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CONSERVATION AND TRADITIONAL MANAGEMENT OF SACRED GROVES IN THE DISTRICT OF NADIA, WEST BENGAL, INDIA

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ABSTRACT

Patches of socially protected forests or sacred groves (SGs) grown around places of local deities and/ or ancestral spirits are very ancient, and once was widespread in most parts of the state of West Bengal, including Nadia district. The causes of their dwindling count may be attributed to various reasons, most of them being anthropogenic. They are the rich biodiversity heritage of the state and play an important role in the religious and sociocultural life of the local people. Being self-ecosystems, they perform most of the ecological functions. Many threatened species have been found to be safely protected in the SGs. The district of Nadia in West Bengal is enriched with SGs for conserving local beliefs. Altogether 60 SGs were studied in different corners of Nadia, West Bengal. People across caste and creed are engaged in protecting age old faiths in old plants, their day to day medicinal uses and thus eventually conserving them. By doing this, they are also helping toward the sustenance of animals living on these old plant populations leading to the conservation of local biodiversity in such SGs. With continuous endeavour and active participation of women, the general people mostly from rural areas of the district are helping the state biodiversity conservation authority to conserve the heritage of these biodiversity sites across the district through financial and logistic aid. Conservation and judicious management of SGs are integral part of the aspiration of local population who are also got benefited from sharing of the resources from such areas.

Keywords: Benefit sharing; biodiversity; conservation; heritage site; sacred grove; traditional management.

1. INTRODUCTION

There are different traditional forms of worship of nature by various communities in India including West Bengal. One such significant tradition is that of providing protection to patches of forests dedicated to deities and/or ancestral spirits. These patches of forests are known as sacred groves (SGs) as defined

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by Malhotra et al. [1]. The institution of SGs is very ancient and once was widespread in most parts of the state of West Bengal. About 670 SGs in this region have so far been reported. They play an important role in the religious and sociocultural life of the local people [2,3]. They are also rich biodiversity heritage sites of the state and are ecosystems by themselves and perform all the ecological functions. Many threatened, endangered and rare species find protection in such SGs [4-7]. The groves are rich in biological wealth of the state. Many threatened species are found to get safe refuge in these culturally protected areas [8,9]. The district of Nadia in West Bengal is a rich area of socio-cultural heritage pertaining to the maintenance of SGs for conserving local belief in supernatural existence. People across caste and creed are engaged in protecting age old faiths in old plants, their day to day medicinal uses and ultimately conserving them and thus providing valuable aid to the sustenance of animals living on these old plant population or forest patches [10-12]. Thus, existence of such SGs depends on the local faith of the people of the district. This also leads to the conservation of local biodiversity [13-15] associated with the SGs. Many investigatory work on SGs have been carried out such as their interactive association with the tribes of India as described by Das et al. [2], regarding wealth of SGs in Telangana, India [6] as well as ethnobotanical study of medicinal plants used in SGs of Kumaon Himalaya, Uttarakhand, India [10] and biodiversity management of SGs in the region of Western Himalaya [16]. There are reports on studies on SGs along the Western Ghats from Maharashtra and Goa [13,17], components of SGs of Karnataka [15], Manipur [18], Kerala [19,20], Andhra Pradesh [21] and Meghalaya [22]. Literature about biodiversity management of SGs [23] is also available including conservation tradition of SGs in India as described by Gokhale [24]. Significant role of SGs in conserving the local biodiversity was also studied by Khan et al. [25]. In this current work role of traditional practices of local people for conserving the SGs, their relationship with the vision of the local communities including characterization of the SGs spread across the district of Nadia are conducted.

2. MATERIALS AND METHODS

2.1 Study Area

Nadia is a vast district with an area of 3927.45 sq km and comprises 4.42% of total area of West Bengal. Total human population is 5,168,488 (2011 Census) and population density is 1,300/km^2. It is mainly a rural district with 17 blocks and having long international border with neighbouring country, Bangladesh [18,26]. The geographical boundary of Nadia district comprises Bangladesh in the East, Bardhaman and Hoogli district on the West, Murshidabad district on the North and North West and North 24 Parganas towards South and South East. Situated on the main rail route connecting Howrah/Kolkata the Nadia district is easily accessible by rail and also well connected by National Highway-34. Average elevation of the district land is 12-15 meters from sea level [26].

2.2 Drainage and River Basin

The district has a number of major rivers, bils (large freshwater bodies) as given in the following Chart 1.

Apart from these, there are numerous jheel, dighi (other large freshwater bodies) and various smaller water bodies spread throughout the district [27]. Drainage system is a very important component of SGs as many of them are located just beside or at the vicinity of a river or water body. Located in gangetic river basin the soil gets ample supply of water from the ground water sourced from river and associated drainage system. The vegetation and green pasture of the SGs require sufficient supply of water. The plants are at the bottom of the food chain of SGs and surrounding area. The faunal diversity of the area is also dependent on the availability of sufficient water.

2.3 Climate

The average temperature of the area varies from 9°C in winter to 42°C in summer. Average humidity range is 46% to 92%. Average annual rainfall varies from 167.0 to 994.1 mm.

Chart 1. Major rivers and water bodies of Nadia district

Nature	Name
1. River	Jalangi (Khore), Churni, Bhagirathi or Hoogly, Ichhamati, Jamuna, Mathabhanga, Anjana, Paglachandi, Jhor, Palda
2. Bil	Kulia, Khalsi, Chamta, Garar doah, Gazna bayor, Bathangachhi, Putikhali bil, Majher doah, Haldir bil, Horse bow lake, Hasadanga bil

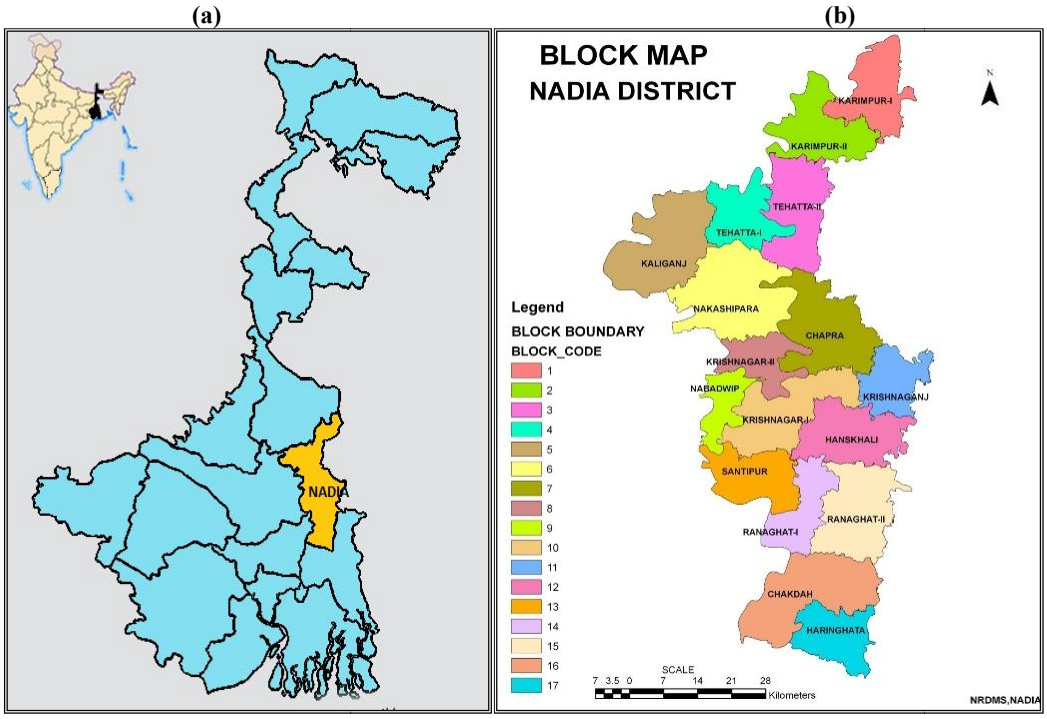

Plate 1. Map of West Bengal showing (a) location of Nadia district in West Bengal. (b) blocks in Nadia district.(www.nadia.nic.in/District_Profile/district_profile.html)
Map source: NRDMS/Nadia

2.4 Soil and Agriculture

Soil is the most important ingredient for vegetations to thrive. The soil type of Nadia district is Ganga flat land type. It is a mixture of clay and fine sand with sufficient content of dead biomass. At places subsoil still contain free calcium carbonate. The sand proportion is predominantly finer in size and whitish grey in colour [26]. This soil texture supports vegetation well. Nadia remains evergreen with canopy of large trees and seasonal field crops throughout the year for its plenty of underground water and soil type (new alluvium).

2.5 Culture

High birth rate among poor villagers and influx of people from neighbouring country rendered a considerable increase of human population in this district for last few decades. This, to some extent, imparts socio-cultural exchange. But the gradual increase in human population affected the ecological balance of many areas of this district. Moreover, establishment of new human habitat areas, sometime, required destruction of forest patches, adjacent to old dilapidated mansions or monuments (considered as SGs) might have disturbed and shrink these SGs for last few decades. Nadia district has a proud tradition in century old "Dochala" & "Charchala" & "Aatchala" terracotta temples [27].

2.6 Methods

1. **Interactive method:** Interaction, discussion and interviewing local people, temple committee, members of trustee boards of a temple developed at SGs. In general, the area surrounding these groves has been becoming populated by human habitation. Many of the endemic species of fauna and flora of rural Nadia districts decreased in abundance. Some are not even found today. The information was gathered by conversation with the local people, villagers or members of the temple committee if the sacred grove turned into a temple partly or as a whole. Photographs were taken of important SGs [17,19,23].
2. **Direct visit and observation of SGs:** Necessary information was also gathered by visiting the SGs including their direct observation.
3. **Collection of information:** Information regarding components and composition of SGs were collected along with their GPS location with the help of etrex model.

4. **Photographic documentation:** Photographs were taken with Canon DSLR camera.

Mode of transport: Hired taxi, two-wheeler motorcycle, cycle van, toto rickshaw were used for the purpose of visiting the sacred grove areas across Nadia district.

District Blocks covered for the study: Primary information of 75 sacred groves was gathered from various sources from 17 Blocks of Nadia district. The SGs were then separately visited and relevant information was gathered. After proper observation 60 such SGs were finally considered depending on their flora and fauna composition, historical perspective, and faith of the local people. The rest 15 SGs were excluded on the ground that either they comprise of a single old banyan, ashwatha or other tree or even the trees were shredded for infrastructural work like highway construction. These single tree SG-like areas also have a small temple or the tree itself is worshipped. Pictures of some of such old trees are given below in Plates 6 and 7.

Plate 2. Picture showing local people at Burimaa tala, Nakashipara, Nadia who gave information about the SG

Plate 3. GPS machine being used to collect GPS location of a SG

Plate 4. Portion of a sacred grove in Nadia

Plate 5. Part of Burima Talaa SG, Nakashipara, Nadia

Chart 2. List of 17 administrative blocks of Nadia district that were covered during survey

1.	Karimpur-1	9.	Krishmagar-2
2.	Karimpur-2	10.	Nabadwip
3.	Tehatta-1	11.	Shantipur
4.	Tehatta-2	12.	Krishnaganj
5.	Kaliganj	13.	Hanshkhali
6.	Nakashipara	14.	Ranaghat-1
7.	Chapra	15.	Ranaghat-2
8.	Krishnagar-1	16.	Chakdaha,
		17.	Haringhata.

Plate 6. A very old Banyan tree at Dhubulia, NH 34, Nadia

Plate 7. An isolated banyan tree beside Khedaitala Manasha Than, Chakdaha, Nadia

2.7 Identification of Plants and Animals

The study involves multi-taxa approach and the biodiversity components are studied on spatial and temporal (monsoon, pre-monsoon and post-monsoon) basis. Diversity of flora was assessed and identified by taxonomic expert or consulting taxonomy book or using standard monogrphs of Botanical Survey of

India (BSI), Kolkata [28,29]. In the same way faunal diversity was assessed by random sampling, visual encounter survey and focal count. Identifications of various taxa were carried out by following standard identification manuals. Large mammals were surveyed either by direct sighting or indirect evidences such as hoof mark/ pug mark, scat/ droppings scrape, sound and presence status from local people [30]. Smaller mammals such as rats and mice were surveyed by turning earth rocks, stones, bricks carefully using a torch light in case they were hiding in earth hole following Menon [31]. Bird watching was done mostly during morning time and also random surveys were carried out during other parts of day. Binocular (Olympus 8X40 DPSI) and Canon DSLR camera were used during the survey and identification was done by using Ali [32] and Grimmett et al. [33]. Amphibian and reptiles were surveyed by searching micro-habitats preferred by different species and identification was carried out by following Dutta et al. [34]. Butterflies are diurnal species and are hostspecific. Hence distribution of plants in a sacred grove is related to the butterfly diversity. Arachnids, such as spiders, scorpions etc. were recorded by searching them among bushes, on trees and on forest floor. Photographs were taken for identification and species level identification was carried out by following field guides and literatures such as Venkataraman [35] and Tikadar and Bustawade [36].

2.8 Biodiversity Assessment

The biodiversity between some selected sacred groves were evaluated using Shanon Weiner Index and Similarity Index using standard softwares and the data were analyzed to compare the diversity among different groves of Nadia district [30]. For calculating similarity index, I consider the most simple and widely used, the Jaccard index (Jaccard, 1912) to evaluate species similarity among different sites .Values for all indices vary from 0, least similar, to 1, most similar. The Jaccard index is calculated using the equation:

$$C_J = a / (a + b + c)$$

Where, a = the number of species common to both communities; b = the number of species in community B, but not A; c = the number of species in community A but not B [27].

2.9 Statistical Analysis

The computer statistical package Microsoft, SPSS version 16.0, SPSS Inc., IL, USA and Biodiversity pro 2.0 for Window Version 10 were used for statistical analysis [30].

3. RESULTS AND OBSERVATION

After detailed observation of sixty sacred groves documentation of biodiversity was carried out. In sixty out of seventy five sacred groves spread in seventeen blocks of the district of Nadia, West Bengal good diversity of fauna and flora was found. Maximum SGs were recorded in Krishnagar-1 block (ten) whereas minimum number was recorded in both Ranaghat-2 and Karimpur-2 blocks (each having one SG). Total of 151 species of plants that includes 72 species of trees, 33 species of herbs, 24 species of shrubs, 20 species of climbers and 2 species of orchids) and 7 species of lower plants (2 lichens and 3 bryophytes and 2 pterydophytes) were recorded from these sacred groves. Likewise 15 species of fungi were recorded from all the groves. The faunal diversity in the sacred groves includes 18 species of mammals, 57 species of birds, 15 species of reptiles, 8 species of amphibians, 31 species of butterflies, 12 species of arachnids, 17 species of other invertebrates. In total 9 species of rare, endangered or threatened flora and fauna were documented among all the groves according to their regional status. It was observed that maximum species variability was encountered in the SGs located away from the town areas. In this connection, SGs located in Nakashipara and Kaliganj blocks were found to have greater flora and faunal diversity than the rest.

Some common flora and fauna observed in sacred groves: Nadia district is a significant area in gangetic river basin that contains green pasture throughout the district. The natural flora is rich throughout the district including many SGs. The richness in vegetation supports diverse arrays of faunal population to a great extent. Many faunal species get safe refuge in these SGs. Some of the most important flora and faunal specimens are listed here:

Apart from these, various types of insects like ants and other hymenopteran insects, lepidopteran insects, and soil arthropods, are also found. Identification and taxonomic studies of fauna specimens being very tedious, describing them in detail is avoided in this article.

Key findings: Most of the sacred groves were found to be roosting and feeding site for birds and insectivorous birds like green bee-eaters, drongos, jungle bablers and mynas were commonly observed in these sacred groves. The undergrowth shrubs were found to be roosting and nesting sites for smaller birds like babblers. The larval host plants of most of the

butterfly species were recorded in these sacred groves, owing to good diversity of butterfly fauna. Sacred groves found amidst agricultural fields or barren lands or beside a water body and hence are chosen by birds for calling and displaying. Few invasive species of both flora and fauna like *Parthenium sp., Lantana sp., Eucatorium sp., Achatina sp. etc.* were found during survey. The data on flora and fauna diversity of the study region was made available to the WBBB management authority.

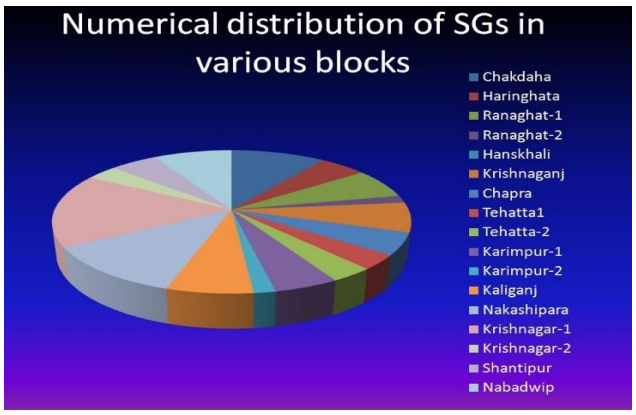

Plate 8. Simplified pie diagram showing relative distribution of SGs in various blocks of Nadia district, WB

Chart 3. List of some of the species of flora (in left column) and fauna (in right column). Scientific name is given in first bracket in each column

Local/ Scientific name of the flora	Local/ Scientific name of the fauna
Bamboo (*Bambusa balcooa, B. Bambos)*	Fox (*Vulpes bengalensis)*
Banyan (*Ficus bengalensis)*	Mongoose (*Herpestes sp.)*
Ashwtha *(Ficus religiosa)*	palm squirrel (*Funambulus sp.*)
Bakul *(Mimusops elengi)*	Field rat (*Bandicota bengalensis)*
Bel tree *(Aegle marmelos)*	Microchiroptera (*Pipistrellus sp.*)
Phani manasa *(Opuntia stricta)*	Bat (*Pteropus sp.)*
Bherenda (*Jatropha sp)*	Monkey (*Macaca sp.*)
Kadam *(Neolamarckia cadamba)*	Langur (*Semnopithecus sp.*)
Mango tree *(Mangifera indica)*	Owl (*Athene sp.*)
Neem *(Azadirachta indica)*	Pigeon (*Columba livia domestica*)
Jackfruit tree *(Artocarpus heterophyllus)*	Spotted dove (*Streptopelia chinensis)*
Tetul *(Tamarindus indica)*	White throated kingfisher (*Halcyon smyrnensis)*
Teak *(Tectona grandis)*	Tia (*Psittacula krameri*)
Sal tree *(Shorea robusta)*	Pond Heron *(Ardeola grayii)*
Tamal tree *(Cinnamomum tamala)*	Drongo *(Dicrurous adsimilis)*
Taal tree *(Borassus flabellifer)*	Green bee eater *(Merops orientalis)*
Date tree *(Phoenix dactylifera)*	Cormorrant (*Phalacrocorax niger)*
Sisu tree *(Dalbergia sissoo)*	Indian myna (*Acridotheres tristis)*
Shonajhuri *(Acacia auriculiformis)*	Jungle babbler (*Turdoides striatus)*
Babla tree *(Acacia nilotica)*	Spectacled cobra(*Naja naja*)
Lambu *(Dysoxylum costulatum)*	Monoceled cobra (*Naja kaouthia*)
Rubber tree (*Ficus elastic)*	Russel's viper (*Daboia russelii)*
Dumur *(Ficus hispida)*	Rat snake (*Ptyas mucosa)*
Nag keshar *(Mesua ferrea)*	Green vine snake (*Ahaetulla sp.*)
Champa *(Michelia champaca)*	Monitor lizard (*Varanus bengalensis*)
Bahera (*Terminalia bellirica)*	Toad (*Bufo sp.*)
Arjun *(Terminalia cuneata)*	Frog (*Rana sp.*)
Pituli *(Trewia nudiflora)*	Tree frog (*Hyla sp.*)
Kool *(Ziziphus mauritiana)*	etc.
Ashoka tree *(Saraca asoca) etc.*	

Species similarity index: A species similarity index was done using multi taxa analysis. Out of 60 sacred groves of Nadia district studied, species similarity index (even distribution of all species) of the 10 major sacred groves (in terms of area covered by them) was compared. The Jaccard index was calculated and the value was found to vary between 0.36 and 0.47. As all the similarity indices between the sites are below 50% level so it can be concluded that the sites' species composition are unique or heterogeneous in nature.

Shannon-Weiner Index: Diversity is a parameter of community structure which is related to the number of species (species richness) and abundance and evenness. Here, the species diversity of 10 sacred groves was compared and Sannon-Weiner Index was calculated. The Sannon-Weiner Index found to be in the range of 1.9 (Khisma Maniktala SG) - 3.1 (Burimatala SG, Nakashipara), which is a recognized range.

Ownership, religious faith and management of sacred groves: SGs in Nadia fall under following categories due to variation in the management status:

- SGs protected by government organizations like A.S.I. or Archaeological Survey of India (as in case of Terakota Temple, Palpara, Chakdaha; Ballal Dhipi, Bamanpukur, Mayapur)
- Privately owned SGs (Fakir bari/ mazaars)
- ISCKON temple, Mayapur
- Trustee Boards
- Village community / local committees / Samaj / Wakf Board
- Intra-village (by separate puja communities)

The human population of Nadia has increased to a considerable extent for last few decades especially due to influx of human population. Over the period the population migration not only brought in different human biological traits, but also a variety of cultural, religious, developmental and technological characteristics. Contemporary Nadia is an agglomeration of different endogamous groups of various religious faith chiefly composed of Hindus and Muslims. In other words, there is heterogeneity in the society in terms of religious beliefs, culture, and pattern of livelihoods. But majority of population in Nadia speaks in Bengali with minor exceptions of Urdu speaking muslims. In this connection, a few tentative inferences can be drawn from the information gathered: the sacred groves are found mainly among non-tribal Hindu groups. The absence of groves in the tribal areas is not clear. There is regional variation in terms of ethnic association. Moreover, the association with different castes is not clear. And habitat fragmentation occurs to the native fauna population due to anthropogenic activities.

3.1 Gender and Management of SGs

The role of gender in SGs can be analysed at least at four levels:

A majority of the SGs in Nadia are associated with female deities such as Maa Kali, Maa Chandi, Maa Manasha, Sri Radha, Maa Durga. But the deities of male god are also not scanty. Nadia is the birthplace of Chaitanya Mahaprabhu who preached the idea of nonviolence, speaking of love by the name of Lord Krishna. So, in many groves the idol of Lord Krishna along with Sri Radha, Sri Chaitanya Mahaprabhu, Jagannath-Balabhadra-Subhadra, Mahadeb or Lord Shiva are worshiped.

As far as the gender of the priest is concerned, it appears that without an exception the priesthood rests with males as also found in other states [24,37]. The access to men and women in various rituals, festivals, ceremonies that take place in the groves and harvest of biomass from the groves was studied. It appears that entry of both men and women of different age groups are permitted into the groves. In some SGs only married women's entry is observed to a large extent. Some information about the kind of role women plays in decision-making regarding management of SGs. Most SGs are associated with a temple or worship structure of other kinds and the worship is managed by a Puja Committee, Temple Committee or trustees which are mainly composed of male members in rural areas. It can be inferred that practically no significant role of women in the management of SGs are observed in Nadia District. It is highly recommended women are represented in the numerous trust bodies or committees that are managing SGs [38].

3.2 Participation of Local People for Protection of SGs

The role of sacred groves in the lives of the local people may be categorized into four features: religious belief, socio-political, socio-cultural and economic aspects. Sacred groves are live parts of the ecosystem. Local people maintain these groves as a part of their cultural tradition. This fact indicates that there are abundant scopes for strengthening this institution [37]. A lot more opportunities are required to be created in the form of workshops, conferences, exchange of views among a wide range of people of the different parts of the district by direct interaction with them. International agencies like UNESCO, the

World Bank and Ford Foundation have included SGs in their agenda [24]. The media is currently devoting a lot more space to this institution than before. The level of awareness among different sections of the population regarding the cultural and biological importance of SGs is increasing [39]. Realizing the cultural, biological and ecological importance of the SGs in our country and the threats faced by this ancient institution, the West Bengal Biodiversity Board, Kolkata (WBBB) has undertaken a number of activities in collaboration with many academic institutions, various panchayats, NGOs, and local human population. Travelling exhibitions using models, paintings, photographs of different components of SGs of our state may be organized to show the common people the importance of conservation of such SGs. Other objective of this is also to interact with local people and different organizations to learn more about SGs of the state and to strengthen the diverse SG-related local management practices and knowledge systems. Through growing awareness among village people living especially in the vicinity of SGs is very encouraging in the sense that these people are protecting the age-old trees of the area along with the beliefs and taboos associated with the SGs. The trees and other vegetation are safe house for many fauna. Thus, local people in one hand using the products and biproducts of the vegetations of the SGs; at the same time helping in protecting the flora and the fauna of the area, ultimately conserving the biodiversity of the SG ecosystem.

4. DISCUSSION

Sacred groves 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 to keep them in a relatively undisturbed state [16,40]. Various SGs constitute virgin vegetation, and are particularly enriched with various trees and associate groups of organisms, like epiphytes, amphibia, reptiles, birds, butterflies etc. With the continuing destruction of forest all around them, the SGs have become fragmented habitats housing a variety of genetic pools and became the safe refuge for many plant and animal species [23]. Today, unfortunately fewer plants are actually reported thriving in some SGs. Sacred groves also act as a nurturing ground for many ayurvedic and folk medicines. They are also of great forestry interest as indicators of the natural productivity of the region. Ecologically valuable species of *Ficus sp.* which conserve high amount of nitrogen, phosphorous, magnesium and calcium in their leaves, are found in several SGs [7,13,41]. Many SGs hold water resource in the form of freshwater ponds, lakes, dighi and jheels, streams or rivers. Not only has that, but the vegetative mass of the grove itself retains water and releasing it slowly in times of summer. It is evident that one of the important ecological roles of these groves is to provide a more dependable source of water for the organisms living in and around the SGs. In addition, transpiration from the SGs vegetation would increase atmospheric humidity and reduce temperature in the immediate vicinity [22]. In addition, diverse cultures recognize this association in different ways in relation to the sacred place and its elements [42]. The institution of SGs has been studied in different parts of Nadia district of the Indian state of West Bengal from anthropological as well as biological conservation points of view. Some of the SGs are on the verge of extinction for different reasons [43]. During interview, the local people reported that some animals are not seen today in the area which was found in these forest patches even few decades ago. This may be attributed to the uncontrolled destruction of habitat i.e. habitat fragmentation of these animals along with their killing for various purposes [25]. Some animals even did come out of these undisturbed forest patches and could be seen by villagers. The number of recently unseen animals is increasing gradually. This observation does not only indicate the extinction of these animals; rather these animals might have migrated to region where they found more secure habitat and abundant resources. Degradation of forests and destruction of habitat due to anthropogenic activities are the major causes of decline in the biodiversity profile of these SGs [25,43]. The biodiversity indices calculated in the SGs of the study area still point to the heterogeneity and richness of the species living in these groves. To preserve the species richness and diversity conservation practices are required to follow strictly and voluntarily by local people as found in Bonai forest division, Odisha [30]. Similarly, many traditional conservation practices of local people in many areas of the district of Nadia including daily worship and rituals in these grove areas [42], regular vigil by local believers, planting of many trees in the boundary of the groves, maintenance of taboos associated with these SGs contribute to the conservation and protection of biodiversity of SGs as encountered in various sacred groves in other part India [20] and abroad including Sri Lanka [14], Nepal [37]. These methods collectively belong to the traditional management practices of SGs in local level. Another important measure to protect the ancient institution of SGs in Nadia is to control indiscriminate access to SGs by cultural restriction and, thereby, reduced the human impact as reported in other parts of the country too [20,24,42]. The consequence of such restriction has been that SGs have evolved as important repository of

biological diversity and permitted diverse ecological processes to continue with least interference over long period of time [21]. Further attention toward the conservation of the SGs and their biological components is very much important, as they also serve as microhabitat for many significant fauna and flora which are essential components of larger ecosystem.

5. CONCLUSION

This article may draw attention of the conservationist so that these socio-ecological forest patches get their due attention for conservation. In general, the area surrounding these groves has been becoming populated by human habitation. Many of the endemic and rare species of fauna and flora in these areas of Nadia district decreased in abundance. Some are not even found today. Over the period, the population migration in this district brought together a variety of socio-cultural, religious, developmental, and technological characteristics. Contemporary Nadia is an agglomeration of different endogamous groups of various religious faiths. Keeping these faith conserved in the areas of SGs is an uphill task of the knowledgeable society because this would bring about the conservation of the biodiversity of these areas too. Conservation through traditional practices by indigenous people may result in sustainable development of the areas along with benefit sharing among stakeholder village conservationists thus converting these SGs into biodiversity heritage sites, not only of the district of Nadia but also of the whole country.

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COMPETING INTERESTS

Author has declared that no competing interests exist.

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