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Sacred Ecosystems of West Bengal

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1. Sacred Groves

One of the many forms of nature worship in India is the tradition of consecrating certain forest habitats to a deity or ancestral spirits. These patches of forest, designated as sacred groves, constitute natural or near-natural vegetation, where harvesting of any living matter is generally prohibited. This customary protection of the habitat over centuries has resulted in conservation of a range of rare and endemic species in the sacred groves, which constitute a glorious example of traditional cultural institutions fostering biodiversity conservation.

The institution of sacred groves (SGs) dates back, according to Kosambi (1962), to the pre-agrarian hunting-gathering phase of human civilisation, and is known to thrive in most parts of India. Dietrich Brandis, the first Inspector General of Forests of India, records that sacred groves were "very numerous" and found "in nearly all provinces" (Brandis 1897: 12-13). However, with the institution of British colonial legislation imposing altered land use predicated on revenue generation, village forests and sacred groves began to disappear from most parts of the country. Presently, most sacred groves persist in areas where the forest laws have permitted village communities to manage Village Forests as a separate category.

Inspired by the pioneering studies of SGs in the Western Ghats by Gadgil and coworkers (Gadgil and Vartak 1976, 1981, Chandran *et al*. 1998; Gadgil and Guha 1992), most students of sacred groves have focused on the Western Ghats. Later on, records of sacred groves in northeastern States (e.g. Khiewtam and Ramakrishnan 1989; Tiwari *et al*. 1998) have made an impression that most existing sacred groves are presently confined to the biodiversity hotspots of India. Large SGs have been recorded to exist in both Western Ghats and northeastern States under the Fifth Schedule, where Village Forests are owned and managed by local communities, unlike in West Bengal where Village Forests do not exist. Most of the SGs reported in the available literature are recorded from the Western Ghats (numbering over 3,570: Gadgil and Vartak 1981), Uttar Pradesh (5,500: Sinha and Maikhuri 1998) and Meghalaya (26,326: Tiwari et al. 1998).

Box 1: Why Sacred Groves are Rare in West Bengal

Distribution of sacred groves is the richest in the southern and the northeastern States (Gadgil and Vartak 1976, 1981; Khiewtam and Ramakrishnan 1989; Tiwari et al. 1998). Large sacred groves from these States have been reported to represent climax vegetation and to contain rich floral biodiversity (Mohanan and Nair 1981; Chandran et al 1998; Tiwari et al. 1999). In contrast, sacred groves seem to have the scarcest distribution in States where the British East India Company enforced a novel land use system for maximizing revenue extraction. The *zamindars*, created by the Permanent Settlement Act of 1793, brought all "unproductive" woodlands under cultivation in order to maximize yield of land revenue, for the Company (Duyker 1987; Rangarajan 1994). The oppression by *zamindars* and moneylenders forced the forest tribals of the western districts of Bengal to migrate *en masse* to neighbouring districts (Duyker 1987). Permanent Settlement thus marks a watershed in the ecological history of eastern U.P., Bengal, Orissa and Bihar, which sealed the fate of the pristine forest tracts including sacred groves. While there is no concrete documentary evidence, it can be surmised that at least some of the sacred groves were cleared for revenue generation.

The next phase of destruction of the sacred groves began with the passage of the 1876 Forest Act, which brought most of the pristine forests, including sacred groves (SGs), under the Forest Working Plans for extracting valuable timber, first for the Empire and then, after independence, for the state government. Brandis (1897, p. 14-15), India's first Inspector General of Forests acknowledged the existence of SGs "in nearly all provinces" since pre-colonial ages. Most of them disappeared after the enclosure of forests by the state.

After independence, the waves of urban-industrial development marked the Third phase of destruction, which expunged most of the remnants of SGs from the village landscapes. Coal mines, steel plants, and big river projects took their toll on vast tracts of forest and tribal hinterlands, including their SGs.

1.1 Distribution of SGs in the State

There hardly was any investigation into the existing sacred groves of West Bengal until the late 1990s: the prevailing presumption has been that SGs had disappeared in the Permanent Settlement provinces, concomitant to the abolition of village forests, and subsequently, as a result of industrialisation. However, studies by Deb and co-workers (Deb and Malhotra 1997, 2001; Deb *et al*. 1997; Spadoni and Deb 2005) indicate that

over a thousand sacred groves still survive in the southwestern districts of West Bengal, albeit in much dilapidated condition. A recent inventory of SGs (Deb *et al*. 2005) counted over 274 SGs from three revenue Blocks of southwestern districts (Table 1).

SGs have also been recorded in North Bengal districts. About 30 bamboo sacred groves exist in the Rajbansi hamlets in Jalpaiguri district, and a dozen Buddhist SGs have been recorded from Darjeeling district. In the northern districts of Jalpaiguri and Darjeelinng, Buddhist pilgrims from neighbouring disricts visit the SGs and offer oblations. In Jayanti of Jalpaiguri district, villagers continue to protect large catfish populations in a sacred pond inside a sacred grove. Villagers of Hari Bhola maintain an old SG attached to the ruins of two temples in Bagh Duar since the year 1496. Hunting, and any sinful or pollutive acts inside the SG are strictly prohibited.

Table 1. Tree Species Diversity and Abundance in Sacred Groves in Southwestern Districts.

District	Block	No. of Sacred groves	No. of Tree Spp.	No. of Individuals
Bankura	VISHNUPUR	267	73	3491
Birbhum	MAYURESWAR-I	103	56	1930
Puruliya	NETURIA	99	53	892
Puruliya	SANTURI	72	55	1238
Total		274??	85	7551

[Source*: Deb* et al. *in press*]

1.2 The role of SGs in biodiversity conservation

In spite of the onrush of modernisation of land use and push for industrial development, numerous patches of SGs still exist in West Bengal (Deb and Malhotra 1997, 2001; Spadoni and Deb 2005). Deb *et al*. (1997) reported the existence of "remnants of sacred grove in almost every tribal village" in West Medinipur districts. All these SGs are protected by traditional taboos on hunting of animals and felling of trees inside the grove. Excepting in a few SGs, removal of dead wood and leaf litter is also customarily prohibited. Taboos on killing of plants and animals have maintained SGs as excellent wildlife sanctuaries for centuries. Gadgil *et al*. (1997) have argued that SGs may serve as important refugia for threatened and rare species. Empirical findings of rare and endemic species corroborate this conjecture (*e.g*. Nair and Mohanan 1995; Das and Chandra 1997). In addition, customary restraints on harvesting of bio-resources from SGS are likely to preserve the microclimate within the SG, recharge aquifers, and enhance nutrient cycling. Many of the SGs are the primary source for perennial streams, and are the last resorts to many animals for their water requirements in dry seasons (Malhotra *et al*. 1999). For instance, a sacred grove is the source of a perennial spring in Shushunia hill of Bankura district.

Certain ancient SGs are known to represent climax forests (Gadgil and Vartak 1976; Chandrashekara and Sankar 1998; Singh *et al*. 1998; Tiwari *et al*. 1999). Pushpagandan *et al*. (1998) showed that the floral biodiversity in small SGs may represent the normal range of floral species richness of tropical rainforests. No comprehensive floristic or faunistic inventory of SGs of Bengal region have yet been carried out, but available data indicate that SG vegetations in West Bengal contain a significant proportion of the local biodiversity. Although severely fragmented and dilapidated, these SGs account for a large area under vegetation cover outside the State forests. An inventory of SGs in two Southwestern districts of West Bengal reveals that there are 274 SGs in three administrative blocks of Puruliya and Birbhum districts, housing a total of 85 tree species (Table 1). Of these, about 17% are rarely occurring in the State forests (Deb *et al*., *in press*). Rare trees like *Martynia diandra*, *Morinda angustifolia* and *Tamilandia uliginosa* have been recorded from several SGs of Puruliya and Bankura districts. The Jambhalasini SG in Chhandar village of Bankura contains a species of liana that has not yet been recorded from the state-managed forest.

The Rajbanshi SGs in Jalpaiguri district seem to be a sanctuary for the metapopulation of the yellow bamboo (*Bambusa variegata var. straiatus*), which are rarely found in north Bengal forests outside the Rajbanshi bamboo groves (Deb *in press*). In Jainti Reserve forest of Jalpaiguri district, an ancient SG surrounding a sacred pond houses various species of lianas and a wide diversity of birds, amphibians and reptiles. Long before the forest laws prohibiting logging in the forest were enacted, local taboos had protected this SG from all human perturbations. Strict cultural prohibition on hunting and removal of boles, including dead logs, is still observed by all villagers and pilgrims visiting the sacred pond and grove.

Although the institution of SGs is known to facilitate conservation of a wide range of fauna (Malhotra *et al.* 1999), there is paucity of direct evidence of faunal conservation in SGs of West Bengal. Nevertheless, Deb *et al*. (1997) have shown that SGs in southwestern districts of West Bengal seem to serve as important bird refugia. An inventory of local land birds in five forest ranges of West Medinipur district revealed a distinct preference of 18 birds for the SGs. Four of these birds were sighted exclusively in the SGs in the district under study (Table 2). A threatened land

bird, Large Indian Parakeet (*Psittacula eupatria*) finds refuge exclusively in SG habitats (Deb *et al*. 1997). Further studies are likely to reveal a large number of animals that are crucially dependent on the SGs for survival.

Table 2: Habitat Preference of Resident Land Birds in West Medinipur district.

Habitat type	No. of species	% of Total
State forest only	10	23.8
Settlement only	1	2.4
Sacred groves only	4	9.5
State forest + Settlement area	9	21.4
Sacred groves + Settlement area	14	33.3
State forest + Sacred groves	3	7.1
All habitats	1	2.4
Total	42	100

[*Adapted from* Deb *et al*. 1997]

1.3 Ownership and Management of SGs

Most of the SGs are owned by village Panchayats, and managed by all villagers. A few SGs are owned by several families, while others are owned by temple trust bodies.
Management of SGs in terms of protection and regulation of biomass harvesting has large variation. Villagers tend to maintain and protect the SGs in a village, regardless of its legal ownership status. Clan-based management of SGs appears to be a widespread practice among the Austric tribes of central, eastern and northeastern India (Malhotra *et al*. 1999). In West Bengal, most ethnic SGs are managed by the village council. For example, the SG at Mohanpur village in West Medinipur district is managed by the traditional council of Santal villagers, but not by the Panchayat. The Bhumij, Lodha, Munda, Santal and Mahli SGs in southwestern districts and the Toto, Mech and Rajbansi SGs are all managed by respective tribal village councils.

SGs that have been sanskritised are generally characterised by a temple, which is managed by its trustees. The SG at Shibpahari village of Birbhum district, for instance, is managed by a temple trust constituted by members from two villages. In Birbhum, several mosques and *dargahs* have small groves, which are considered sacred, and maintained by the *imam* of the mosque or the custodians of the *dargah*. SGs which are not owned by any specific ethnic community are managed by the entire village. For example, the Jambhalasini grove of Chhandar village, and Bhairabthan grove of Bhagaband village in Bankura district are managed by the Panchayat members of the respective villages.

1.4 Sacred Groves: A Trans-Religious Institution

SGs are known to be a characteristic of most tribal village landscapes in West Bengal, Chattisgarh, Jharkhand and Orissa (Deb and Malhotra 1997; Malhotra and Das 1997; Malhotra 1998; Patnaik and Pandey 1998). However, a large number of SGs are also maintained by the non-tribal segment of the population in West Bengal Malhotra *et al*. 1999; Pushpagandan *et al*. 1998; Spadoni and Deb 2005).

In many parts of India, a number of ancient tribal SGs have been adapted by the local Hindus, especially the lower caste communities. Images of Hindu deities as well as built platforms, shrines or temples have been constructed in many of these groves. However, the tribal origin of the groves is discerned by their tribal nomenclature. Thus, SGs in Puruliya district of West Bengal, worshipped by Hindus, are still called *jaher-than* – Santali name of SGs. The process of sanskritisation continues to bring the tribal and subaltern traditions into the fold of the Hindu pantheon. Most subaltern Hindu SGs are called *garam-than* (sacred place of the village), which often have no images of deities. Such SGs seem to indicate an affinity with the tribal animistic tradition, and even with Buddhist or Tantric tradition. Some of these subaltern Hindu SGs contain images of Shitala and Manasa, and also some Buddhist deities. The *garam-than* at Muradi village in Puruliya, is worshipped by a Brahmin priest, although the SG does not contain any image of deity and its rituals are animistic. In Birbhum district, a Brahmin and a Scheduled caste priest are both required to worship at Dhramathakur SGs (Deb et al. *unpublished MS*). The Jainti sacred grove and pond in Jalpaiguri district are visited by both Buddhist and Hindu pilgrims, and the taboos on hunting and logging are strictly observed by both the communities.

Malhotra *et al*. (1993) have reported that pomegranate (*Punica granatum)* trees are held sacred in a mosque in Maharashtra, and conferred the origin of this sacredness to the prevalent Hindu cultural influence. However, SGs attached to Islamic shrines have seldom been reported in published literature. The only exception is a study that records the existence of a number of Muslim SGs in Mayureswar-I block of Birbhum district of West Bengal (Deb and Malhotra 2001). These SGs are around shrines erected in the past by *Pirs* (Sufi saints), and are visited by both

Hindu and Muslim devotees. While Sufism is no longer in practice in the common populace, the SGs prove to be a significant syncretic interface of Hindu and Muslim religious verities. Similarly, SGs housing *Shiva* and *Dharmathakur* are worshipped by both Hindu and tribal people.

Another class of SGs are believed to be the abode of evil spirits, whom villagers, including local Muslims, seek to appease by votive offerings. It appears that people's sense of sacredness of a place is a cultural legacy that transcends religious beliefs. Thus, the subaltern sensitivity toward a sacred grove and its resident spirit or deity crosses formal religious boundaries, bringing together Brahmanical as well as subaltern Hindu sects, Islam and tribal belief systems. At the subaltern cultural level, the institution continues to integrate the different ethno-religious factions of rural India.

1.5 Sustenance of A Conservation Ethic

Indigenous communities continue to maintain their SGs, and in some cases often plant new trees. The planting of non-sacred species, including exotics in some SGs (like *Eucalyptus tereticornis* and *Acacia auriculiformis*) indicate that the local people deem it necessary to maintain the groves. In a number of SGs, especially in temple groves in southwest Bengal, ornamental species (e.g. *Delonis regia*) and fruit trees (like *Anona reticulata* and *Psidrius guajava*) of no particular religious importance are also found. While the natural regeneration process has become disrupted, anthropogenic interference in terms of tree planting seems to have become a necessity in order to sustain most of the SGs, and local people evince signs of realisation of this need.

The tradition of selective use of trees for construction of temple or other specific sacred purposes notwithstanding, local communities tend to keep the SGs undamaged. In the southwestern districts of West Bengal, logging on special occasions are allowed in ca. 6.0% of SGs attached to temples; in these cases, only those trees demarcated by the temple priest are felled, while all other live and dead trees are left on the site.

1.6 Threats to SGs

SGs were once a part of the regional tract of natural forest. The processes of forest fragmentation and perforation – modern silvicultural practice of rotational clear felling, building of roads and railways, mining and urbanisation – has eventually isolated the SGs into "islands" of mature native vegetation, surrounded by a "sea" of human-modified environments. Fragmentation is known to lead to erosion of the forest seed bank, causing mortality of sedentary taxa like plants, leading to local extinction (Haila 1999; Spies and Turner 1999), and is thus a great threat to the remnants of SGs.

The process of sanskritisation of many tribal SGs is also known to place a greater emphasis on building temples or shrines and images of the deity than maintaining the original vegetation. In many cases, timber from the SG is extracted to build temple structures. Furthermore, the customary taboos on biomass removal from SGs are often ignored and violated by non-tribal people, who have little respect for the marginalised tribal religions and cultures.

In addition, the inroads of modernisation into the traditional societies, causing erosion of their belief systems (Doshi 1992; Deb and Malhotra 2001; Spadoni and Deb 2005), serve to decimate traditional institutions. Thus, a section of the young generation of the local people tends to consider the institution of SG as an embodiment of superstition and cultural backwardness. This cultural threat is no less threat to the SGs than that from industrialisation and urbanisation. Unless an inchoate awareness of the ecological and cultural values of the indigenous conservation ethic is appreciated by the state bureaucracy and galvanized into our educational system, the process of decimation of the SGs is likely to continue.

Box 2: Destruction of Sacred Groves: Instances from West Bengal

All extant SGs are small islands of vegetation, housing unique species assemblages that are highly vulnerable to perturbations. These islands are further fragmented by extension of agricultural and industrial activities. Perforation caused by roads and mining sites divide the SGs into typically small fragments of communities, where both species numbers and populations become too small to persist. The average rate of decline in species number with decreasing area is expressed by the well-known species-area curve, and is much discussed in conservation biology context (May *et al*. 1995; Halia 1999). Fragmentation is likely to have an additional effect, differentially on different species according to their species-specific characteristics. The total effect is likely to be non-linear relative to area, *i.e.*, negligible at first when fragmentation begins but then having increasingly adverse consequences on species composition after a certain threshold in the degree of fragmentation has been reached (Haila 1999).

The process of fragmentation of SGs is spectacularly instanced by an ancient SG at Chhandar village of Barjora block, Bankura district, where it has been crisscrossed by a road from Beliatore to Bishnupur town and a road to Sonamukhi town. A small Kali temple under an old *Saraca indica* tree on one side of the tri-juncture maintains the sanctity of the place. Two century-old sprawling banyan (*Ficus bengalensis*) trees survive on the oppsosite side across from the temple. About 20 m across from the temple, another small grove of old trees survive, behind which a vaishnava *ashram* has been erected. About 10 m north from the boundary of this *ashram*, another few banyan trees constitute a small SG, where villagers

place votive offerings of *terra-cotta* horses. The area covered by these tiny clumps of trees around the tri-juncture of roads and the age of the banyan trees suggest the large area and the rich species composition of the original grove.

During our surveys over the past decade, local people at many places reported existence of a SG before it had been expunged by a governmental agency. All such cases related to roads, power transmission lines, dam, irrigation canal, or public buildings. A large SG in Baghmara village of Neturia block, near Panchet, for example, was destroyed in the 1960's by the National Thermal Power Corporation in a bid to extend power lines over the area: the SG had to be cleared because it was too dense to extend the line through it. In early sixties, the Panchet and Maithon dams of Damodar Valley Project, submerged several SGs in dozens of villages upstream. In Garia village of Mayureswar-I block in Birbhum district, a small SG, along with the adjoining agricultural lands, was engulfed in 1990 by a private stone quarry.

Although SGs are by and large immune from extractive exploitation of plants and animals sheltered there, wood required for construction and repair of a temple is in some cases harvested from its grove. In the absence of regeneration or plantation, continuous removal of wood, even at a low frequency, eventually leads to dwindling of the grove. Building of permanent temple structures is by itself an important factor for destruction of sanskritised SGs.

The process of sanskritisation has destroyed many ancient tribal SGs. Whereas the tribal SGs contain no images of deities and spirits, sanskritisation invariably invokes erection of images of a Hindu deity. This eventually leads to the erection of a temple structure, which gradually increases in size, at the expense of the vegetation. In Bankura and Birbhum districts, images of Shiva, Kali, Manasa, Shitala and other Hindu deities have been erected in a number of ancient SGs, and most of the trees in the groves have been cleared to make room for elaborate temple structures.

In the wake of industrial development and urbanisation, indigenous populations are first extirpated, and their SGs are sanskritised, animistic beliefs replaced with images of deities and their temples. This process of decimation of aboriginal SGs is evident in and around Durgapur, Chittaranjan, Barrackpore, Haldia and other industrial townships. The disappearance of the Brahmasthan SG of Titagarh, close to the city of Kolkata, is a glaring example of sanskritisation, combined with modernisation, extinguishing a SG. The sacred grove that had existed there over a century ago had an indigenous name *Baram than*, which indicates a distinctly tribal origin. Later, the *Baram than* gave way to a Hindu temple, and the sacred place was given a sanskritic name 'Brahmasthan' (= abode of divinities). The construction of Barrackpore Trunk Road, as well as the urban sprawl of Titagarh, one of the major industrial townships, caused clearance of the grove. What was once a dense grove is now a bare ground, with two *Ficus religiosa* trees. A small nondescript Hindu temple was established in 1840s at a corner of the SG. Juxtaposed to this temple is another small temple that was built later. A mosque also was built close by the temple within the grove.

The memory of the non-existent grove still lives in the memory of a few old people. The name of the place itself has transformed in the parole of local residents and bus conductors as 'Barah Mastan' (= the big rowdy). The final blow of destruction came in the first week of September 2005, when the temples and the trees were destroyed to provide space for widening the Barrackpore Trunk Road.

2. Sacred Ponds

Unlike sacred groves, sacred tanks and ponds in India have received scant attention from researchers in socio-cultural institutions with conservation consequences. One plausible reason is that aquatic biodiversity is less familiar than more visible forest biodiversity. Thus, conservation status of such uncharismatic organisms as algae, diatoms, zooplanktonic animals and molluscs tends to remain neglected. A second reason, from resource management perspective, is that unlike forests and sacred groves, ponds are usually privately owned property, and therefore community control over such private property resources is presumed unlikely to be effective.

The only pond in the Indian subcontinent that has received any repute in ecological studies is the *Bostomi* pond in Chittagong district of Bangladesh. This ancient pond, protected by Buddhist, Vaishnava and Sufi monks in succession, is the only habitat for the last population of the black turtle *Trionyx nigricans.* An equivalent lentic body in India is the Vembanad lake in Kerala, which is the only habitat for the half-beak fish (*Hyporhamphus xanthopterus*) population. Apart from these two, there is no publication indicating the existence of a sacred water body where unique or rare taxa are conserved.

There is a large body of anecdotal evidence that sacred ponds are common in many States. In Karnataka, ponds attached to mosques are considered sacred (Gokhale 1998). In Sikkim and north Bengal, fishing and washing are prohibited in a number of sacred ponds and lakes. However, the status of biodiversity in these water bodies as a result of such protection is not known.

2.2 Distribution of Sacred Tanks in the State

A recent survey in West Bengal indicates that such sacred ponds may be more common in the country than suspected. In Chhandar village, near Beliatore of Bankura district, a small pond is accorded total protection by villagers (Deb and Malhotra 2001). The pond's name – *Bodher pukur* (Bodh's pond – seems to be derived from the word "Bouddha" (=Buddhist), suggesting that its sacred status is legacy of the Buddhist period (12th –13th century) in Bengal. The villagers believe that human use of the pond might disturb the goddess, and that whoever pollutes the pond water would be mortally punished by the angry goddess. The villagers observe a strict taboo on using the pond water for any purposes, except for a brief ritual ablution on the Manasa festival in mid-June. Preliminary results of an ongoing taxonomic study indicate at least two uncommon zooplanktonic rotifer species, an uncommon leech *Poecilobdella masiliensis*, eight fish species, and two ranid frog species live in this pond (Deb and Bersier, unpublished mss).

The Thakurpukur sacred pond in Belboni village, Bankura district, is used as a principal source of drinking water for two neighbouring villages (Deb and Malhotra 2001). Attached to a sacred grove consecrated to the goddess Manasa. The pond is protected by all villagers from any polluting activities like washing, bathing, etc. In order to prevent pollution by outsiders, the villagers have fenced the pond with barbed wire, the cost of which was borne by every household.

The Gorakshabasi tank at eastern Calcutta metropolis is attached to a temple of a deity whose identity is mysterious. Gorakshabasi may have been named after the Jain monk Gorakshanath, but the temple contains images of Radha and Krishna. The fish population in the tank is given total protection by the local community, and the fishes, composed mainly of Indian major carps, gather at the appearance of any humans at the quay of the pond in expectation of food offerings. The fishes are known to be fearless and fairly used to being fed and caressed by humans. The age of the pond is uncertain, but seems to be at least as old as the city of Kolkata, that is, over 300 years.

In Cooch Behar district, an old tank attached to Baneshwar (Shiva) temple is protected by the entire community. This temple and the tank were created by the king of Cooch Behar in the sixteenth century, and was renovated in the late 1750s. In a recent renovation in 2002, the pond bank was paved by concrete lining, changing the littoral habitat to a large extent. The pond houses large populations of *Ophicephalus morilinus* and turtles *Lissemys punctata* and *Chitra indica*, which receive complete protection from the community. Taboo on fishing and washing in this pond still continues. The strength of the tradition is evinced by the fact that in the flash flood of 1993, many turtles had escaped from the overflowed pond, but when the floodwater subsided, local people brought them back to the pond.

Inside Jayanti forest in Jalpaiguri district, a large pond is held sacred by the local Buddhist villagers. Fishing, bathing, washing and even stepping into the pond is forbidden. Every year on the full moon day of the month of *Baisakh* (April-May), a fair of *Pukhri Mai* (the pond goddess) is held in the sacred grove by the pond, where pilgrims from the neighbouring villages as well as from Nepal, Sikkim and Bhutan gather. During this fair, pilgrims draw the holy water from the pond for the purpose of drinking, cooking and ritual ablutions. A unique feature of the pond is that it houses large populations of catfish (*Clarius batrachus* and *Heteropneustes fossilis*). Pilgrims feed the fish with rice and bread crumbs, which the fish grab from the palms of people. The patch of forest surrounding the pond is also considered sacred, and has remained untrammeled for centuries.

A sacred pond in Chilapata forest and another in Bagh Duar near Adabari Ghat in Jalpaiguri district are also well protected. The latter is attached to two derelict temples, established in 1496. The fish species in the two ponds include *Barbus ticto*, *Ophicephalus punctatus*, *O. striatus*, *O. morulius*, *Nandus nandus* and *Heteropneustes fossilis*. Local people protect the forest patches around these ponds as sacred groves, where all pollutive activities (like excretion) are prohibited.

In Darjeeling Himalaya, Buddhist villagers prohibit tourists from polluting the Kali Pokhri sacred pond (altitude 3108 m a.s.l.). The dark water of this pond does not freeze in winter, although a thin crust of ice forms on the surface. The old-growth forest adjacent to the pond is a sacred grove.

2.3 Modernisation and the Disappearance of Sacred Tanks

In Cooch Behar town, a Shiva temple and a sacred tank, Sagar Dighi were established by the king of Cooch Behar in the year 1307. The tank was maintained as a principal source of drinking water in the neighbourhood, and the royal family used to draw the holy water from the tank for bathing before entering the temple for performing prayer rituals. Washing and fishing in the tank were prohibited. Over the past few years, the customary prohibition on washing and bathing has become lax. Sometimes the tank also receives waste from the neighbourhood, and the water is no longer safe for drinking. Over the past few years, the municipality has been selling tickets for angling in the pond.

Another tank, attached to the famous Madan Mohan temple, was created by the king of Cooch Behar in 1889. Washing and fishing were prohibited in this pond by royal decree, while bathing was allowed to a few privileged. After independence, the tank was ceded to the State Fisheries Department, which managed the tank for commercial returns from pisciculture. In 1994, the tank was handed over to a fisheries cooperative, which has weeded out all native fish and released fry of major carp. The tank water is now polluted from regular bathing and

washing, and also from extraneous "inputs" for fish culture. Apart from *Panchax panchax*, no other native fish was found to thrive in the tank. Until recently, a large number of tanks in Bankura, West Medinipur, Puruliya and Nadia were the principal source of drinking water for villagers. Many of these tanks were consecrated to certain local deities. Bathing, washing and fishing in these sacred tanks were strictly prohibited, and villagers used to keep their livestock from getting into these tanks. The value of such ponds and tanks shrank after the introduction of tube wells over the past fifty years. Now all these tanks have fallen victim of disrespect and neglect, and are open for bathing, fishing and washing of cattle and buffaloes. While the traditional customs of maintaining cleanliness regarding drinking water have evaporated, modern health and sanitary awareness has not taken roots; in many parts of southwest Bengal, tube wells are used mainly for irrigation, while pond water is used to fulfil all domestic water needs. Consequently, gastro-enteric diseases have become endemic in most villages where people still use pond water for drinking and cooking. The "weed fish" and frog species that were maintained in the ancient ponds though taboos on fishing, are now poisoned out for high-value pisciculture. This has also facilitated growth of mosquitoes and caused resurgence of some long-forgotten water-borne diseases like malaria, dengue and encephalitis. Modernisation has thus abolished the sacred status of many ponds, and occasioned public health menace in its wake.

3. Lessons from Community Management of Sacred Ecosystems

Recent evolutionary ecological studies indicate that under certain social institutional arrangements, individuals may sacrifice their short-term benefits to achieve long-term community benefits. Summarizing these studies, Ruttan and Borgerhoff-Mulder (1999) show that there are four 'principal conditions for conservation'. First, there must exist mechanisms to exclude outsiders from the use of the commons. Second, there must be intra-group mechanisms to enforce restraint; this may involve social threats of penalties (like ostracizing), or occult threats of supernatural disasters to offenders. Third, resources must be handed down to next generations, so that long-term benefits can accrue to them. Finally, "there must be no alternative forms of investment yielding higher rates of return than the conserved resource" (*ibid*.: 622).

The first three conditions above might explain the persistence of the sacred ecosystems. The fourth condition, that alternative forms of land use should not yield greater benefits than that from conservation, is also true for the sacred habitats, but the mechanism is not obvious from the neo-classical economic perspective. Indigenous societies count benefits from conserving the sacred ecosystems not in monetary terms, but in terms of non-use value of the resources and biophilia (Spadoni and Deb 2005). The religious value of sacred ecosystems is only an expression of the appreciation of non-use value of biodiversity (Deb and Malhotra 2001; Deb 2003). Furthermore, social approval and appreciation of a resource use mode, handed down from generations, constitutes a tradition, which creates a cultural value of the resources.

Customary social approval is of key importance in the prevalence of resource use modes. In many developing countries, a resource destructive behavior persists because it is profitable *and* approved or at least accepted by society, even when that behavior is illegal (Uphoff and Langholz 1999). Social approval/disapproval appears to be a crucial factor in the individual's choice of a behavior to conserve or destroy a resource item. In some cases, local people impose upon themselves more stringent restrictions than the legal prohibitions decreed by the government. "Individual profitability can thus be subordinated to the larger interests of the collectivity by community action rather than through state or legal action" (*ibid*.: 254).

With the state protection of private property and profit, discarding the commons for long-term community benefits and community institutions to maintain the commons has been the norm. Breakdown of community management system is caused by external interventions, especially market intrusion and new exogenous technologies that serve the market (Ruttan and Borgerhoff Mulder 1999; Burke 2001). Yet, regulated use of the commons by community members and exclusion of nonmembers are integral to the traditional land use systems (Ruttan and Borgerhoff Mulder 1999; Deb and Malhotra 2001). The persistence of the sacred ecosystems in West Bengal, in spite of the aggressive inroads of modernization into traditional societies, evinces the strength and potential of the communitarian ethos that subjugates the individual profit motives.

The communitarian ethos operates not only in the true commons, but also privately-owned resources that have some traditional cultural/religious value. The *Bodher pukur* and *Thakurpukur* ponds in Bankura district are privately owned. Nevertheless, they are managed by the entire community as commons. Particularly noteworthy is the fact that the respective owners of these ponds do not show any intention of excluding the community users from their property, neither do the villagers mind protecting the ponds on the owners' behalf.

The pattern of management of these sacred ponds provides several important insights into the modes of common property resource management. Firstly, all these ponds belie Hardin's (1968) conjecture of the "tragedy of the commons". None of these ponds are open access resources, as Hardin imagined in his mistaken formulation of the "commons". Rather, the sacred ponds serve as a resource in which all villagers have a stake. This is especially evident in the case of ponds that are a source of drinking water. The protection of Thakurpukur in Belboni village indicates that a resource (in this case drinking water) may be commonly managed for the common interest, when the stake is shared. The community may even go so far as to incur considerable cost to protect it (by fencing with barbed wire) from outsiders.

Secondly, the *Bodh* pond demonstrates that a landscape element may be respected and protected even when it has no direct use value to the

community. This pond seems to illustrate the popular appreciation of the existence value and bequest value of a natural resource. The appreciation of these non-use values of the resources is articulated in the myths and religious rituals concerning such sacred habitats (Deb 2003).

Finally, a common property resource management regime is possible to remain effective regardless of its ownership, provided it has a living tradition of community utility and cultural connotations of its customary use. Thus, Bodher pukur (privately-owned) in Bankura district, Baneswar temple pond (trust property) in Cooch Behar district, and the sacred pond at Bagh Duar (forest department property) in Jalpaiguri district, are as much well protected as is the community-owned Kali Pokhri sacred pond in Darjeeling district.

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