Understanding Livelihood Impacts of Participatory Forest Management Implementation in India and Nepal

WORKING PAPER No 8

Sacred Groves of West Bengal:
A Model of Community Forest Management

Debal Deb

The Overseas Development Group
University of East Anglia
UK

Understanding Livelihood Impacts of Participatory Forest Management Implementation in India and Nepal
Working Paper No. 8

Sacred Groves of West Bengal:

A Model of Community Forest Management?

Debal Deb
Centre for Interdisciplinary Studies, Barrackpore

Series Editor:
Oliver Springate-Baginski
Overseas Development Group - University of East Anglia, Norwich

October 2007

'Understanding Livelihood Impacts of Participatory Forest Management Implementation in India & Nepal' is a research project coordinated by the Overseas Development Group, University of East Anglia, UK, and supported by the UK Department for International Development Forestry Research Programme.

Project partners, including Winrock India, Delhi; Centre for Economic and Social Studies, Hyderabad; Sambalpur University, Sambalpur; Ramakrishna Mission, Calcutta; and Environmental and Resources Development Center, Pokhara, are undertaking studies to understand the actual livelihood impacts of different PFM implementation strategies in India and Nepal. This project working paper series, edited by Oliver Springate-Baginski, is one of the outputs of the project.

About the Author: Dr. Debal Deb is a biologist, with a doctorate in ecology from Calcutta University. His post-doctoral research included human ecology of marine and estuarine resource use at the Indian Institute of Science, Bangalore and ecological economics at the University of California, Berkeley, and has made extensive documentation of sacred groves and ponds in West Bengal. While conducting free-lance research in food web theory, agroecology, ecoforestry, natural resource management and community forest management, he founded *Vrihi*, the only non-governmental indigenous rice gene bank in east India, and *Basudha*, a demonstration farm where villagers learn techniques of building low-cost housing, biodiverse farming, ecoforestry, alternative energy use and traditional water harvesting. He can be contacted at: cintdis@hotmail.com

Copies of this reports, and others in the series are available from:
Dr. Oliver Springate-Baginski, Overseas Development Group, University of East Anglia, Norwich NR4 7TJ, UK. Tel.; (+44) 1603 592883. Fax.: (+44)1603 591170.
Email: oliver.springate@uea.ac.uk. Web: http://www.odg.uea.ac.uk/pfm/

Note:
'This publication is an output from a research project funded by the United Kingdom Department for International Development for the benefit of developing countries. The views expressed are not necessarily those of DFID' R.8101 Forestry Research Programme: http://www.frp.uk.com/

CONTENTS

TABLES

FIGURES

MAPS

SUMMARY

Sacred groves (or SGs) are distinct patches of vegetation (ranging in size from a small cluster of a few trees to a large forest stand spanning several hundred acres) which are consecrated in the name of local deities or ancestral spirits. Removal of any living things from the SG is a taboo, although dead logs and leaves are sometimes removed from some SGs. This institution is perhaps the best example of indigenous traditional resource use practices promoting conservation of biodiversity.

In West Bengal, most SGs are found in the southwestern districts where the tribal populations are the largest, and where industrial development has not expanded enough to expunge indigenous cultural traditions. The indigenous cultural milieu in the region consists of a strong legacy of animistic institutions including SGs. The lack of industrial growth in the region seems to have facilitated the survival of such institutions. Furthermore, most of the forests in the region belong to the Protected Forest category, allowing villagers virtually free access to a wide range of non-timber forest products (NTFP). This relative freedom of the villagers in these districts to harvest and use NTFP seems to have indirectly allowed the local forest-based cultural traditions to persist, in which SGs occupy a significant space.

Protected over centuries, SGs are remnants of pristine forests in climax formation (Malhotra et al., 2001). However, our survey of SGs in West Bengal indicates that along with the indigenous flora, non-native trees like guava (*Psidrius guajava*), *Acacia auriculiformes*, *Ervatamia divaricata* and *Polyalthia longifolia* also occur in the SGs. This indicates that these trees are often planted in the SGs to replace dead trees in the stand, and therefore the biotic composition of SGs is not necessarily pristine, but is a result of continuous human intervention and management.

SGs are known to contain many rare and endemic flora. Our inventory of SGs in four randomly selected administrative blocks of three districts of West Bengal has recorded a total of 117 species of angiosperm trees, among which 15 species have become rare in the State forests of southwest Bengal (Table 1). Specimens of an unidentified species of liana and an unidentified tree of Bombycideae family have been recorded from two SGs in Bankura district. SGs also function as important refugia for many animals. At least four resident birds, including the large Indian parakeet, prefer the SGs over other habitats in West Medinipur district of West Bengal (Deb *et al*. 1997).

Conservation of biodiversity in SGs is a consequence of the sacred physical space of the SG, which is communally shared as commons, and used to observe important social ceremonies in indigenous societies. Several cultural festivals are performed in the SG, which also provide a meeting place on various occasions including social gatherings, marriage, after-death rituals, etc. (Deb and Malhotra 1997).

Table 1: Tree Species Diversity and Distribution of Sacred Groves in Southwestern Districts of West Bengal.

District	Inventoreyed Block	No. of SGs with ≥ 5 trees	Total Area (,000 m^2)	Number of Tree Species (Diversity)	No. of Trees with gbh >15cm
Puruliya	Neturia	99	90.59	50	892
	Santuri	72	79.95	53	1,238
Bankura	Vishnupur	132	62.40	74	3,710
Birbhum	Mayureswar-I	120	261.86	64	1,930
Total		**423**	**494.80**	**117**	**7,770**

The SG institution is associated by a range of oral narratives and belief systems, which are unique social means to prevent intra-group conflicts and violation of the traditional ethos by infringements by outsiders. The myths around SGs often contain elements of biophilia, in varying forms of auguries and omens, which depict the metaphorical expression of biophilia of a culture (Deb and Malhotra 2001).

SGs demonstrate participatory involvement of all members of the user community in protection. Indeed, customary edicts to protect sacred groves are more acceptable to pre-industrial communities than the externally imposed laws restricting traditional land use practices (Burke 2001; Campbell 2004). The institution begins to dwindle only when industrialisation, market intrusion and external cultural influence overwhelm the force of the local tradition and/or the state authority overrides local institutions (Burke 2001; Spadoni and Deb 2005).

However, the tradition seems to be buttressing itself with new myths and legends that have lasting influence on the minds of the youth – the inheritors of the tradition. The motif of 'divine punishment to the offender' repeatedly appears in oral narratives of the SG myths, which has in many tribal villages of West Bengal saved SGs from extinction.

The pivotal focus of the state forest management system on monetary incentives seems to ignore the fact that increased availability of NTFP is an effective incentive for villagers to protect the forest. This has given rise to a situation where the drive to maximize sale proceeds often subjugates the very participatory objective of the JFM system and the conservation objective of forestry. In contrast, people's voluntary participation in protecting the SG makes it a true commons, toward which the community responsibility is reflected in "sentiments of affinity", and is unrelated to "calculated empiricism" (Kellert 1996, 151). Sacred groves are a strong testimony to the success of resource conservation when all members of the community have the ownership of, and accountability for, the resource in question (Shutkin 2000). The persistence of the institution of SGs in the face of market advent and dissolution of the community indicates that true commons can be maintained if the community participates, even in the absence of any direct economic incentives (Deb and Malhora 2001).

The customary mode of management of SGs suggests that a successful community forest management regime must foster a communitarian ethos based on shared accountability relationships. Rebuilding this communitarian ethos in resource management is the most effective means to deter free-riding based on short-term economic gains and ensure long-term welfare of the community.

Because the FD has itself turned the commons into a state property, it now ought to play a pivotal role in facilitating the transition of forests from state-owned open access status to common property status. During this transition phase, the FD may devise an arrangement by which the SGs, and the biodiversity of these relic forest patches in West Bengal be protected from any industrial-commercial abuse. The FD may also aid in generating and disseminating information about the rare species found in the SGs and about the ecological and cultural services of the SGs. Furthermore, SGs may serve as interesting sites for eco-tourism and educational visits and a source of State revenue, which may be shared with the local people and trustees of the SGs.

1 INTRODUCTION

Biodiversity conservation practices are as diverse as the world's cultural diversity. Indigenous knowledge of local plants, animals, their habitat preferences, distribution, life histories, and demographic features, is socially transmitted from one individual to another within and across generations (Gadgil *et al*. 1993), though not necessarily in writing. In addition, there are examples where communities regulate the use of resource by restricting the access to resources, and enforcing compliance through religious belief, ritual and social convention. Indigenous cultural practices and folk beliefs that have distinct conservation consequences have been labelled ethnoforestry (Pandey 1998). Examples of ethnoforestry in India include sacred trees, sacred groves and temple forests. It is debatable whether these 'restraints' have evolved after ages of trial and error with different resource use modes, or as systematic prescriptions for protecting some key resources. However, it is certain that these restraints definitely have conservation consequences, incidental or otherwise (Deb and Malhotra 2001).

Sacred Groves (SGs) are segments of landscape, containing vegetation and other forms of life and geographical features that are delimited and protected by human societies under the belief that to keep them in a relatively undisturbed state is an expression of important relationship to the divine or to nature (Hughes and Chandran, 1998). Different cultures perceive this relationship in different ways, and institutionalize various rules of behaviour (mainly taboos) in regard to the sacred space and its elements.

Customary protection of the SGs over centuries has resulted in conservation of a range of rare and endemic species in the sacred groves, which constitute a brilliant example of traditional cultural institutions fostering biodiversity conservation (Varner 2005). There is an expanding body literature to suggest that SGs are remnants of pristine forests in its climax formation and probably constitute the only representation of the pristine forest flora in near-natural state in many areas (Malhotra *et al*. 2001). It appears that the cumulative floral diversity of SGs in a given geographical unit at the district level closely resembles the total floral richness of the area. This has been confirmed for the floral richness of SGs in Kerala (Pushpagandan *et al*. 1998).

SGs and other ethnoforestry elements are examples of traditional biophilia of ancient human cultures, which express a tendency to love and respect of nature (Wilson 1984; Deb and Malhotra 2001). This is not to say that all indigenous pre-industrial societies lived in a state of ecological balance. Many Pleistocene hunter-gatherer communities are believed to have caused the local extinction of a number of large mammals through over-exploitation (Joshi and Gadgil 1991). However, ancient hunter-gatherer societies are likely to have learnt from the collective experience of past resource crunches, and subsequently fine-tuned their resource use modes (Gadgil and Guha 1992). The institution of sacred groves seems to have evolved from an urge of ancient ecosystem peoples to protect their resource base for long-term use.

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 in India have focused on the Western Ghats. Later records of sacred groves in Northeastern States (e.g. Khiewtam and Ramakrishnan 1989; Tiwari *et al*. 1998) have given the 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.

2 THE ANTIQUITY OF SACRED GROVES

The institution of sacred groves is perhaps "as old as the civilization itself," born at a time when pristine religion was taking shape (Skolimowski 1991). At the dawn of religious thinking, deities were imagined by primitive societies to reside in stones, trees, animals and woods. This animism seems to be an expression of the gratitude to and respect for nature for providing goods and services to human society.

Kosambi (1962) and Gadgil and Vartak (1976, 1981) state that most of the cults associated with the SGs in Maharashtra are Mother Goddess cults. In contrast, most of the SGs in Karnataka and Kerala are abodes of non-Sanskritic deities including snake gods. In West Bengal, the cults surrounding the SGs range from animistic tribal deities and ancestral spirits to Sanskritized deities like Shiva and Kali, and medieval subaltern deities like Sitala and Manasa.

SGs once existed 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). Many SGs have been identified to be as old as the Indus Valley civilization. Aging of the SGs in eastern India has not yet been confirmed by any systematic scientific study. However, the age of many SGs can be surmised from the respective ages of different temples and tanks to which such groves are attached. For example, the SG adjacent to the Kanak Durga temple at Chilkigarh in West Medinipur district is much older than the temple, which was founded by king Bhim Singh in early Nineteenth Century. Most of the tribal SGs in the districts of Bankura, Birbhum, Puruliya and West Medinipur seem to be as old as the history of tribal settlements in these areas. Throughout the nineteenth century, local zamindars enlisted the Santals to clear forests in this region in order to create agricultural land, and subsequently were replaced by more skilled non-tribal cultivators (Duyker 1988). The Santals served as agricultural labourers, who lived in new settlements, each created around a new SG. The Mundari-speaking tribes who settled in the region in the Nineteenth Century all established their Jaher thans in their respective villages (Ray 1912). The Lodhas migrated in the nineteenth century from the central Indian forests to settle in west Medinipur (Bhowmick 1963), and created their own SGs.

3 EVOLUTION OF THE SACRED GROVES INSTITUTION

Sacred groves were perhaps the first temples of worship in the world (Varner 2005). SGs are the physical spaces of the operation of ancient animistic religions of all hunter-gatherers of the Old World, being prevalent in tribal societies in all States of India, except the Andaman and Nicobar Islands (Malhotra et al. 2001). The tribal SGs are characterized by the absence of any images of deities, but votive offerings are made at some trees within the grove. Flowers are a common feature of the worshipping rituals in all these groves. In central and eastern India, terracotta figurines of horses, elephants and bulls are placed at the base of one or trees. In West Bengal, no animal sacrifice has been reported to take place in the SGs.

As the indigenous animistic beliefs began to become assimilated into the Brahminical religion, many of the sacred trees, animals and habitats became a part of the Sanskritic rituals of Hinduism. Sanskritization began with the spread and dominance of the Brahminical social order, and became an important factor of traditional Indian society, where it appears to have been the principal idiom of social mobility in the mainstream Hindu society (Béteille 2005: 217). This process of 'Sanskritization' of the indigenous traditions is still continuing, incorporating much of the indigenous religious institutions and also transforming the institutions in the process. Thus, idols of Hindu godheads like Shiva and Kali have been placed in many ancient SGs. The SGs thus serve as interfaces between Sanskritic and indigenous religious traditions.

SGs also mark the confluence of tribal animistic institutions and subaltern Hindu sects that arose in Medieval Bengal as a protest against the Brahmanical hierarchical religion. In Bankura and Puruliya, many old SGs are consecrated to numerous subaltern Hindu deities of West Bengal like Dharma Thakur, Manasa and Shitala, whose worshipping rituals do not need Brahmin priests to perform. Numerous derelict SGs in Bankura district seem to be a legacy of the Buddhist tradition in the area, and are consecrated to deities whose names (like Byaghrasini, Jamhalasini) seem to be derived from Buddhist deities.

A major mark of Sanskritization of SGs is the erection of images or icons (like a trident) signifying the presiding deity. As the process of idolization advances, an earthen or stone image of the god or goddess is placed on a raised platform (altar), and a housing structure is constructed within the SG. This housing structure may consist of a makeshift thatched shed in the early phase of Sanskritization, or a concrete temple when the SG has become completely Sanskritized. A continuum of such structures from a simple raised platform to an elaborate temple is a marked sign of Sanskritized SGs, with concomitant disappearance of trees from the habitat. Thus, Sanskritization (or Hinduization) tends to replace the animistic spirits and deities with idols and the natural habitat with a built habitat as a place of worship.

SGs also accompany certain sacred tanks and ponds. In Belboni village of Bankura, an ancient (presumed 600-year old) pond is attached to a SG. This pond is used for drinking water, and strict vigilance is maintained by villager to keep it free from all pollution. In some at these pool-grove areas small temples are also constructed.

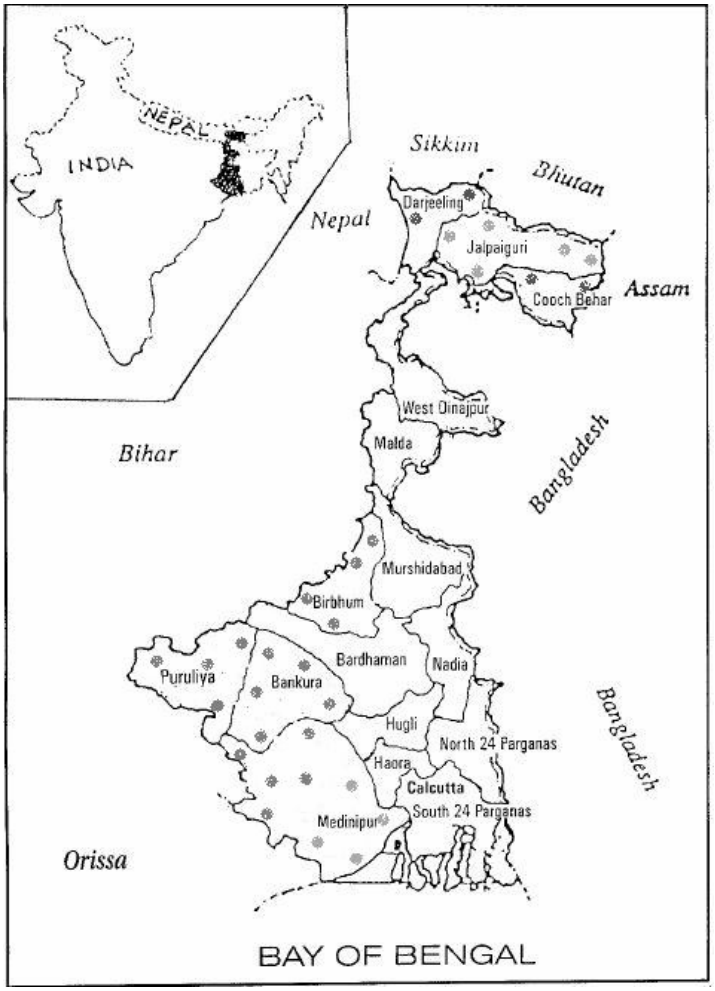
4 GEOGRAPHICAL DISTRIBUTION OF SACRED GROVES

Sacred groves (SGs) have been reported from all over the world, excepting the New World (Gadgil and Guha 1992), and seem to be most numerous in Asia and Africa (Roy Burman 1996). Brandis, India's first Inspector General of Forests acknowledged the existence of SGs "in nearly all provinces" since pre-colonial ages (1897, p. 14-15). However, most ancient SGs in India have become either extinct or derelict. In the eastern Indian States, especially where the Permanent Settlement (enacted in 1793) altered all customary land use practices, all village forests were converted into agricultural lands. Thus numerous SGs were expunged from the landscape of Bengal under Permanent Settlement. Subsequently, forest laws subjected all community forests, including SGs, to the "scientific forestry" of the Forest Department, leading to the destruction of most SGs. The extant SGs exist only in the areas where indigenous communities still maintain the institution under various social and religious edicts.

There was little investigation into the existing sacred groves of West Bengal until the late 1990s. The prevailing presumption has been that SGs had disappeared from the Permanent Settlement provinces, concomitant to the abolition of Village Forests, and subsequently, as a result of industrialization. However, studies by Deb and co-workers (Deb 2007 a; Deb and Malhotra 1997, 2001; Deb, Deuti and Malhotra 1997; Spadoni and Deb 2005) have recorded the existence of numerous SGs from southwestern districts of the State.

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 (Deb 2007 a). In the northern districts of Jalpaiguri and Darjeelinng, Buddhist pilgrims from neighbouring districts visit different SGs and offer oblations. In Jayanti of Jalpaiguri district, villagers continue to protect large catfish populations in a sacred pond inside a sacred grove (Spadoni and Deb 2005). Villagers of Hari Bhola in Bagh Duar in the same district maintain an old SG attached to the ruins of two temples since the year 1496 (Deb 2007 a). Hunting, and any sinful or pollutive acts inside the SG are strictly prohibited.

From the pattern of distribution of SGs, it appears that SGs are more abundant in forested districts where the forest tract is interspersed with human settlements. Fragments of earlier forest vegetation are likely to survive as SGs in these forest villages. The candidate districts with significant forest cover in West Bengal are Bankura, West Medinipur, Puruliya and Darjeeling. There is consistent evidence that the abundance of sacred groves is high in the southwestern districts (Deb and Malhotra 1997, 2001), but low in Darjeeling district (Fig. 1). In the alluvial non-forest districts lying on both sides of the Ganga, SGs are conspicuously scarce (Table 1). This seems to relate to the past expansion of settled agriculture, which erased all riparian forest habitats, and also to the industrial growth that intensified on the banks of the river since the 1930s.



Map 1: Districts with High Abundance of Sacred Groves in West Bengal
(*after* Deb and Malhotra 2001).

The reason for the relatively greater numbers of SGs in the southwestern districts is threefold. Firstly, the forests of Darjeeling district remained uninterrupted by human settlements for centuries, until the first half of the nineteenth century (Hooker 1854) . Therefore there was hardly any indigenous society in the hill and *Terai* forests to establish their SGs. By contrast, early texts like *Acharanga Sutta* of the 8th century informs that forests of the Jungle Mahal and its continuation in the southwestern Bengal districts were interspersed with forest villages inhabited by various tribals who were, according to the chief Imperial ethnologist, "the most unimprovable" people, who often used to "relapse into their condition as savages" (Dalton 1865: p.4). The region "where Bengal, Behar and Chotanagpur meet" was described in British administrative literature as "a tangled mass of hill and jungle peopled by uncouth aboriginal races, standing like the furthest outpost of barbarism (Bradley-Birt 1905, cited in Sivaramakrishnan 1999: p. 54). Western Mednipur was described as a region "given up to savagery" (Carstairs 1912: p. 188). While such racist remarks were common in British colonial lexicon to describe forest people, they unmistakably describe the close proximity of the indigenous people in the region to

wilderness. The area thus has a legacy of 'savage' animistic beliefs and institutions like SGs for a long time. While modernisation drives in all industrialised districts have swept away much of the local traditions, the lack of industrial growth in the southwestern districts seems to have facilitated survival of traditional institutions in the region.

Secondly, the southwestern districts have witnessed considerably less population pressure from immigrants from other districts than did Darjeeling and the southern districts. From 1947 onwards, political refugees from East Pakistan (and subsequently from Bangladesh) settled in different phases by clearing most forested habitats in the southern districts as well as much of the northern districts bordering Bangladesh and Meghalaya, but not in the southwestern districts. Most of the new settlers in the latter region are local immigrants, sharing the same forest-based cultural ethos.

Finally, a total state monopoly over the Reserve Forests in Darjeeling district severed the cultural linkage of forests with the native societies. In contrast, most of the forests in the southwestern districts were assigned Protected Forest category, allowing villagers virtually free access to a wide range of non-timber forest produce. The relative freedom of the villagers in much of these districts to harvest and use various non-timber forest products seems to have indirectly fostered the local forest-based cultural tradition, in which SGs occupy a significant metaphoric space.

Table 1: Distribution of Sacred Groves in West Bengal.

District	Abundance of Sacred Groves				
	High	Moderately High	Low	Very Low	Nil
Bankura	√				
Birbhum	√				
Coochbehar			√		
Darjeeling			√		
Dinajpur, North				√	
Dinajpur, South				√	
Howrah				√	
Hugli				√	
Jalpaiguri		√			
Maldah					√
Mednipur, East		√			
Medinipur, West	√				
Murshidabad				√	
Puruliya	√				
24 Parganas, North					√
24 Parganas, South				√	

The frequency of SGs has a direct correlation with proportion of tribal populations in a given village or block. Our inventory of sacred groves in the western and southwestern districts, (namely Bankura, West Medinipur, Puruliya and Birbhum) suggest that in these districts,

every village that has at least a few resident tribal households invariably have a SG, albeit very small in size. Every tribal settlement in the region has at least one SG as a component of the landscape, and all the tribal villages contain relicts of ancient SGs (Deb and Malhotra 1997). More than a thousand sacred groves may still survive in the districts under study, albeit in much degraded condition. Our comprehensive inventory in these districts enumerated 423 SGs (each with ≥ 5 trees) from four randomly selected revenue Blocks of southwestern districts (see below).

5 THE SIZE DISTRIBUTION OF SACRED GROVES

The size of sacred groves in West Bengal varies considerably from a cluster of a few trees to a few hectares. Our preliminary survey indicates that compared to the groves on the lateritic region in the southwestern districts, the SGs in eastern and southern districts are rarer and much smaller in size. In the southwestern districts, the Pir than SG of Khabasinpur has been recorded to be the largest SG complex (including the Pir's majar or shrine), spanning an area of 4 ha.

Table 2:The Size Distribution of Sacred Groves in Four Blocks of West Bengal

District	Block	Total No. of SGs *	Total Area (,000 m²)	Frequency (,000 m²)					
				< 1	1-2	2-4>	4-6	6-8	>8
Puruliya	Neturia	99	62.40	66	17	12	2	0	2
	Santuri	72	261.86	45	0	12	4	1	0
Bankura	Vishnupur	132	90.59	109	18	5	0	0	0
Birbhum	Mayureshwar I	120	79.95	86	2	4	2	1	9

*All SGs with ≥ 5 trees, each tree with >15 cm gbh)

Table 2 presents a summary of data in terms of the area under SGs in different districts under study. In this data set, we have counted only those SGs that have at least 5 trees, each with >15 cm gbh. The data indicates that most of the SGs are small (< 1000 m2); the arithmetic averages of the size of SGs (total area/ total no.) in Neturia, Santuri, Vishnupur and Mayureswar-I blocks are 915, 1110, 473 and 2182 m² respectively. The mean area of SGs in Mayureswar-I block is enhanced by the presence of a few exceptionally large SGs, spanning more than 1 ha (one amongst these is as large as 4 ha). Barring these large SGs of Mayureswar-I block, the inter-district variation in size distribution of SGs is small (Fig. 2).

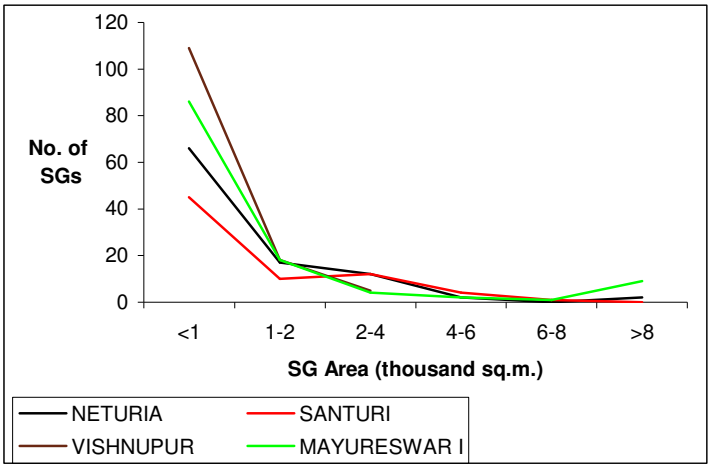


Figure 1: Size Distribution of Sacred Groves in Four Blocks of Southwest Bengal

6 SOCIAL, CULTURAL AND POLITICAL FUNCTIONS OF SACRED GROVES

Throughout India, many SGs are located in important strategic locations, and therefore have been used by traders, kings and priest-chiefs as shelters. Kosambi (1962) showed that many sacred groves are found along ancient trade routes and cross-roads, which were used by early nomadic pastoralists. Sawant (1990) informs that Phindaghat sacred grove in Sindhdurg district of Maharashtra was a resting place for traders in the medieval period. Roy Burman (1995) describes the importance of SGs located along the trade routes in Meghalaya where the moral authority of the priests-chiefs monitored the flow of commodities. In pre-British Bengal, major trade routes in the kingdoms of Vishnupur (now Bankura district) and Panchet (now in Puruliya district) passed through many forest areas, portions of which were SGs. Numerous SGs also dotted old settlements that were linked with riverine trade routes. In south Bengal, all villages alongside the Hugli river and its branches had SGs where traders, pilgrims and villagers took rest and offered votives to deities. Hundreds of relics of small temples at all important quays (Ghats) of rivers stand testimony to the existence of temple groves, some of which still exist to offer shelter to passers-by.

SGs have also been important in politics and warfare. Roy Burman (1996) noted that Shivaji took shelter in Jhnji mahal sacred grove in Kolhapur district before attacking Shayasta Khan in Pune. This grove was a hiding place for the troops and also their training centre. Sacred Groves have often been supported by local rulers. Sahu Chatrapati, the king of Kolhapur, use to support a sacred grove dedicated to Amba Devi (Roy Burman, 1992). Kalam (1996) has mentioned the regal patronage of sacred groves in Kodagu district of Karnataka.

Among the Santals, the SGs serve as an important criterion to ascertain village membership and geographical boundaries(Troisi, 1978). Hembram (1983) states that through the Sarna Dharma (religion pertaining to sacred groves) discrete ethnic groups in Chottanagpur were brought to a common platform for asserting their rights to self-determination. The institution aids in consolidating the ethnic identity of the Christian as well as non-Christian tribes of the Chotangapur plateau and its extension in southwest Bengal. The SGs provides an important physical space to reassert the ethnic cultural identity of the Santal, Munda, Mahli, Kora, and Lodha in southwest Bengal. The significance of SGs in the indigenous social polity became prominent in Bihar and Chattisgarh, where the people's movement to stall the Koel-Karo dam project was centred around SGs as a cultural icon of tribal identity and solidarity (Mitra and Pal, 1994).

The use of SGs as a semiotic platform for tribal self-assertion is not always strong, however. The erosion of the traditional conservation ethos by the process of modernization has been too widespread to stop the destruction of SGs. In Bankati mouza of Vishnupur block in Bankura, the local Santal villagers failed to stop several old sal trees from being cut down by the Forest Department in 1996. The construction of temples in the groves or replacing local deities by images of Hindu godheads reflect subjugation and engulfment of the tribal animistic tradition by the mainstream Hindu culture.

Several cultural festivals are performed in SGs. A most important social function of the sacred grove is that they provide a meeting place on various occasions including social gatherings, marriage, after-death rituals, etc. SGs are also used as a place for village fairs during festivals. Detailed accounts of socio-cultural functions of the space of SGs are described in some ethnographic studies (e.g. Ray 1912; Troisi 1978; Baské 1993). In West Bengal, ritual gatherings of different tribal communities take place in the *Jaher-than* (Santali nomenclature of SGs) on the occasion of Salui (or Sohrae) and Karam festivals, as well as wedding ceremonies (Deb and Malhotra 1997). Various religious ceremonies that involve all villagers also take place in the SGs. In most SGs, a priest organizes the ritual performances, which are attended by all villagers. Subaltern Hindu deities like Manasa, Shitala and Dharma Thakur are worshipped on certain days, and those ceremonies are performed at the Garam-than, Manasa-than, Shitala-than, etc. Ceremonies associated with Shiva (or His incarnation Bhairava) are observed in Bhairab-than and Shib-than. Many SGs, consecrated to certain resident deities like Byaghrasini, Jambhalasini, or Bhairab have no images, and indicate their legacy of Tantric traditions in the area.

In villages where different SGs are loosely demarcated for different caste and ethnic communities, a Brahmin priest is a usual feature, whereas non-Brahmin priests are common in SGs that are visited by all communities, especially the Scheduled Caste communities. Many SGs in the area comprise a cross-religious institution and signify interpenetration of cultural traditions of the region: Sannyasi-tala SG at Nabagram village and Kali-tala SG at Nadra village in Mayureswar-I block, are visited by both Hindu and Muslim devotees; SGs housing Shiva and Dharma Thakur are visited by both Hindu and tribal worshippers; and every SG around a Pir-than (Sufi saint's shrine) is visited by both Hindu and Muslim devotees.

The process of Hinduization continues, but in most places within this study's purview, the sanctity of the SGs are religiously maintained. Hindu festivals and Brahmin priests notwithstanding, many erstwhile tribal SGs reveal their tribal identity by nomenclatures. SGs at Mulunga, Baghmara, Domsota and Baghraibari villages in Neturia block, as well as those at Dulurdi and Kalikapur villages in Santuri block, worshipped by S.C. Hindus, are still called *Jaher-than* and *Garam-than* – Santali nomenclature of SGs. Although Sanskritization as a rule implies establishment of images of Hindu deities, there are some notable exceptions. Seasonal festivals held at Garam-than of Muradi in Santuri block, Jaher than of Mulunga in Neturia block, and Bhairab than in Bhagabandh in Vishnupur block are presided by a Brahmin priest, although these SGs do not contain any image of the presiding deity. The purpose and meaning attached to various rituals, ceremonies and functions performed in SGs are summarised in Table 3.

Table 3: Non-Economic Services Provided by SGs*

Typologies	Functions of SGs
1. Sacred	- Propitiation of deity/spirits
	- Propitiation of ancestral spirits
	- Propitiation of totemic objects biotic and abiotic
2. Secular	
2.1 Cultural	- Provides cultural space to the community as a CPR
2.2 Social	- Assertion of group identity
	- Assertion of group solidarity Establishing new alliances
	- Gift exchange
2.3 Health	- Well-being of crops and animals
	- Well-being of community
2.4 Economic	- Assurance of Success in agricultural production & hunting
	- Refugia for beneficial animals (*e.g.* owls)
	- Supply of medicinal plants
2.5 Psychological	- Moral support, guidance
	- Fertility and Paternity
	- Well-being of individual/family

* Modified from Malhotra et al. 2001.

7 BIODIVERSITY AND ECOLOGICAL FUNCTIONS OF SACRED GROVES

An expanding body of literature shows that the vegetation of SGs seem to represent the original floral species composition of forests of the region and probably constitute the only representation of forest in a near natural condition. This was demonstrated in the Silent Valley of Kerala, where the biological spectrum of SGs closely resembles the normal spectrum of the forest flora found in the entire district (Pushpangadan *et al*. 1998). This should be expected if SGs are derelict fragments of the local forest tract. Cultural protection of the SGs is likely to preserve most of the component species of the original forest, which has been depleted over a century or more by commercial silviculture under state forestry. Silvicultural selection of a few species for timber has been consequent upon the natural species diversity of the region's forests, with a number of native species becoming increasingly rare. Our findings indicate that the derelict SGs of southwest Bengal house a large number of tree species (Fig. 3), many of which rarely occur in the State-managed forests of the districts (see below).

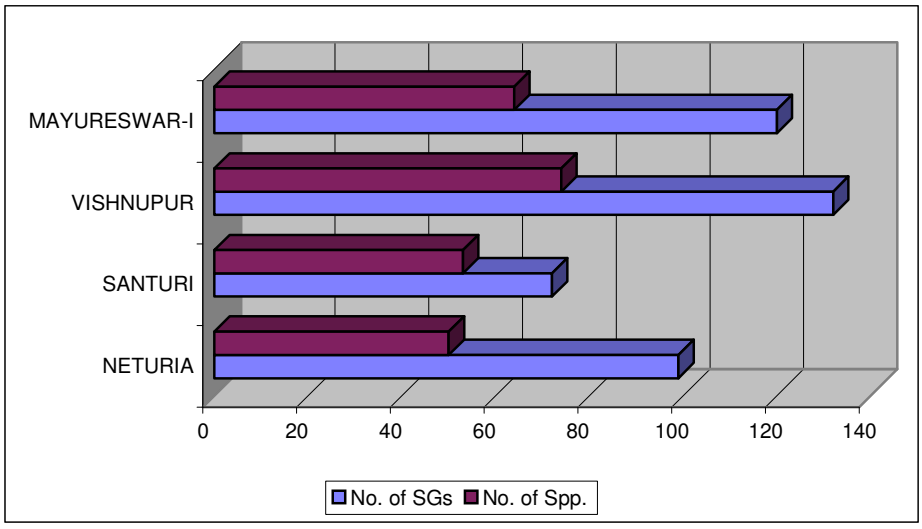


Figure 2: Species distribution in all SGs in four districts of West Bengal

A total of 117 species of angiosperm trees is recorded from the four blocks inventoryed, among which 15 species have become rare in the State forests of southwest Bengal. Furthermore, specimens of at least 7 plants are not found in the State forests, but have been recorded from the SGs (Table 4). These plants exclude non-native fruit trees like guava (*Psidrius guajava*), timber trees like teak (*Tectona grandis*) and *Acacia auriculiformes*, and garden trees like *Ervatamia divaricata* and *Polyalthia Longifolia*, which are sometimes planted in the SGs to replace dead indigenous trees in the stand. The presence of these exotics in the SGs thus indicates that the biotic composition of SGs are not necessarily pristine, but is a result of active human intervention and management.

Some rare wild species recorded from the SGs are not found in the Protected Forest tract of southwest Bengal, but it seems plausible that they once occurred in some moist parts of the native forest. Trees like *Barringtonia racemosa* and *Garcinia morella* are now confined to riparian and alluvial south Bengal forests, but probably once occurred in the riparian parts of the region. The fact that a few specimens of *Garcinia morella* are still found along the river Barakar in Puruliya district seems to corroborate this conjecture.

A few species found in SGs are extremely rare, and a few of them are likely to be the last specimens of the species. A specimen of a yet-unidentified rare tree (local name: Bhat), belonging to family Bombycidae seem to exist only in Chhandar SG of Bankura district. A few specimens of an unidentified liana (designated Liana X in **Table 4**) have been recorded in Jambhalasini SG of Bankura.

Table 4: Rare Tree Species Found in SGs.

Rare in District Forest	No Specimen in District Forest	Unidentified flora
Adinanthera pavanina	*Barringtonia racemosa*	Bharna
Bridelia retusa	*Ficus infectoria*	Bhat
Careya arborea	*Garcinia morella*	Boerkuri
Dillenia pentagyna	*Martynia diandra*	Liana X
Dyospyros Montana	*Tamilandia uliginosa*	Gobra
Ficus religiosa	*Tetranthera monopetala*	Kari bili
Grewia hirsuta		Karhur
Morinda angustifolia		
Stereospermum suaveolens		

The conservation of species that rarely occur in the region is a major function of SGs. The small and vanishing populations of species like *Tamilandia uligionosa, Martynia diandra* or the unidentified *kari bili* and *bhat* trees (Table 4) may represent the unique fragments of the respective species gene pool. Conservationists often ignore the importance of the "population diversity" of species that has become rare in the region. A geographically restricted genetic population is an important component of biodiversity, because its evolution is independent of the gene flow from other such units. To paraphrase Ehrlich and Daily (1993: 65), "the extinction of populations, rather than of species, may be the most important facet of the decay of biological diversity. Therefore, consideration only of species extinctions may greatly underestimate the rate of loss of organic diversity as a whole". Thus, even if a particular species is not listed in the Red Data Book as "Endangered" or "Threatened" category, a population that is rapidly vanishing is an endangered component of biodiversity. Conservation of SGs may conserve the declining population diversity.

Table 5: Tree Species Diversity and Distribution of Sacred Groves in Four Inventoried Blocks

District	Block	No. of SGs with ≥ 5 trees	Total Area (,000 m²)	Diversity of Tree Species	No. of Trees with gbh >15cm
Puruliya	Neturia	99	90.59	50	892
	Santuri	72	79.95	53	1,238
Bankura	Vishnupur	132	62.40	74	3,710
Birbhum	Mayureswar-I	120	261.86	64	1,930
Total		**423**	**494.80**	**117**	**7,770**

As the generalized species-area relationship suggests (Keeley 2003), a greater number of species is likely to be conserved in larger SGs. However, within the ambit of our study, it seems that this need not be the case in SGs (Fig. 4 and Table 5). While SGs of Vishnupur block are most numerous and contain the largest diversity of tree species (74), the two blocks of Puruliya district contain a similar number of species, despite the differences in area of the SGs. The total land area under SGs in Vishnupur is 62,402 m², whereas that in Mayureswar-I is four times larger (261,860 m²), yet the former has significantly greater tree species diversity than the latter (χ^2 test, $p > 0.1$). Moreover, the smallest aggregate area of SGs (Vishnupur block) houses the largest number of tree species, and an inverse relationship between species diversity and area seems to prevail (Fig. 4). This counter-intuitive result may be explained with reference to local history and anthropogenic interactions. Anthropogenic interactions are particularly important because they influence the species turnover and composition of the SG ecosystem. The existence of non-native flora like *Eucalyptus tereticornis, Acacia auriculiformes*, teak and guava suggest that local people tend to change the species composition of several SGs. In some SGs, the addition of exotics like guava may increase the available number of tree species. However, in SGs where native flora are replaced with allellopthic exotics (as in many SGs of Mayureswar-I), the tree species diversity is likely to decline, compared to SGs where saplings of native species are allowed to grow (as in most SGs of Vishnupur block).

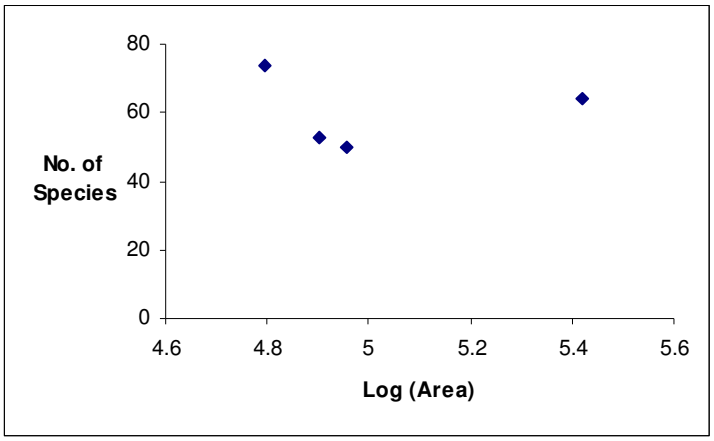


Figure 3: Number of Trees in Sacred Groves Plotted Against Log-Transformed Area (m2).

With the felling of forest all around them, the SGs have become fragmented habitats containing the vestiges of quondam genetic pools and the last refuge of many threatened, endangered and endemic organisms. Many rare wild relatives of cultivated plants like the wild cinnamon and wild pepper are found in SGs of Kerala (Chandran et al. 1998). Endangered trees like *Rhus hookeri* (endangered) and *Flacourtia cataphracta* have been recorded in two SGs in Manipur valley. Certain SGs in Kerala are unique habitats of "point endemism", that is, unique species that are found in these habitats and nowhere else. Examples of such endemic plants include *Syzygium travancoricum, Kunstleria keralensis, Cinnamomum quilonensis, Myristica malabarica* and *Garcinia gummi-gutta* (Malhotra et al. 2001). In West Bengal, the bamboo SGs of Jalpaiguri district seem to be a sanctuary for the metapopulation of the yellow bamboo (*Bambusa variegata* var. *straiatus*), which is rarely found in north Bengal forests outside the Rajbanshi bamboo groves (Deb, 2007 b). 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 (Deb 2007 a).

Although faunal diversity from SGs has not received much taxonomic attention, it appears that rare and endemic animals with small territories are likely to be better protected in the SGs than in State-managed forests. Das and Chanda (1997) discovered a new species of frog (*Philautus sanctisilvaticus*) from the sacred forest of Amarkantak, Madhya Preadesh, for instance. Animals having large territories also may prefer the undisturbed SGs during their nesting and breeding periods. Deb, Deuti and Malhotra (1997) reported that the large Indian parakeet, an endangered bird, prefer the SGs over other habitats in West Medinipur district of West Bengal.

A rich faunal diversity exists in the SGs, in particular birds (mostly insectivorous and birds of pray), small mammals (rabbit, porcupine, rats, bats etc), reptiles (several snake species, lizards), frogs and insects (honey bees, butterflies, beetles). However, no large mammals are seen in the SGs. An extensive taxonomic inventory of animals, especially the invertebrates and herpetofauna, of SGs in West Bengal is needed to improve our understanding of the ecological role of SGs.

8 ECONOMIC SERVICES OF SACRED GROVES

Ecologically valuable species, which perform the function of 'keystone' species in an ecosystem and contribute to the maintenance and enhancement of biodiversity, are also found in SGs. The sacred groves of Rajasthan, called 'oran', invariably contain khejadi (*Prosopis cineraria*), which is a keystone species in desert ecosystem, providing food and shelter for the blackbuck, several birds and humans. In some SGs in Birbhum and Puruliya districts, people are allowed to remove dead logs to be used as fuelwood in special ritual functions and for construction purposes. Wood needed for construction or repair of a temple is largely harvested from the SG attached to it.

Sacred groves, in general, act as a nursery and storehouse of many of the local ayurvedic, tribal and folk medicines. Some of the species so preserved are of medicinal significance, others waiting to be given their right place and significance. In our survey of SGs in southwest Bengal, valuable medicinal plants like *Azadirachta indica, Aegle marmelos, Holarrhena antidysenterica, Leucas aspera,* and *Hemidesmus indica* are found to be most common. When the overall frequency of occurrence of each species is estimated as the number of SGs where it occurs relative to the total number of SGs in all the 4 blocks under study, several medicinal plants appear to have a high frequency of occurrence. Table 3 gives a list of medicinal herbs found in SGs of four Blocks block of the three southwestern districts surveyed.

Table 6: Medicinal Plants Recorded from Sacred Groves of 4 Blocks in Southwest Bengal

Local Name	Botanical Name	Frequency
Amlaki	*Emblica officinalis*	0.56
Anantamul	*Hemidesmus India*	14.76
Arjun	*Terminalia arjuna*	6.41
Bael	*Aegle marmelos*	10.31
Bahera	*Terminalia belerica*	2.79
Begna/Buan	*Vitex negundo*	5.85
Bhela	*Semelcarpus anacardiale*	0.56
Dudhilata	*Ichnocarpus frutescens*	4.18
Ghentu	*Clerodendron infortunatum*	5.01
Gurmar/Dudhi	*Gymnema sylvestris*	0.84
Hijal	*Barringtonia racemosa*	0.28
Kalmegh	*Andrographis paniculata*	0.84
Kanchhira	*Commelina benghalensis*	3.06
Kayetbel	*Feronia limonia*	2.23
Kuchila	*Strychnos nux-vomica*	5.85
Kukuranda	*Grevia hirsute*	0.28
Kunch	*Abras plicatoriusI*	0.84
Kurchi	*Holarrhena antidysenterica*	8.64

Lajjabati	*Mimosa pudica*	4.18
Leda	*Tetranthera monopetala*	0.28
Mansa	*Euphorbia neriifolia*	2.23
Neem	*Azadirachta indica*	13.93
Parashi	*Cleistanthes collinus*	1.11
Patha	*Stephania hernandifolia*	0.84
Shatamuli	*Asparagus racemosus*	0.84
Swet Dron	*Leucas aspera*	3.34

* calculated as [(No. of SGs where a species occurs)/ (Total No. of SGs surveyed)] x 100

A direct economic use of SGs comprises the maintenance of a safe drinking water source. In many places, ponds and tanks traditionally demarcated for the sole purpose of drinking water were usually associated with a SG. For centuries ponds or tanks of water have been constructed and managed by villagers throughout West Bengal. Digging a tank was considered a virtuous duty of kings and zamindars. The king of Cooch Behar, and zamindars of Jamboni, Jhargram and Vishnupur created numerous tanks and ponds. Village communities also created many ponds to meet their perennial needs of drinking water. Thus, the sacred ponds of Belboni in Bankura and the Baneswar sacred pond in Cooch Behar are still an important source of drinking water for the local communities. These ponds have always incorporated sacred teachings and include the planting of sacred trees to create a sacred grove and pool system.

In general, biomass is not extracted from the sacred groves. This is certainly true for most of the living sacred groves found across the country. However, there are many groves from where biomass extraction is permitted, and thus the user community derives certain direct economic benefits from the groves. From many groves dedicated to ancestor worship wood is extracted for cremation (Mitra and Pal 1994). The erection of a new Hindu temple in a SG is the predominant factor for extracting wood from a SG. The wood is harvested for use in construction and repair of a temple. There is a strong taboo against hunting of animals in the groves, including collection of honey.

Indirect economic use value of SGs includes various ecological services. The trees of the SGs maintained on the constructed embankments of the pools protect the soil from erosion, and also serve as a habitat for a number of aquatic birds like fishing eagle, king fishers, jacanas and wagtails. Many tanks and ponds adjacent to SGs are maintained as sacred, and usually no pollutive activity is allowed. Fishing, bathing and washing are forbidden in these sacred ponds, until modern market-oriented values related to short term economic out-turn overtake the management of these ponds.

9 THE PROCESSES OF EROSION AND EXTINCTION OF SACRED GROVES

Like most traditional institutions and ethos, the SGs are facing a severe threat of extinction in the recent decades. Modernization in the forms of industrial growth, agricultural expansion and urban sprawl is rapidly obliterating the habitats and also eroding the cultural substrate of the institution. Five principal historical factors may be identified to cause the erosion of the institution.

(i) The Revenue Motive

The Permanent Settlement Act, passed in 1793, marks a watershed in the ecological history of eastern U.P., Bengal, Orissa and Bihar (including its districts now demarcated as Jharkhand). The Settlement sealed the fate of forest tracts including sacred groves by bringing large tracts of "jungles" under the plough in order to generate revenue, first for the English East India Company, and then for the British Crown. The zamindars, created by the Permanent Settlement Act of 1793, brought all "unproductive" woodlands under cultivation in order to maximize yield of land revenue (Malhotra and Deb 1998). 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). With the disappearance of the tribals, their community forests were cleared for creating agricultural lands (Rangarajan 1994). This explains the absence of any community woodlot or the Village Forest category in Bengal, although many zamindars owned large estate forests until 1953. It can safely be surmised that like all the pristine commons, at least some of the early tribal sacred groves of West Bengal disappeared in the process of altering traditional land use mode.

The next phase of destruction of the sacred groves began with the passage of the 1878 Forest Act, which was designed to remove all concessions and 'rights' of local people that were not explicitly granted by the state (Gadgil and Guha, 1992). The new act brought most of the old-growth forests, including sacred groves (SGs), under Working Plans of the Forest Department for extracting valuable timber, first for the Empire and then, after independence, for the state government. Most of these groves disappeared after the enclosure of forests by the state.

(ii) Industrial Development

After independence, the waves of urban-industrial development marked the next 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.

During our survey in southwest Bengal, 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. For example, a large SG in Baghmara village of Neturia block of Puruliya district 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 the late 1950s, the Panchet dam of the Damodar Valley Project, submerged several SGs in dozens of villages upstream. One such village, Lakhyabad, in Neturia block of Puruliya district, contained three SGs, which disappeared under the Panchet dam waters. 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.

(iii) Sanskritization

The process of Sanskritization 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 (Spadoni and Deb 2005). 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.

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.

(iv) Abandonment of Traditional Ethos

The mass media as well as the educational system has played a pivotal role in modernizing lifestyles and values of traditional societies. Just as the spread of monotheistic religions among the indigenous societies extirpated their animistic belief system, the current Westernized educational system tends to uproot the society's biophilia and inculcate a disdain for traditional ways of life (Deb and Malhotra 2001). A large section of the rural youth has already accepted the cultural hegemony of the mainstream urban culture (Doshi 1992), forgoing the traditional communitarian ethos. Because the urban lifestyle symbolizes an upward social mobility, the modern youth is drawn into the mainstream economy, which fosters and enhances short-term private profits over long-term social goods.

The dominant official endeavour of "mainstreaming" all indigenous cultures has successfully sown a feeling of inferiority in the "backward" ethnic cultures (Doshi 1992; Spadoni and Deb 2005). This feeling of inferiority is so entrenched that in Taldangra village

(Vishnupur block, Bankura district), the Santals discontinued their SG rites because they were ashamed of the association of their animistic rituals to witchcraft and other superstitions. Santal devotees abandoned the SG for years until its trees were chopped down by their Muslim neighbours in 1999.

(v) Legal Undermining of the Commons

Community arrangements are seen in neoclassical economics as violations of individual rights and freedoms. This explains why the capitalist system is "hostile to traditional governance in general" (Bliese 2001: p. 337), and invariably disintegrates the commons and the community. Founded on the neoclassical economic principle of promoting private profits, modern state legislation is geared to establish the state monopolistic control of forests and to protect private ownership, but tends to abolish community rights to the resources. Community arrangements for the commons are rejected in capitalist societies as violations of antitrust laws or even of individual proprietary rights (Bliese 2001). Although customary user rights are in some cases upheld in the Indian forest policy of 1988, local people has no legal title to the commons. Thus, all community ownership arrangements with SGs are legally untenable, and vulnerable to usurpation by both industry and state bureaucracy.

Box 1: The Inroads of Development and the Disappearance of Sacred Groves

Many mouths of development engulf the SGs. Road building, mining, dams and power line extension are the most prominent methods of eliminating SGs and other commons. Three SGs in Lakhyabad village (Neturia block, Puruliya district) were submerged in the Panchet dam water when the Damodar Valley Project was initiated in the 1950s. In the same area, National Thermal Power Corporation destroyed a SG in the same block near Panchet hill in order to facilitate drawing of a power line. Hundreds of such instances can be cited from the more industrialized districts, like Bardhaman and Howrah.

With a mean size of 0.1 ha, all existing SGs in southwest Bengal are small islands of vegetation amid a landscape of depleted nature. As islands, these SGs are highly vulnerable to perforation and fragmentation 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; Keeley 2003). 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 a road from Beliatore to Bishnupur town and a road to Sonamukhi town intersect. 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 opposite 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.

Owing to the state's undermining of the customary rights of the community over the commons, the existence value of the common property resources tend to give way to their market value. This is directly linked to the economic development paradigm discussed above. The prevalent techniques of valuation of any component of biodiversity fails to capture its indirect value and non-use value (Kadekodi 2000), reflected in the ecological ethos of indigenous cultures (Spadoni and Deb 2005). In development economics, it is a largely accepted norm that "a piece of land must be producing something we desire almost all of the time or we deem it unproductive" (Maser 1999: 289). As the ecological value of a natural resource is supplanted by its commercial value, the resource tends to become exhausted. Several SGs have thus disappeared because the state Forest Department (FD) clear-felled the trees for their commercial value. A recent instance of such clearing of SGs is one that took place sometime in the late 1980s in Ban-kati forest mouza of Vishnupur block. Despite the Santal villagers' plea, the Forest Department chopped down an entire SG, because it contained dozens of mature timber trees; however, the Beat officer condescendingly left a single sal tree, which survives as a reminiscent of the SG.

10 OWNERSHIP AND MANAGEMENT OF SACRED GROVES

Literature on this aspect, though sparse, suggests a vast variation in the legal status and management of SGs in the country. Customary participation in maintaining the rules and regulating access is a key feature of SG management all over the country. Orans in Rajasthan are usually managed by Gram Panchayats (Jha et al., 1998); the Haryali grove in Garhwal is managed by a temple committee made up from members of three villages (Sinha and Maikhuri, 1998); Roy Burman (1996) mentions that among the Mahadeo Kolis of Pune district, the management is usually vested with the clan elders, whereas among the Kunbis of Kolhapur district the groves are managed by village elders; clan-based management appears to be a widespread practice among the Santhals, Oraon, Munda, Kharia and other tribes of central and eastern and north-east India (Malhotra et al. 2001).

However, the community's authority and rights to manage the SGs may be restrained by private interests when the land in question is owned by a family. Management decisions may also be overridden by state authorities if the SG is legally demarcated as a state property. Because modern state legislation denies the community any legal entitlement to ownership of the commons, most SGs are now facing threat of real estate development. In terms of the legal tenurial rights, the sacred groves may be classified under three categories:

1. Managed by a local administrative unit (including Panchayat);
2. Privately-owned, but managed by community; and
3. Owned and managed by the entire village community.

Most of the SGs belong to the category (b) above, that is, are owned by families, but protected and used by the community. The Jambhalasini SG in Chhandar village (Sonamukhi block, Bankura district) is private property, but all villagers are responsible for preventing removal of biomass and unauthorized entry by outsiders. This is typical of most of the SGs.

11 THE ROLE OF STATE AGENCIES IN SACRED GROVE MANAGEMENT

In post-independence India, about 22% of the national territory is under the control of the forestry departments where local communities' rights to land are generally denied. It is exactly these areas that are densely inhabited by indigenous peoples. These indigenous societies are traditionally dependent on the forest for subsistence and also their cultural identity. In southwest Bengal, all rural societies in general, and the tribal people in particular, are crucially dependent on the forest for food, fodder for animals, wood for fuel, materials for household articles and farm implements, folk medicine and for various religious and ornamental purposes (Malhotra et al. 1992). However, the local cultures are not only confined to the instrumental value of the forest, but incorporate its existence value and bequest value as well, which are reflected in various cultural ceremonies that involve ritual uses of various wild biota (Deb and Malhotra 2001). While the new forest policy acknowledges the strategic importance of involving local cultures in forest conservation, the ground reality of forest management tactics seem to show a disdain for the forest villagers and their cultural affinity with the forest resource. This disdain is instanced by the departmental felling of the Santal SG in Ban-kati (see Sec. 9 [v]).

While state takeover of the SG management may protect the habitat from destructive land use practices, it may not ensure proper maintenance of the habitats. It is likely that short-term financial motives may guide the state managers to exploit the SG, eventually depleting them of biodiversity. In Maharashtra, most SGs were registered with the government sponsored Paschim Maharashtra Deosthan Samity, which have proved incompetent to maintain the SGs (Roy Burman 1992). Trees from many of these SGs are reported to have been sold off by village leaders in collusion with the Samity functionaries. A number of SGs in Maharashtra were also taken over by the State Forest Department for including them in the social forestry program, which has soon replaced all the old evergreen trees of the SGs with a handful of exotic tree species (*ibid*.). This has not only destroyed the ancient ecosystem components and processes but has been useless to the local people. Indeed, SGs have dwindled in areas where they were their ownership and management were taken away from the local people by Forest Department or any other government agency. Therefore, usurpation by acquisition of the SGs by any state agency is likely to be detrimental to the SGs and to the public interest. The traditional principle of sanctity attached to the habitats would possibly provide better results.

A vast body of recent literature indicates that the surest way to conserve the commons is by ensuring customary community custodianship, where profligate use of the resource is prohibited through various socio-cultural restraints (Berkes 1999; Oström et al. 1999; Burke 2001). But the community can hardly maintain its custodian role if the resource is owned, and its benefits are usurped, by an external authority whose interests are divergent from the users'. Long-term sustainability of the resource is ensured in an arrangement of community ownership, where everyone benefits from restraints on exhaustion of the resource while no single individual can make a profit at the cost of others.

However, the role of the community in management of the commons receives little more than lip service. As discussed above, modern state legislation is geared to consolidate state's monopoly and promote private ownership of natural resources, but tends to abolish the community ownership of resources (Kovel 2004). As a result, the commons turns into an open access property subject to common plunder. In the absence of any transfer of managerial power, people's participation often has proved to degenerate into an authoritative "I decide, you participate" approach, where the 'community' is expected to share the responsibility of protecting the forest, while the ownership and privileges of decision making are retained by the state bureaucracy. This official unwillingness to hand over managerial power to the community has been the principal cause of disappearance of the participatory spirit from the Joint Forest Management approach in most forest ranges (Banerjee 2004; Deb 2007 c). In contrast, people's voluntary participation in protecting a resource makes it a 'true commons' that can exist for centuries. In a true commons, the community responsibility toward the resource is reflected in "sentiments of affinity", and is unrelated to a "calculated empiricism" (Kellert 1996, 151). Sacred groves are a strong case in point.

The true common property nature of the SGs is also evinced by the assignment of religious value to them, regardless of its consumptive end uses. The sacred status of SGs seems to be a symbolic recognition by local cultures of their "existence value", the importance of which has not yet been fully captured by mainstream economics (Deb and Malhotra 2001; Spadoni and Deb 2005). Most of the SGs in our study area, and many sacred species that have no direct use values, are nevertheless held sacred and protected in local cultures.

In spite of the general appropriation of SGs that existed in the demarcated state forest area for timber harvest, two SGs at Swargabati village (Barjora block, Bankura district) have so far been excluded from the Forest Department's working plans. One of these SGs is deep inside the forest, and another is an ecotone – lying on the forest edge at the end of the village; both contain a large number of tree species, some of which (like *Symplocos sp*. and *Sansevieria roxburghiana*) occur rarely in the forest. The existence of these two SGs seem to demonstrate that the community forest conservation practices can indeed be practically incorporated into the state Forest Working Plans. An official recognition of, and respect for, the existence value of the common property can go a long way to conserve the seed bank of native flora and continue to provide the ecological and economic services for the benefit of the community.

To protect the commons from the tentacles of development is not an easy task, especially in the absence of the communitarian ethos, which is the first victim of the advent of market (Kovel 2004). However, as the SGs indicate, rebuilding the communitarian ethos in resource management is perhaps the most effective means to deter short-term economic gains and ensure long-term welfare of the community. However, the reinstatement of the traditional conservation ethic is possible only when all members of the community have the ownership of, and accountability for, the resource in question (Shutkin 2000). **Because the FD has itself enclosed the forest to turn this common property resource into a state property, it ought to play a pivotal role in facilitating the transition of the forests from state-owned open access**

status to the common property status. During this transition phase, the FD may devise an arrangement by which the SGs, and the biodiversity of these relic forest patches in West Bengal be protected from any industrial-commercial abuse. The FD may also aid in generating and disseminating information about the rare species found in the SGs and about the ecological and cultural services of the SGs. Furthermore, SGs may serve as interesting sites for eco-tourism and educational visits and a source of State revenue, which may be shared with the local people and trustees of the SGs.

12 COMMUNITY PERCEPTIONS ABOUT SACRED GROVES

In spite of the rapid pace of modernization and erosion of the traditional belief systems, a considerable proportion of the indigenous population in southwest Bengal is still embedded in the matrix of traditional beliefs, folklore and mythology. It must be noted that the members of the indigenous communities belong not only to ethnic tribals like the Santals but also to the mainstream Brahminical Hindu community. The indigenousness is characterized by a tradition that is orally transmitted from generation to generation. A living tradition is endowed with an originality of problem solving mechanism that makes it adaptive to new threats to its existence. This is evinced by the periodic emergence of new myths around the old SGs.

Myths appear and spread spontaneously among the indigenous communities, and reassert the roots of tradition that challenge modernity. The myths around SGs often contain elements of biophilia, in varying forms of auguries and omens, which depict the metaphorical expression of biophilia of a culture (Deb and Malhotra 2001). The auguries and omens, often encapsulated in legends, forbid possible infringements of the customary rules regarding the sacred entity like a SG. An implicit function of most modern myths about the SG in a locale is to warn the new generation of users that any disrespect for the SG is likely to invite divine punishment. The motif of 'divine punishment to the offender' repeatedly appears in most oral narratives that constitute the central theme of the SG myths. As most modern youth in the mainstream Indian culture are brought up within and imbued with religious beliefs, the legends of divine wrath seem to sufficiently deter activities that might ruin the SG. A few examples are as follows.

The Bhairab than SG in Majdiha (Onda block, Bankura district) is owned by a Hindu family residing in the village. In the late 1980s, the head of the family tried to cut down and sell off the grove's old trees, with an aim to 'developing' the land. Being apprehensive of divine punishment, the landowner hired a group of Muslim labourers, who started chopping the huge roots of a sprawling old tamarind tree. After the mighty roots were cut, the tree fell down, only to stand right up again after a few days. This amazing incident frightened the labourers, some of whom also fell ill, and the felling operation halted. It is said that the landowner was soon punished by a severe familial disaster (the death of a son). Nobody dared to damage anything in the grove ever since.

In Belboni of Bankura district, the SG complex includes a sacred pond Thakur pukur, which lies beside a busy State highway connecting Durgapur to Bankura town. Used as a major source of drinking water for adjacent villages, the pond was constantly threatened by disrespectful uses by outsiders, especially the highway riders passing by the pond. On one occasion in the early 1990s, a private car owner wanted to wash his car, and pulled out of the road. He was driving down the pond's embankment, when the car suddenly became immobile midway. Despite all attempts by the driver, the car refused to move forward or backward, until the owner realized his sin and pledged atonement to the goddess of the pond and the grove. Later on, the villagers put a barbed wire fence around the pond to keep the outsiders from reaching the pond's water, but no 'insider' dares to pollute it.

These oral narratives and belief systems are unique semantic means of society to prevent intra-group conflicts and violation of the traditional ethos by infringements by outsiders. In the face of continuing threats to the SGs from secular commercial interests, the tradition seems to buttress itself with new myths and legends that have lasting influence on the minds of the youth – the inheritors of the tradition. The SGs begin to dwindle only when the external cultural influence overpowers the force of the local tradition and/or the state authority overrides the local institutions.

On a smaller scale, the strength of religion in protecting species is instanced by a sacred complex of the Shiva temple at Panchami village in Birbhum district of West Bengal, where the temple walls were ruined by the growth of a banyan (Ficus benghalensis) tree. The demolition of the temple by the growing tree over decades was withstood by the villagers, and a new temple was erected close by. The sacred trees, occupying the previous temple site are still given full protection by the local community (Deb and Malhotra 2001).

13 CONCLUSION:: SACRED GROVES AS A MODEL OF COMMUNITY FOREST MANAGEMENT

The continuation of the institution of SGs in the face of market advent and dissolution of the community indicates that true commons can be maintained if the community participates, even in the absence of any direct economic incentives (Deb and Malhora 2001). This is a significant lesson for the forest management machinery of the state, which seeks to involve the local user community in forest management on a pragmatic scale. The primary objective of forest protection is to ensure a steady flow of revenue for the state rather than benefits to the local forest user community. In the existing legal framework, the State wields monopoly over all timber and designated forest products found in private lands and non-forest government lands. Thus, "the interests of primary collectors dependent on NTFPs have been ignored in this regard for the sake of safeguarding the State revenue" (Palit 1999: 25).

The institution of Joint Forest Management (JFM) in West Bengal has, since 1989, entitled the forest-fringe villagers in southwest Bengal to certain benefits, including sharing in the net sale proceeds of timber harvest (Joshi 1996; Banerjee 2004; Deb 2007 c). However, the FD remains the sole authority to take all decisions regarding choice of species for plantation, selection of forest sites for plantation and harvesting, the periodicity and quantities of timber harvest. Thus, the Forest Department manages the forest according to its own institutional priorities based on revenue needs, while the villages partake in guarding the resource in exchange for some pecuniary benefits. This monetary incentive is assumed to be both necessary and sufficient to sustain local people's interest in forest protection. However, the quarter share of the sale proceeds, when distributed among all members of the FPC, often turns out to be too small to sustain the interests of many poor villagers. The monetary incentive (a quarter share of net sale proceeds) seems to motivate the power elite of the villages to usurp some of the benefits. For example, a few members of the Panchayat, who are outside the forest user-group, sometimes wield key positions in the executive body of the forest protection committee (FPC), and exert their influences on FPC functioning. Although a Government Order in 1990 directed every household to be a member of the FPC, "the hold of the Panchayat remains strong" (SPWD 1992: p. 35).

The pivotal focus on monetary incentives seems to ignore the fact that an increased availability of NTFP is an effective incentive for villagers to protect the forest (Malhotra and Deb 1998; Deb 2007 c). This has given rise to a situation where the drive to maximize sale proceeds often subjugates the very participatory objective of the JFM system and the conservation objective of forestry. In order to ensure periodic incomes from the forest products, commercial plantations tend to become more important than the mix of diverse native flora that are important to village economies. Clearly, the means to supplement the local needs – sale of forest produce – becomes the end. By neglecting the long term needs of local people on forest patches, the current JFM programme has already shown its limitations to identify and address the local needs (Banerjee 2004).

In contrast, SGs demonstrate a true participatory involvement of all members of the user community to protect the hundreds of SGs. Indeed, customary edicts to protect sacred groves are more acceptable to pre-industrial communities than externally imposed laws restricting traditional land use practices (Burke 2001; Campbell 2004). Until modernization and market intrusion weaken the community management systems and supporting cultures (Ruttan and Borgerhoff-Mulder 1999; Burke 2001; Spadoni and Deb 2005), cultural sanctions are difficult to violate, because they are enforced by custom, transmitted across generations, and ingrained in the communitarian ethos for safeguarding the common interest.

The institution is a result of the legacy of the physical space as commons and a whole range of cultural attitudes. Ancient customary sanctions on the mode of use of the habitat are handed down to generations, and observed by every member of the community – until modernization challenges the tradition. The strength of the SG tradition demonstrates that a new and sustainable forest management regime must incorporate broad social constraints rather than legal sanctions.

Regardless of whether SGs exist as a logical consequence of the original intent of a society to protect any specific resource (a prey organism, a valuable medicinal plant, a perennial spring of water) or an incidental consequence of a set of superstitious rituals, the institution serves to conserve a wide spectrum of biodiversity, in the face of continuing land use changes and political and social turnovers. Specifically, the whole community, at least the majority of the members of the community, actively cooperate to maintain the institution through a set of behaviours that are universally conducive to biodiversity conservation. This set of behaviour with regard to the use of SG elements are essentially of two kinds:

1. Restraint on harvesting of biomass from SGs, such as taboos on killing animals, taboos on collection of leaf-litter, cutting of live trees etc. have a long term positive impact on the integrity of SGs. In a majority of the SGs such practices are being followed;
2. An inchoate perception of the local communities about the diverse ecological functions such as SGs providing habitat for plants, birds, honey bees and other animals, governed by a kind but retributive deity will have positive impact.

Until market forces dissipate the traditional ethos, community protection have proven to be sufficiently strong to protect SGs for an indefinitely long period of time. The informal and customary nature of community management of the SGs mark the institution as a true commons, characterized by community custodianship and regulated access. True commons indicate the strength of tradition and community institutions in maintaining social cohesion that overcome short-term economic 'rationality' or to reorient the individual self-interest. The cohesiveness of indigenous societies strengthens the interdependence of group members and ensures the individual's expectation of cooperation from others. This characterizes the 'assurance' problem (Sen 1967), rather than the free-rider problem of the use of the commons. The commons begins to encounter its 'tragedy' only when the assurance of cooperation disappears as a result of erosion of tradition.

The strength of the traditional conservation ethos is discernible in the maintenance of the hundreds of derelict SGs in the districts described here. Although many SGs have been Sanskritized and many of the tribal ethos centred on SGs have been marginalized by the dominant Hindu culture, most of the old SGs with their old tree populations are still maintained, and the sanctity of the grove remains alive. The SGs and sacred trees continue to exist because everyone of the community continues to cooperate on mutual consent (regardless of its explicit articulation) in maintaining the institution. Conversely, the commons is doomed when individuals are neither aware of the value of the common resource nor about the consequences of their free-rider behaviour. The erosion of the belief system and disappearance of consensual cooperation results in the collapse of the commons, as instanced by the Santals of Taldangra village in Bankura.

Common property resources are best conserved when its management lies in the hands of users. To apply this principle of CPR management to community forest management, it must foster a system of informed choice of resource users. Informed choice for common pool resource users is contingent on the public perception of long-term collective costs and individual short-term benefits of profligate use of the resource.

> "The failure to recognize this role of perception in common resource use is likely to result in incorrect predictions and misguided policy recommendations" (Burke 2001: p. 450).

In a successful common property resource management regime, individuals have prior information regarding the consequences of their action. This knowledge guides them to behave prudently toward the resource. Contrariwise, if individuals are unaware of the consequences, their resource use norm becomes wasteful, thus depleting the commons. The reason that private rights deplete the commons is the lack of public awareness of collective costs, not the dilemma of the commons.

The traditional management system of SGs could be of immense use to the forest managers because of its demonstration of the efficacy of community management of resources. Incorporation of a similar system of giving credence to the local people for managing their own resources on which they depend for usufructory needs may improve the current system of JFM. The FD can play a significant role in facilitating the community to develop its own mechanisms to take custody of the forest. By rebuilding the community, it could also strengthen communitarian ethos in order to protect its own resources without the need of an external authority to fine-tune managerial technicalities. Indeed, the customary management model of SGs is capable of showing the course of transition from the current model of JFM toward community forest management, which would turn people's forest management into a self-sustained reality, having a positive long-term effect on the economic well being and conservation of local biodiversity.

REFERENCES

Banerjee, Ajit K. 2004. Tracing social initiatives towards JFM. pp. 45-56. In: V K Bahuguna, D Cabistrano, K Mitra and S Saigal (eds), *From Root to Canopy*. New Delhi. Commonwealth Forestry Association (India Chapter)/ Winrock International-India.

Baské, Dhirendra Nath 1993. *Paschim Banger Adivasi Samaj* [*Tribal societies of West Bengal* (in Bengali)], 2nd ed. Calcutta. Subarnarekha.

Berkes, Fikret 1999. *Sacred Ecology: Traditional Ecological Knowledge and Resource Managements.* Philadelphia. Taylor & Francis

Béteille, Andre 2005. "The future of the backward classes: The competing demands of status and power." In: *Anti-Utopia: Essential Writings of Andre Béteille* (ed. D. Gupta), pp. 207-231. Oxford University Press. New Delhi.

Bhowmick, P K 1963. *The Lodhas of West Bengal*. Punthi Pustak. Calcutta.

Bliese, John R E 2001. *The Greening of Conservative America*. Boulder. Westview Press.

Brandis, D. 1897. "Indigenous Indian Forestry: Sacred Groves", In: *Indian Forestry*. Oriental Institure. Woking, pp.12-13.

Burke, Bryan E 2001. "Hardin revisited: a critical look at perception and the logic of the commons." *Human Ecology* 29: 449-176.

Campbell, Michael O'Neal 2004. "Traditional forest protection and woodlots in the coastal savannah of Ghana," *Environmental Conservation* 31: 225-232. Chandran, M.D.S., Gadgil, M. And Hughes, J.D. 1998. "Sacred groves of the Western Ghats." In: Ramakrishnan, P.S., Saxena, K.G. and Chandrasekhara, U.M. (eds) *Conserving the Sacred for Biodiversity Management.* Oxford and IBH, New York. Pp. 211-232.

Das, Indraneil and Chanda, S.K. 1997. *Philautus sanctisilvaticus* (Anura: Rhacophoridae), a new fog from the sacred groves of Amarkantak, central India. *Hamdryad* 22: 21-27.

Deb, Debal 2007 a. "Sacred ecosystems of West Bengal." In: A K Ghosh (ed), *Status of Environment in West Bengal: A Citizens' Report*. ACB Publications. Kolkata. [*in press*]

Deb, Debal 2007 b. "The sacred bamboo groves of the Rajbansi of North Bengal." In: K C Malhotra, Debal Deb and Yogesh Gokhale (eds), *Sacred Groves of India: Interfaces between Biodiversity and Culture*. Indira Gandhi National Museum of Mankind: Bhopal. [*in press*]

Deb, Debal 2007 c. "Forest management in West Bengal." In: A K Ghosh (ed), *Status of Environment in West Bengal: A Citizens' Report*. ACB Publications. Kolkata. [*in press*]

Deb, Debal, K Deuti and K C Malhotra 1997. "Sacred grove relics as bird refugia." *Current Science* (Bangalore) 73: 815-817.

Deb, Debal and K C Malhotra 1997. "Interface between biodiversity and tribal cultural heritage: a preliminary study." *Journal of Human Ecology* (New Delhi) 8: 157-163.

Deb, Debal and K C Malhotra 2001. Conservation ethos in local traditions: the West Bengal heritage. *Society and Natural Resources* (Philadelphia) 14: 711-724.

Doshi, S. 1992. "A tradition in transformation." In: S. Doshi (ed), *Tribal India: Ancestors, Gods and Spirits*. Marg Publications. New Delhi.

Duyker, Edward 1987. *Tribal Guerrillas*: *Santals of West Bengal and the Naxalite Movement*. Oxford University Press. Delhi.

Ehrlich, Paul R and G. Daily 1993. "Population extinction and saving biodiversity". *Ambio* XXII (2-3): 64-68.

Gadgil, Madhav and Ramachandra Guha 1992. *This Fissured Land*. Delhi. Oxford University Press.

Gadgil, Madhav and Vartak, V.D. 1976. "Sacred groves in Western Ghats in India", *Economic Botany.* 30:152-60.

Gadgil, Madhav and Vartak, V.D. 1981. "Sacred groves in Maharashtra- An inventory". In: S.K. Jain (ed.) *Glimpses of Indian Ethnobotany.* Oxford & IBH Publishers. New Delhi, pp. 279-294.

Gadgil, Madhav, F. Berkes and Carl Folke 1993. "Indigenous Knowledge for biodiversity conservation." *Ambio* XII (2-3): 266-270.

Haila, Y. 1999. "Islands and fragments." Pp. 234-262. In: M.L. Hunter, Jr. (ed), *Maintaining Biodiversity in Forest Ecosystems*. Cambridge University Press. Cambridge.

Hembram, P. C. 1983. "Return to the sacred groves." Pp. 87-91. In: K S Singh (ed), *Tribal Movements in India.* Vol. 2. Manohar Publications. New Delhi.

Hughes, J.D. and Subhash Chandran, M.D. 1998. "Sacred groves around the earth: An overview". In: Ramakrishnan, P.S. Saxena, K.G. and Chandrashekara, U.M. (eds) *Conserving the Sacred for Biodiversity Management*, Oxford and IBH Publishing Co. New Delhi. pp.69-86.

Jha, M., H. Vardhan, S. Chatterjee, K. Kumar and A.R.K. Sastry 1998. "Status of Orans (Sacred Groves) in Peepasar and Khejarli Villages in Rajasthan." In: P.S. Ramakrishnan, K.G. Saxena and U.M. Chandrashekhara (eds), *Conserving the Sacred for Biodiversity Management*. Oxford and IBH Publishing Co. Pvt. Ltd., pp. 263-275.

Joshi, Anuradha 1996. *Progressive Bureaucracy: an Oxymoron? The Case of Joint Forest Management in India*. Rural Development and Forestry Network Working Paper 24a. London. Overseas Development Institute.

Joshi, N. V. and Madhav Gadgil. 1991. "On the role of refugia in promoting prudent use of biological resources." *Theoretical Population Biology* 40: 211-229.

Kadekodi, G K 2000. "Environmental accounting." Pp. 106-131. In: S N Chary and V Vyasulu (eds), *Environment management: An Indian perspective*. Macmillan India. Delhi.

Kalam. M.A. 1996. *Sacred Groves in Kodagu District of Karnataka (South India): A Socio-Historical Study*. Institute Francais de Pondichery. Pondichery.

Keeley, 2003. "Relating species abundance distributions to species-area curves in two Mediterranean-type shrublands." *Diversity and Distributions* 9: 253-259.

Kellert, S. R. 1996. *The value of life*. Washington, DC: Island Press.

Khiewtam, R.S. and Ramakrishnan, P.S. 1989. "Socio-cultural studies at the sacred groves at Cherrapunji and adjoining areas in north-eastern Inida." *Man in India* 69: 64-71.

Kosambi. D.D. 1962. *Myth and Reality: Studies in the Formation of Indian Culture*. Popular Press. Bombay.

Kovel, Joel 2004. *Enemy of Nature*. Tulika. New Delhi.

Malhotra. K.C. and Ketaki Das 1998. "Interface between faunal biodiversity and cultural heritage in south-west Bengal. in India". In: Fujiki. N. and Macer. R.J. (eds.) *Bioethics in Asia*. Eubois Ethics Institute. Japan. pp. 346-51.

Malhotra, K. C. and Debal Deb 1998. "History of Deforestation and Regeneration/ Plantation in Midnapore District of West Bengal, India." In: Roy, SB, Chatterjee, M, Yadav, G, Mukherjee, R, (Eds), *Policy to Practice of Joint Forest Management*. Indian Institute of Bio-Social Research and Development (IBRAD). New Delhi, pp279-300.

Malhotra, K C, Debal Deb, M Dutta, *et al*. 1993. The role of non-timber forest products in village economies of southwest Bengal._ *Rural Development Network Paper* 15d. ODI: London. (Summer 1993)

Malhotra, K C, Y Gokhale, S Chatterjee and S Srivastava 2001. *Cultural and Ecological Dimensions of Sacred Groves in India*, Indian National Science Academy, New Delhi and Indira Gandhi Rashtriya Manav Sangrahalaya, Bhopal.

Maser, Chris 1999. *Ecological Diversity in Sustainable Development*. Boca Raton. Lewis Publishers.

May, Robert M., John H. Lawton and Nigel E. Stork 1995. "Assessing Extinction Rates." In J.H. Lawton and R.M. May (eds), *Extinction Rates*. Pp. 1-24. Oxford University Press. Oxford.

Mitra. A. and Pal. S. 1994. "The spirit of the sanctuary". *Down to Earth*. January 31.

Mohanan. C.N. and Nair. N.C. 1981. "Kunstleria Pain - a new genus record for India and a new species in the genus". *Proc. Ind. Acad. Sci*. B 90:207-210.

Oström, Elinor , Joanna Burger, Christopher Field, Richard B. Norgaard and David Policansky 1999. Revisiting the commons: Local lessons, global challenges. *Science* 284: 278-82.

Palit, Subhabrata 1999. *Structural Changes in Forest Departments*. New Delhi. WWF-India/IIED.

Pandey, Deep Narayan 1998. *Ethnoforestry: Local Knowledge for Sustainable Forestry and Livelihood Security.* Himanshu Publications. Udaipur/New Delhi.

Pushpangadan. P. Rajendraprasad. M. and Krishnan. P.N. 1998. "Sacred groves of Kerala – A synthesis on the state of art of knowledge". In: Ramakrishnan. P.S.. Saxena. K.G. and Chandrashekara. U.M. (eds) *Conserving the Sacred for Biodiversity Management*. Oxford and IBH Publishing Co. New Delhi. pp. 193-210.

Rangarajan, Mahesh 1994. "Imperial agendas and India's forests: the early history of Indian forestry." *Indian Economic and Social History Review* 31: 147-167.

Ray, Sarat Chandra 1912. *The Mundas and Their Country.* Kuntaline Press. Calcutta.

Roy Burman, J. J. 1992. "The institution of sacred grove." *Journal of Indian Anthropological Society* 27: 219-238.

Roy Burman. J. J. 1995. "The dynamics of sacred groves". *J. Human Ecol.* 6: 245-254.

Roy Burman. J. J. 1996. "A comparison of sacred groves among the Mahadeo Kolis and Kunbis of Maharashtra". *Indian Anthropologist*. 26: 37-46.

Ruttan, Lore M. and Monique Borgerhoff Mulder 1999. "Are East African pastoralists truly conservationists?" *Current Anthropology*, 40: 621-652.

Saint, K. 1994. Sacred groves: the common roots. *Down to Earth* (31st January 1994)

Sen, Amartya 1967. Isolation, assurance, and the social rate of discount. *Quarterly Journal of Economics* 81: 112-124.

Shutkin, William A. 2000. *The Land That Could Be: Environmentalism and democracy in the twenty-first century*. MIT Press. Cambridge, Mass.

Sinha, B. and R.K. Maikhuri 1998. "Conservation through `Socio-cultural-religiois Practice' in Garhwal Himalaya: A Case Study of Hariyali Sacred Site." pp. 289-299. P.S. Ramakrishnan, K.G. Saxena and U.M. Chandrashekhara,(Eds). *Conserving the Sacred for Biodiversity Management.* Oxford and IBH Publishing Co. Pvt. Ltd.

Skolmowski, H. 1991. "Sacred groves in history." *Himalaya Man and Nature* XV: 5.

SPWD 1992. *Joint Forest Management: Concept and Opportunities*. Proceedings of a Workshop (Surajkund, Aug 1992). Society for Promotion of Wastelands Development. New Delhi.

Spadoni, Massimo and Debal Deb 2005. "Ethnoecology of sacred groves in West Bengal, India." Pp. 143-160. In: *Himalaya: Environment, Culture and Sustainable Development*. Rome.

Tiwari. B.K.. S.K. Barik and R.S. Tripathi 1998. "Sacred groves of Meghalaya". In: Ramakrishnan. P.S.. Saxena. K.G. and Chandrashekara. U.M. (eds) *Conserving the Sacred for Biodiversity Management*. Oxford and IBH Publishing Co.. New Delhi. pp. 253-62.

Troisi, J. 1978. *Tribal Religion: Religion and Practice among the Santhals*. Manohar Publishers. New Delhi.

Wilson, Edward O. 1988. *Biophilia: The Human Bond with Other Species.* Cambridge, MA: Harvard University Press.

Varner, Gary 2005. Sacred Groves. [online] (updated June 9, 2005) URL: <http://www.authorsden.com/visit/viewarticle.asp?AuthorID=1215&id=15919>

ANNEX: PHOTOGRAPHS OF SACRED GROVES

Photo 1: Terracotta Votive Offerings Inside a Typical Sacred Grove.

Photo 2: Egrets Roost and Nest on Trees in a Sacred Grove in Janta, Bankura.

Photo 3: A rare and unidentified Liana in Jambhalasini Sacred Grove, Chhandar, Bankura.

Photo 4: A sacred grove amid agricultural fields, in Santuri, Puruliya.