SACRED GROVES IN CONSERVATION OF BIODIVERSITY IN ODISHA

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ABSTRACT

Phytodiversity survey of sacred groves was carried out for a period of two years (2016-2018) in Bhadrak district of Odisha, India. A total of 42 plant species belonging to 39 genera under 26 families are recorded from 20 selected sacred groves of the district. Moraceae represents the dominant family. The respondents affirmed that the plants inside these sites are never cut or harmed and some plant like neem (*Azadirachta indica* A. Juss.), banyan (*Ficus benghalensis* L.) and peepal (*Ficus religiosa* L.) present in the sacred groves are more than a century old. The present study indicates the role of sacred groves in biodiversity conservation through faith, belief, religious activity and community participation.

Keywords: *biodiversity, deity, cultural and religious belief, traditional knowledge*

INTRODUCTION

Biodiversity is rich at many places in India beyond the designated officially protected areas due to some religious beliefs and taboos [1]. Taboos are the unwritten, orally transmitted social rules that regulate human behaviour [2] and play a major role for the conservation of natural resources, species, and ecosystems on a local and regional level [3]. Traditional customs and beliefs of human society in the form of nature worship have played an important role in protection and conservation of biodiversity worldwide [4, 5]. Sacred groves are patches of forest or places with natural vegetation conserved through man's spiritual beliefs and faith [6], being considered holy or sacred place with existence of the village deity there. Nobody disrupts the vegetation or cuts trees from inside for the fear of the divine curse. Many plant and animal species inhabit these protected sites due to lack of human interference rather due to community protection [7, 8]. These sacred groves naturally are rich sources of rare and endemic plants of the concerned region [9, 10]. Even in some cases, it is considered as a mini biosphere reserve [11]. The importance

of sacred groves is now well realized and even in IUCN's (International Union for Conservation of Nature) six protected categories, cultural and spiritual values are better reflected [12]. There are several studies carried out in different parts of the country [13-15] to assess the role of sacred groves in conservation of flora of the concerned region. But there is hardly any study and exploration on such sites in Odisha. So, the present study was planned and executed during 2016 - 2018 to explore and evaluate the role of sacred groves in Bhadrak district of Odisha, India. The current work may be helpful to understand the ancient vegetation history including the predominant flora, which would be very significant in environmental development through better management of the groves and to create conducive conditions for restoration and sustenance of wild biodiversity through community participation.

EXPERIMENTAL

Study site

Bhadrak district (20° 43′–21° 13′N and 86° 6′–87° E) is in Northeast Odisha. It spreads over 2505 km^2 and has 1,506,522 inhabitants (2011 Census). Four other districts – Balasore, Kendrapara, Jajpur, and Koenjher – surround Bhadrak district while a part is bounded by the Bay of Bengal. The district covers about 1.61 % of the total land area of the state and contributes 3.59 % of the state's population. About 86.66 % of the inhabitants are villagers and the people are engaged in agricultural practices as their primary occupation. Paddy is grown as the main crop in Kharif, covering approximately 94 % of the total cultivable area. In addition to cultivation, people in the seacoast area (Dhamara, Chudamani and Chandabali) also depend upon fishing for their livelihood. The climate of this district is generally hot and humid with May being the hottest month. December is the coldest month with monsoon generally arriving during the month of June. The rainfall during June to October constitutes at least 75 % of the actual rainfall of this district. Being situated near Bay of Bengal, the district is characterized by periodic earth tremors, thunderstorms in the rains and dust storms in April and May.

Data collection

The methods employed in this study were designed with the purpose of providing base line information on the biodiversity of sacred groves and funeral ground, through literature survey and field visits to various areas (seven blocks of the district i.e. Basudevpur, Bhadrak, Bhandaripokhari, Bonth, Chandbali, Dhamnagar and Tihidi) from June 2016 to May 2018 in Bhadrak district, Odisha, India. Systematic field surveys were carried out monthly, following established and standard procedures [16]. The information on plant biodiversity was obtained through structured questionnaires, complemented by free interviews and informal conversations [16, 17]. During these surveys, 20 sacred groves were covered for preparing an inventory of tree and shrub species of angiosperms. Only tree and shrub species were considered as the ground was disturbed by domestic herbivores like cattle, goat, sheep etc. A total of 75 respondents (village priest and other elderly persons) were considered the key informants in the study, and the selection process was based on the knowledge and experience in sacred groves. The information on historical background of groves and their associated deity, nature of vegetation, largest trees present in it, age of trees, rituals, cultures and taboos were collected from ethnic communities. Personal interviews and group discussions carried out in the local language revealed specific information about the plants, which were further compared and authenticated by crosschecking [18]. The plant specimens were identified during the field study. Sample specimens of confusing species were collected and identified with the help of flora book [19].

RESULTS AND DISCUSSION

There was presence of a sacred grove in each village, usually in the middle or end of the village. It was believed to be the abode of certain deity, worshiped by the village priest. People had adopted strict rules of not cutting any trees, no grazing of herbivores, and no killing of animals inside the groves, believing such place and specifically the trees to be the abode of god and ancestral spirits. Different rituals and religious functions were performed inside the site for the wellbeing of the villagers, their animals, crops, and protection against diseases. A total of 42 plant species belonging to 39 genera under 26 families with different life forms (trees and shrubs) were identified during the survey. Members of family Moraceae (5 spp.) were found to be the most represented among all the species identified followed by Caesalpiniaceae (4 sp.) and Fabaceae (3sp.) respectively. Seven families were represented by two species and 16 were monospecific of the total number families in the inventory (Table 1, Figure 1 and 2). Different species of *Ficus* were predominantly present in most of the sites in terms of generic richness. These species provide a niche for the large number of birds and small animals to feed and live there undisturbed. Some ornamental plants as well as plants required in rituals and worship were found to be naturally-occurring in these premises.

Figure 1. Neem tree with village deity

Indigenous communities in India have cultural and religious beliefs and have worshiped trees since time immemorial. This religious belief serves as an instrument for protection of rare plant species [20]. Every sacred grove has own legends, lore, and myths that link between the present and past society in terms of biodiversity, culture, religious and ethnic belief [21]. It represents an excellent example of traditional conservation practice that continues to provide respite to the dwindling bio-resources in different parts of the world, predominantly in tropical Asia, Africa, South America and Australia [22 - 27]. They have also been reported from different parts of India [28] and found mainly in tribal localities. Prohibition of killing animals and cutting-down trees, except when wood is needed for the religious purposes like construction and repair of temple buildings, and temple rituals in the sacred groves of Bhadrak district substantiate the findings of earlier studies [22, 29]. The dominance of genus *Ficus* in sacred groves of the study area is also reported [30]. In the present investigation, *Ficus benghalensis* L. and *Ficus religiosa* L. provide a niche for large number of small animals. These species are classified as “keystone mutualist" for the maintenance of tropical biological diversity [31, 32].

Figure 2. Banyan tree with village deity

All the sites visited in Bhadrak district of Odisha show various level of depletion due to anthropogenic and other allied activities. As reported by elderly villagers, most of these plant species were predominantly growing in the past, which have now vanished from the surrounding locality due to such interference. The area and vegetation of sacred groves are rapidly shrinking due to above biotic pressure. It is akin to the status of majority of sacred groves in other parts of the country [33].

Table1. Plant species recorded from selected sacred groves of Bhadrak district, Odisha

	Local Name	Botanical Name	Family
1.	Kaincha	*Abrus precatorius* L.	Fabaceae
2.	Bana Ritha	*Acacia sinuata* (Lour.) Merr.	Mimosaceae
3.	Bela	*Aegle marmelos* L.	Rutaceae
4.	Kadamba	*Anathocephalus cadamba* Roxb.	Rubiaceae
5.	Jeuta	*Artocarpus lacucha* Roxb.	Moraceae
6.	Karamanga	*Averrhoa carambola* L.	Geraniaceae
7.	Nima	*Azadirachta indica* A. Juss	Meliaceae
8.	KantaBaunsa	*Bambusa bambos* L. Voss	Poaceae
9.	Kanchana	*Bauhinia retusa* Roxb.	Caesalpiniaceae
10.	Simili	*Bombax ceiba* L.	Bombacaceae
11.	Tala	*Borassus flavelifer* L.	Arecaceae
12.	Gila	*Caesalpinia bonduc* L.	Caesalpiniaceae
13.	Beta	*Calamus guruba* Buch.	Arecaceae
14.	Pulanga	*Calophyllum inophyllium* L.	Clusiaceae
15.	Arakha	*Calotropis procera* (Ait.) R. Br.	Asclepiadaceae
16.	Baruna	*Crateva magna* Lour.	Capparidaceae
17.	Kala Dudura	*Darura metel* L.	Solanaceae
18.	Oau	*Dillenia indica* L.	Dilleniaceae
19.	Kendu	*Diospyrus melanoxylon* Roxb.	Ebenaceae
20.	Aonla	*Emblica officinalis* Gaertn.	Euphorbiaceae
21.	Paladhua	*Erythrina variegata* L.	Fabaceae
22.	Kaitha	*Feronia limonia* L.	Rutaceae
23.	Bara	*Ficus benghalensis* L.	Moraceae
24.	Dimiri	*Ficus racemosa* L.	Moraceae
25.	Aswastha	*Ficus religiosa* L.	Moraceae
26.	Amba	*Mangifera indica* L.	Anacardiaceae
27.	Baula	*Mimusops elengi* L.	Sapotaceae
28.	Singadahara	*Nyctanthes arbortritis* L.	Oleaceae
29.	Durlava	*Ocimum basilicum* L.	Lamiaceae
30.	Tulsi	*Ocimum sanctum* L.	Lamiaceae
31.	Kia	*Pandanus fascicularis* Lam.	Pandanaceae
32.	Jandakhai	*Phyllanthus reticulatus* Poir.	Euphorbiaceae
33.	Katha Champa	*Plumeria rubra* L.	Apocynaceae
34.	Karanja	*Pongamia pinnata* L.	Fabaceae
35.	Patala Garuda	*Rauvolfia serpentina* (L.) Benth. ex. Kurz.	Apocynaceae
36.	Chakunda	*Samawea saman* Merr.	Mimosoceae
37.	Ashoka	*Saraca asoca* Roxb.	Caesalpiniaceae
38.	Ambada	*Spondias pinnata* Kurz.	Anacardiaceae
39.	Sahada	*Streblus asper* Lour.	Moraceae
40.	Kochila	*Strychnos nux-vomica* L.	Loganiaceae
41.	Jamu	*Syzygium cumini* L.	Myrtaceae
42.	Tentuli	*Tamarindus indica* L.	Caesalpiniaceae

CONCLUSION

Our study demonstrates the importance of sacred groves in protecting and conserving various life forms. As the sacred groves surveyed have been observed to become the victims of exploitation at different levels, suitable remedial measures like awareness programme and formation as well as implementation of some legal guidelines are warranted for protection of such mini biosphere reserves in Bhadrak district of Odisha. Moreover, there should be further in-depth study in wider scale covering larger areas of the state to pinpoint the status of sacred groves and the threatened, endangered or near extinct species, if any, which once dominated the concerned region.

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