in the river Kapila flowing by the side of Sheshileshwara temple was poisoned by fishermen with severe toxic compounds, killed mercilessly and thus made unfit for any purpose. The reason was that being a protected place, a temple sanctuary, where fishing has been strictly prohibited from 1938, the villagers reprimanded four fishermen for fishing illegally in the night. The fishermen in turn, wrought destruction on the fishes." (Jayaram, 1997). A similar incident also took place in Sringeri taluk of Chikamagalur district of Karnataka.

We have already mentioned above several instances of Government machinery intervening to take over sacred groves or sacred ponds, as local communities have lost their control.

### **Design Principle Three**

#### *Social Organization Competent to Manage Sacred Sites*

Through much of India's local community based social organizations competent to manage sacred sites have given way to new social organizations subservient to larger polity unable to do so. On the mainland this process has gone on for well over a century; but in some of the more remote areas such as in Manipur it is more recent. Thus amongst the Kuki tribe called Gangtes in Churhandpur district of Manipur the traditional social organization persisted till 1950's. Over the last 40 years it has gradually given way especially in localities close to the market town of Churhandpur. Thus traditionally the Chief of any village was nominally the owner of all land and property, and was given a certain portion, about 5% of the agricultural produce by all members as the rent. The Chief however was expected to provide hospitality to all visitors and discharge

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other social responsibilities with the help of the supplies so received. The council of elders and others made all community wide decisions, including sanctions against members violating rules governing the management of sacred sites. This social organization has totally broken down close the market town, with the Chief asserting his ownership rights over all land and demanding that others buy it from him for cultivation and pay him royalty for cutting wood from forested patches. At the same time, protection to sacred sites has also fully eroded from these localities (Hemam, 1997).

#### **Design Principle Four**

##### *Monitors Accountable to and Respected by the User Group*

Traditionally the protection to sacred sites was maintained by belief in omniscience and powers of local deities complemented by enforcement of the deity's will by priests and leaders of local community. Just as the social organization has broken down, so has the faith in omniscience and power of the deities. This is particularly evident in the Christianised tribal communities of northeastern India, where protection to old sacred sites has been largely abandoned along with the belief in local nature spirits. But elsewhere in India too the belief in these supernatural monitors, the local deities is weakening, to be replaced by deities of Hindu pantheon, who may be worshipped in man-made temples without any association with sacred trees, or groves. This weakening of protection through loss in faith in local deities is greater, greater the proximity to market towns in predominantly Hindu state of Karnataka as well. Thus a comparison of an area close to the market town of Kumta and much further away in the district of Uttara Kannada in Karnataka shows a significantly lower level of association of deities with sacred trees and sacred groves in the area more exposed to market influences.

#### **Design Principle Five**

##### *Collective Choice Arrangements*

With the dissolution of local community control over resources, and local social organization, decisions on resource use, including protection to sacred sites pass into the hands of more centralized state machinery with little or no scope for arrangements reflecting collective choice by local communities. On takeover with the Forest Settlement beginning 1880's, the British policy towards the Kans of Uttara Kannada was one of stringent protection. Yet there were many lapses. In Uttara Kannada sacred kan demarcation during the period of early forest settlement (1880-1920) was imperfectly done. Also some were converted into 'betta' (leaf manure forests) and some others into 'minor forests' open to all for exploitation

which in practice was carried out in unregulated fashion during the British period itself (Collins, 1922). Kans were, during post independent period included in forest working plans for selective felling of particularly industrial timber and even fuelwood (Shanmukhappa, 1966; Thippeswami, 1963). All this has contributed to erosion of protection to sacred sites, as in the village Golgodu (Siddapur taluk, Uttara Kannada district, Karnataka) mentioned above where an individual farmer has encroached on a sacred grove against the wishes of a majority from local community. In case of Oran in Devikot village in Jaisalmer district of Rajasthan, Muslim community does not believe in the restrictions on cutting trees from Oran. At the same time they are also dependent on Oran as like other villages to graze their cattle. But other villagers cannot take any legal action against the violators as the Oran land is under control of the government and not of the community. So if some initiative starts from villagers towards conservation of the Oran, villagers cannot legally enforce it.

### **Design Principle Six and Seven**

#### *Flexible Rules and Graduated Sanctions*

The centralized bureaucratic procedures pertaining to the management of natural resources are rigid and insensitive to particular local context. They are also unsympathetic to local traditions including those of sacred sites. This is evident in several examples of the state interventions leading to liquidation of sacred sites narrated above.

### **SCALE OF EROSION**

All the trends in recent past thus seem to militate against the seven principles for successful functioning of self-organized conservation systems such as sacred sites. There is indeed abundant evidence of the consequent erosion of such systems. Such erosion took place much earlier in Europe as Christianity spread buttressing states with concentration of power in the hands of the aristocracy and the church. (Hughes, 1994) summarises much of the pertinent evidence. In India such erosion gathered pace as the consolidation of British rule after 1857 was followed by land settlements and forest reservations that denied the legitimacy of community control over land and water resources. Dietrich Brandis the first Inspector General of Forests (1864-1882) was a witness to this early phase of destruction of India's sacred groves (Brandis, 1897). He records: "Very little has been published regarding sacred groves in India, but they are, or rather were very numerous. I have found them in nearly all provinces. As instances I

may mention the Garo and Khasia hills... the Devara kadus or sacred groves of Coorg ... and the hill ranges of the Salem district in the Madras Presidency .... Well known are the Swami shola on the Yelagiris, the sacred forests on the Shevaroy's. These are situated in the moister parts of the country. In the dry region sacred groves are particularly numerous in Rajaputana..... In the southernmost states of Rajaputana, in Partabgarh and Banskara, in a somewhat moister climate, the sacred groves consist of a variety of trees, teak among the number. These sacred forests, as a rule, are never touched by the axe except when wood is wanted for the repair of religious buildings, or in special cases for other purposes".

This attrition continued through the British regime. Its pace picked up again after independence as rapid development of transport and communication networks and of forest based industries led to another spurt of deforestation in areas that were earlier much more difficult to access such as northeast India. In these areas the destruction of sacred groves took place primarily in 1950's and 1960's (Gadgil et al., in press).

Can we then estimate the extent of such erosion that has occurred? Chandran and (Gadgil, 1993) attempted to do so for a limited area of 25 km<sup>2</sup> in Siddapur taluk (Uttara Kannada district, Karnataka). They constructed a landscape map labelled with local names of the landscape elements. These names provide clues to the historical pattern of land cover and land use. On this basis they surmise that 5.85% of the land was earlier under a system of sacred groves; this had come down to 0.3% at the time of their field study in 1991. Gadgil et al., (in press) conducted extensive interviews with Gangtes, a group of shifting cultivators of Churhandpur district of Manipur in 1997. Many of those interviewed were personally familiar with the system of sacred sites that prevailed prior to their destruction beginning in 1950's. Their accounts suggest that somewhere between 10% to 30% of land and waters were earlier treated as sacred sites. In Kerala there is a tradition that 1/7 of the land must be set aside as a sacred grove dedicated to snakes when bringing new forest land under cultivation. These findings suggest that it is possible that 10% or more of land and waters may have been covered under sacred sites in pre-British times. What may the total area of sacred groves be in present day India? The level of 1/3% noted above for Siddapur is an unusually high level today. Such a level may hold for only a small proportion of the better forested tracts of India which cover parts of Western Ghats, Chota Nagpur plateau and Northeastern India. These amount to less than 10% of the total country. In rest of the country the levels must be far lower. An estimate of the latter may be obtained from an admittedly incomplete inventory of sacred groves of Maharashtra prepared in 1973-74 (Gadgil and Vartak, 1981). The total area of sacred groves in this inventory amounts to 3570 ha which is a mere

(1.16 /100)% of the state of Maharashtra. The total area of the sacred groves of India as a whole is however more likely to correspond to this level; it would then come to 33000 ha. If the original area of sacred sites amounted to 10% of the land and waters, then this amounts to a decline by a factor of 1000.

## REASONS FOR PROTECTION OF SACRED GROVES

Nevertheless sacred sites continue to be protected, albeit to a much lower degree in present day India. This may be because of (a) persistence i.e. continuation of traditional protection, (b) revival, i.e., resumption of earlier practices of protection that had lapsed, or (c) emergence, i.e., institution of protection on a site without an earlier tradition.

The seven design principles remain relevant in these cases of persistence, revival as well as emergence. An appropriate balance of benefits and costs is particularly relevant in cases of revival and emergence; persistence may be found in certain conditions, even in face of an adverse benefit-cost balance.

### Persistence

The village Mathigar (Siddapur taluk, Uttara Kannada district, Karnataka) harbours a patch of pristine evergreen forest of 1 ha in size, rich in species like *Vateria indica* right next to paddy fields on level ground. There are fairly extensive stretches of *Acacia auriculiformes* and *Casuarina equisetifolia* plantations as well as degraded evergreen and moist deciduous forests and tree savannas in the neighbourhood, so that the sacred grove is by no means the only source of woody vegetation of the locality. In fact there is a taboo on the removal of any woody matter, including dead and fallen wood from the sacred grove. Neither is the grove important in providing any ecosystem services such as watershed conservation. There are thus no tangible benefits of the grove; retaining it does incur to the community substantial opportunity costs. These opportunity costs are in terms of income which may be accrued by felling the wood, income which is very large relative to their earnings from small scale agriculture. The opportunity costs are also substantial in terms of the level land on which the grove stands and which may be converted to paddy cultivation.

The villagers of Mathigar are then maintaining protection to their sacred grove despite adverse balance of tangible benefits and costs. It is notable that this is happening in a single caste Karivokkaliga village. Karivokkaliga is a small community of erstwhile shifting cultivators who are still very poorly linked to the market economy. They retain strong

community level organization for deciding on disputes amongst their own community members. They retain strong faith in the deities believed to be resident in the sacred grove and have community level ability to regulate the behaviour of their own members so as to ensure that they do not violate the taboos against interference with the sacred grove. The situation of Mathigar then does conform to several of the other six design principles for successful functioning of self-organized conservation systems.

The story of village Gani (Shrivardhan taluk, district Raigad, Maharashtra) narrated by Gadgil and Vartak (1975) provides an illustration of a sacred grove maintained by the local community of Kunbis because of an attractive benefit/cost balance. These authors came across the villagers of Gani during the course of a survey of sacred groves of the Maharashtra Western Ghats. This village had a sacred grove of 10 ha dedicated to goddess Kalkai in the catchment of the only remaining perennial stream of the village, all the other forest in the neighbourhood having been liquidated earlier. The forest was also important as a source of shade to the cattle during the afternoons. The Maharashtra Forest Department had marked the trees in the grove for clearfelling. This felling would not have benefited the local villagers in any way, except through some temporary employment as wage labour. They were therefore very much interested in saving the forest, but had no way of influencing the remote central authorities of the forest department in any way. However a sympathetic local Range Forest Officer informed them of the authors' ongoing survey of sacred groves, suggesting that they may be able to help them out. They wrote to the authors who visited the village and the sacred grove and carried their request to the Chief Conservator of Forests of the state. This official agreed to the request on grounds of personal friendship, but remarked that he saw no merit in saving these "stands of overmature timber". It is evident that local ecosystem services, which the villagers valued were of no concern to the centralized authority focussed on wood as a commercial commodity.

Apart from an appropriate balance of benefits and costs for the villagers of Gani, several other principles of design were satisfied as with Mathigar. The local Kunbi community is socially homogenous and not strongly linked to market forces. It has community level decision making machinery to regulate the behaviour of members of their own community. They believed in the monitoring power of their local deity. Importantly of course, the rules governing how to treat the sacred grove are no longer in control of this local community, but framed by a rigid, centralized authority with no accountability to local community. That is of course why the grove was about to be felled.

### **Revival**

The tradition of sacred groves is not only being maintained in some cases, in other cases it is being revived. Such cases of revival seem dependent on local communities perceiving tangible losses of benefits on liquidation of the sacred grove of a level sufficient to offset the costs of revival of the tradition. Some of the most interesting cases of such revival come from northeastern states like Manipur and Mizoram where the once extensive network of sacred groves was largely destroyed in 1950's on development of a transport network and a lucrative market for timber coupled to conversion to Christianity. But in this tract where shifting cultivation prevailed, some of the sacred groves encircling the settlements served as firebreaks during the slash and burn operations. In several villages of inhabited by Gangte tribals of Churhandpur district of Manipur such revival of sacred groves encircling habitation has taken place. Since now the community has embraced Christianity, the groves are no longer being viewed as abodes of deities. In communication with outsiders they are called "forest reserves", or as Malhotra (1990) reports for Mizoram "safety forests". The term used for the grove in their own language however remains as before 'Gamkhal'. Protection to these gamkhals continues to be organized through monitoring by local community members and implemented through sanctions for violation imposed by the community leaders. This is possible because in the more remote Gangte villages traditional community level organization is still functional.

There is however a clear pattern in the spatial distribution of villages where such revival has occurred. In villages close to the market town of Churhandpur the whole landuse pattern has changed with all land now belonging to individuals; terraced and bought under permanent cultivation of commercial crops like pineapple. In these villages the function of sacred groves as a firebreak is irrelevant, nor do these villages retain the community level organization capable of monitoring and enforcing protection. In such villages there has been no revival. The cases of revival become more frequent as one moves to the interior, away from the market town and roads, to settlements which continue the practice of shifting cultivation and retain more traditional forms of community organization.

### **Emergence**

Finally, there are interesting lessons to be learnt from new emergence of sacred groves in places where none existed earlier. One can see three types of contexts in which such emergence may occur (a) It may employ religious beliefs, but serve a tangible function (b) It may relate to the traditional religious beliefs without serving any tangible function (c) It may

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relate to the state machinery attempting to ensure protection through the medium of traditional religious beliefs. The sacred forests newly established by people in the areas of Almora and Pithoragarh districts in Uttar Pradesh are instances of case (a), serving tangible functions. In Dharamgarh area which is on the border of the two above mentioned districts, about 25 villagers are protecting extensive forest areas dedicated to the local goddess. The area is at around 2400 ft. from mean sea level in very remote hills of Kumaon Himalaya. All the economy is mainly dependent on agriculture and people are directly dependent on forests to meet daily requirements like firewood, fodder, timber etc. Forests were also under threat because of market demand for timber. Though the local panchayats were having ownership over the area, they were unable to protect the forest. Finally villagers decided to handover the forests to local goddess—Kokilamata who is supposed to be the goddess of justice. They prepared an agenda for protecting the forest and offered it to goddess. Then in a ritualistic fashion they also marked the boundaries of forests offered to goddess. People were allowed to cut the twigs of trees, collect firewood and deadwood. Nobody was allowed to cut the live plant; otherwise goddess will punish the violator. The process was started around 1982 from the village Jakhani in Almora district and got spread in more than 25 villages around. In villages like Madigaon, Phanku, Dharamgarh people are getting tangible benefits to meet complete their requirements of forest produce.

The initiative for the establishment of this sacred grove probably came from local people, although today panchayat members as well workers from a Gandhian Ashram at Dharamgarh claim credit for this experiment. Today people are permitted to harvest dead trees and green twigs as well as graze their cattle in the sacred grove. There is no commitment to protect animals with the goddess. People hunt various animals for various purposes e.g. medicinal treatment, meat etc. This low level regulated harvest of living resources from the sacred grove is clearly providing sufficient tangible benefits to offset costs of protection.

Two other examples of recent emergence of sacred groves in villages Bada Bhilwada and Shyampura (Zadol taluk, Udaipur district, Rajasthan) also relate to adequate tangible benefits being available. Boda Bhilwada and Shyampura are situated in foothills of Aravalli mountains in southern Rajasthan. A new tradition has emerged in these villages for the conservation of forest; which they call as "Kesar Chirkav". The story of this emergence was started in a literacy programme by a worker of NGO Sevamandir, based at Udaipur, Rajasthan. The worker told the villagers about such a "Kesar Chirkav" reported from Sagwada village, Udaipur district because of the influence of the famous deity "Kesariyaji" situated about 80 kms. south of Udaipur. People also came to know about the tangible benefits

because of the new tradition and they decided to do the same in their villages namely Bada Bhilwara and Shyampura coming under Panchayat-Bichiwada

In both the villages Joint Forest Management was initiated with the help of Sevamandir organization. Villagers brought sacred 'kesar' i.e. saffron from the "Kesariyaji" temple. They prepared saffron water using that saffron, and in ritualistic fashion they sprinkled the saffron water along the boundary of the area to be protected under "kesar chirkav". They also included JFM land in "kesar chirkav". Since that day in 1994 there was total ban on cutting trees from the area, harvesting of grass is allowed. With the help of forest department, plantation was done on "kesar chirkav" area. When the benefits started coming out, then there were different experiences in village Shyampura and village Bada Bhilwada.

Bada Bhilwada villagers experienced a lot many cases of violation of the restrictions. A few times the Forest Protection Committee also asked for the help of forest department for legal action against the offenders. People have faith for "Kesariyaji" but the belief of wrath due to violation of restriction is not deeply rooted.

Unlike Bada Bhilwada, Shyampura villagers deeply believe in wrath of "Kesariyaji" due to violation of restriction of not cutting trees. The forest protection committee has not used its powers since 1994. Today, grass harvest is the cause of tangible benefits available to people immediately. In Shyampura, villagers harvest the grass as per the rules of the forest protection committee. The committee charges Rs 5/- per sickle. Villagers harvest the grass and can easily get around Rs 30/- for a headload in the local market.

The villagers of Shyampura are happy with present scenario, but their neighbouring villages are encroaching the land of "Kesar Chirkav" as some of the land was part of the resource catchment of those other villages. Also sometimes because of vested interest they try to violate the restrictions.

We also have on record one case where a sacred grove has been established, by an individual farmer on his own land, apparently without any motivation relating to tangible benefits. This is a small grove of 750 m<sup>2</sup> dedicated to a local female deity, Yakshi: in village Mathigar (Siddapur taluk, Uttara Kannada district, Karnataka). But such cases are very likely truly exceptional at the present time.

Karnataka Forest Department, which in early 1970's, clearfelled large sacred groves, such as one at Mensi of 21 ha. to supply softwood to plywood industry, has also now programs of establishment of sacred groves called 'Pavitravanas', first initiated in 1988. As mentioned above the cream of Karnataka's forest resources was largely exhausted through a process of sequential overexploitation by early 1970's. This led to a gradual phasing

out of commercial exploitation of natural forests with the imposition of a ban on green fellings in the evergreen forest belt by 1985. As the stocks of commercially more attractive forest resources depleted, the Forest Department's motivation of maintaining a tight control over the resource base weakened. Simultaneously, democracy, first instituted in 1947 has been growing stronger with more and more power being devolved to people. It was in this setting that the program of decentralized administration with considerable powers vested with village cluster (or Panchayat) and district (or Zilla) level elected bodies was introduced in the Karnataka state in 1986. This weakening of the hold of centralized bureaucracy and political set up and simultaneous strengthening of decentralized Institutes is clearly favourable to the functioning of self-organized systems of resource management. A number of initiatives have therefore emerged over the last decade, including those of Joint Forest Planning and Management and Water User's Associations.

The experiment of Pavitravana, an initiative of the state forest department to create new protected sites with the co-operation of local communities and specifically designated as pavitra or sacred is an outcome of these forces. In 1988, Karnataka forest Department established a Pavitravana called as 'Sridhar van' in village Salkani of Sirsi Tahsil of district Uttara Kannada. Youth organization in the village took initiative in the process. Plantation of species used for ritual performances like yajnas is done on 2 acre land on hill top.

Now in the same village people are demanding to afforest the barren hill tops with useful species for NTFP, fuel, fodder etc. The later proposal is getting support from villagers because the plantation will serve as wind break and the Areca and Coconut gardens will be saved from heavy winds.

In another experience in the village Bakkal in Sirsi taluka of Uttara Kannada district with the initiative from people, state forest department has established a Pavitra vana spread over 28 ha. Earlier forest department was planning to have Acacia plantation on that area. But the people opposed it; with the support from the then Conservator of forests, Shri Yellapa Reddy, the Pavitra vana was constructed. People also consulted the local priest, Shri Nagendra Bhat and provided a religious and mythological touch to the 'Pavitra vana'.

The Pavitravana is based on Hindu scriptures which state about various plant species as favourite of gods. Planting of these species confers some merit to the persons who do it and also obviously some ecological functions these species perform.

Each auspicious star of Hindu mythology has its own favourite plant species—mostly a tree. Thus 'Ashwini' has *Strychnos nux vomica*, 'Bharani' *Emblia officinalis*, 'Kritika'—*Ficus glomerata* and so on. Similarly each

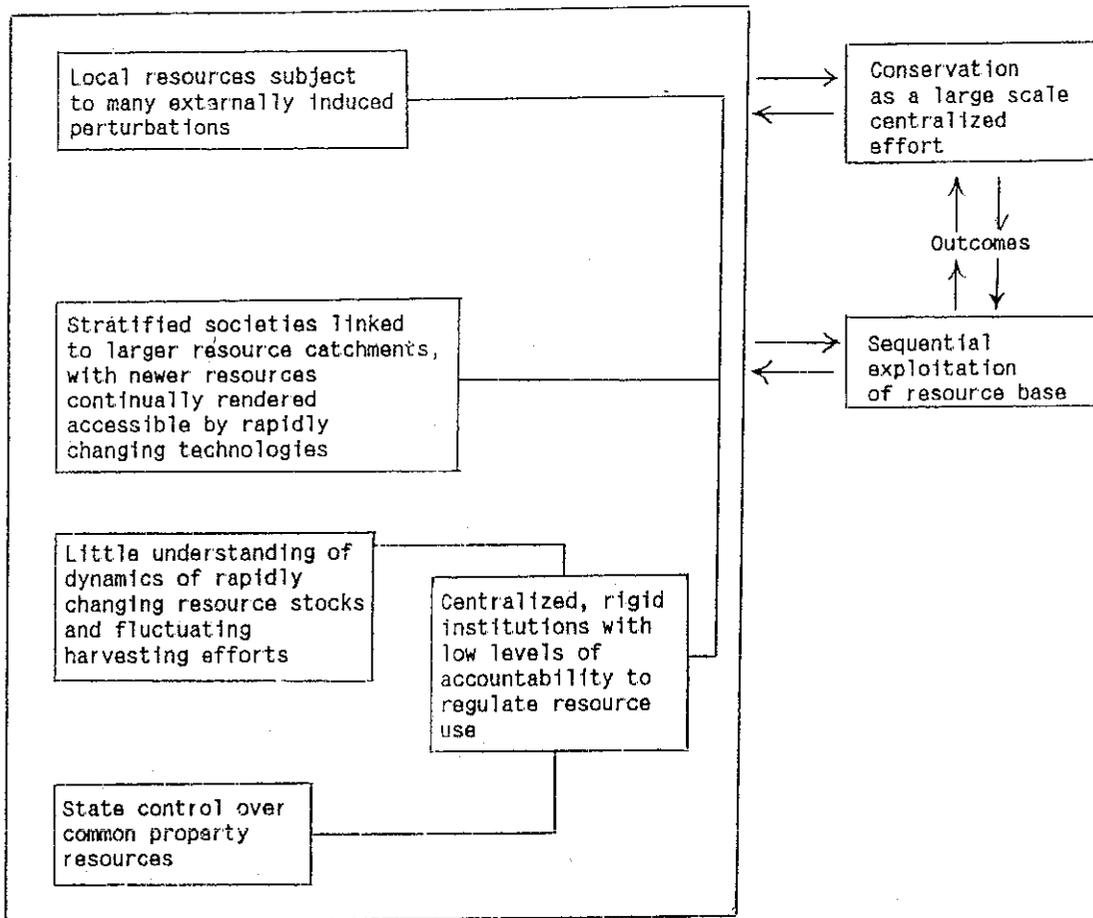


Fig 5. System of management of natural living resources characteristic of industrial societies

planet and each zodiac sign has its own associated plant species. The Hindu gods also have their own favourite plant species. For example, *Aegle marmelos* and *Calotropis gigantea* are favourites of Shiva and *Ocimum sanctum* for Vishnu. The Bakkal experiment shows that planting together of these various species mentioned in the scriptures in one place-organized under star, planet, zodiac gardens and plants favourite of gods in separate clusters do not however make up for the alarming degradation of sacred groves of natural vegetation which have been selectively felled, or clear-felled and converted into plantations or allocated as leaf manure forests (bettas) or added to the minor forests. At best then Pavitravanas uphold the supremacy of the more formal, Sanskritised traditions. They can also function as excellent arborata. However, planting together of species from diverse ecosystems will not give rise to a natural ecosystem

For instance in the star garden we find grown together *Acacia catechu* (Mrigashira star) and *Calotropis gigantea* (Shravana star) from dry open on

rocky habitats grown in the company of evergreens *Artocarpus heterophylla* (Uttarashadā star) and *Mesua ferrea* (Ashlesha star) and *Pinus longifolia* (Jyestha star). They are intermingled with various deciduous tree species like *Butea monosperma* (Hubba star) and *Spondias mangifera* (Hastha star). Nevertheless these groves can be of educative value as well as re-emphasize man's bonds with plants.

### PROSPECTS

What then is in store for the sacred sites, sacred groves, ponds, grasslands in coming years? There are obviously signs of strengthening of community level institutions which would favour the persistence, revival or emergence of such self-organized systems. But there are also continuing trends of weakening of traditional religious beliefs, especially of small scale societies, of 'little traditions' of faith in sthaladevatas-deities rooted in particular localities. That means that intangible benefits flowing from respecting the sites where such deities reside are likely to continue to be devalued. Nor would such deities be relied upon to help local communities monitor adherence to prescribed norms of behaviour. If the system of self-organized conservation sites is to continue, then such sites must provide to local communities tangible benefits, be they as firebreaks or in terms of dead and fallen wood. But such benefits would often turn out to be as inadequate as gathering market forces lead to an escalation of the opportunity costs of maintenance of sacred sites. The larger society will then have to invest in augmenting tangible benefits through special financial or other rewards (Gadgil and Rao 1994, 1995).

Simultaneously with availability of appropriate tangible benefits, the prospects for such self-organized systems of conservation would depend on effective community organization and devolution of authority to communities. As discussed above, there are many encouraging trends in this direction. It is then entirely reasonable to expect that these self-organized systems of conservation would continue to play a role worthy of their history in years to come.

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