

Status of Sacred Groves in India: A Review

Abstract

Areas covering native plant and tree species protected on behalf of religious grounds are known as sacred groves. Apart from India, sacred groves occur in various countries including America, Australia, Africa, Asia and Europe. They are not merely patches of forests but are islands in desolated landscapes. Many valuable medicinal plants and wild relatives of cultivated species are residing in sacred groves which have got tremendous roles to play in species or tree improvement programmes. Ancient sacred groves should be treated as possessing “Incomparable Values” according to the National Environment Policy of India. This paper reviewed extensively, analyzed and presented the current status on these invaluable resource pockets in India.

Key Words: Biodiversity, Endangered Species, Endemic Species, Rediscovery, Sacred Groves, Sacred Sites.

1. Introduction

Areas covering native plant and tree species protected on behalf of religious grounds are known as sacred groves. Sacred groves form a part of worshipping nature and are considered ‘Sacred Natural Sites’ as per IUCN’s definition. Apart from India and Indian sub-continent, sacred groves exist in other parts of the world including America, Australia, Africa, Asia and Europe. In India, sacred groves are mainly distributed in the states of Andhra Pradesh, Chhattisgarh, Haryana, Himachal Pradesh, Karnataka, Kerala, Maharashtra, Manipur, Meghalaya, Odisha, Rajasthan, Tamil Nadu, Uttarakhand, West Bengal and the Union Territory of Puducherry [1,2]. They are priceless treasures of biological, cultural, ecological and historical value. High conservation and biodiversity values of sacred groves make them to be used as a tool and model for biodiversity conservation [3]. Ancient sacred groves should be considered as having “Incomparable Values” according to the National Environment Policy of India [4].

Only a smaller number of sacred groves are documented and subjected to detailed studies [5]. The total number of sacred groves in India is estimated between one lakh and one lakh fifty-thousand [6] and the latest number of sacred groves known is 13,720 [1]. The vast diversity of India has given different names to them as follows:

Table 1. Local names of sacred groves in different states

State	Name
Assam	Than or Madaico
Chhattisgarh	Matagudi, Devgudi or Sarana
Himachal Pradesh	Dev Van
Jharkhand	Jaherthan or Sarana
Karnataka	Devarakaadu or Kans
Kerala	Kaavu
Maharashtra	Devrai or Devgudi
Manipur	Umang Lai
Meghalaya	Law Kyntang or Law Niam
Odisha	Jahera or Thakuramma
Rajasthan	Orans
Tamil Nadu	Kovilkaadu
Uttarakhand	Bugyal or Dev Van
West Bengal	Garamthan or Jahiristhan

The size of the sacred groves varies from a very few trees to thick forest areas having extensive tracts of land. Scientific studies of these price-less treasures were initiated only in the late seventies though many references are available on sacred trees and sacred groves in India in early literature [7]. As there are no comprehensive reviews available on sacred groves in India, an attempt was made to present this information in the form of a detailed review article.

2. Methodology

Information and data available from secondary sources like books, journal articles and online data sources were used for preparing this review article.

3. Status of Sacred Groves in Different States and UTs in India

3.1 Manipur: [8] reported that about 166 sacred groves are present in different parts of Manipur. Through floristic studies of these valuable resource pockets in the state, 173 species of angiosperms of 145 genera and 70 families were documented. Most of these plant species (96%) are being used as medicines [9]. Considering that sacred groves are the abode of spirits, Gangte tribe in Manipur do not practice shifting cultivation in these lands [1]. Gamkhap are the forest patches conserved as sacred around the living areas in Manipur. Small reserves of bamboo called Mauhak are also being managed by Gangte tribals. No extraction of bamboo shoots is carried out from Mauhak [10].

3.2 Assam: 'Than' is the local name given to sacred groves managed by the forest-based tribes such as Rabha and Bodo, living in valleys of Western Assam. Twelve sacred groves have been re-discovered called as Dikhos, conserved by the Dimasa tribal community of Dima Hasao district of the state [11]. Ethnomedicinal plants numbering 38 (36 genera and

27 families) were recorded from the sacred groves of Karbi Anglong district of Assam [12].

3.3 Sikkim and Arunachal Pradesh:World Wide Fund for Nature -India attempted a preliminary enumeration of the sacred groves and their locations in Sikkim and Arunachal Pradesh [13].From West Kameng and Tawang districts of Arunachal Pradesh, 58 sacred groves called Gompa Forest Areas were reported.From Lower Subansiri and Siang districts of Arunachal Pradesh, few sacred groves have been identified. An inventory reported a total of 101 sacred groves in the state of Arunachal Pradesh. Many of the sacred groves are found at high lands [14].Carbon sequestered by the sacred forests was 569.42 Megagram carbon dioxide per hectare in Deorali and 583.34 Mg CO₂ per hectare in Enchey, Sikkim which is almost double when compared to the 280.76 Mg CO₂ per hectare in the younger natural rural forest [15].

3.4 Meghalaya:A base-line study on the floristic study of Meghalaya, India was carried out by [16].According to this floristic study, a total of 514 species of flowering plants under 340 genera were recorded from 79 sacred groves.Canopy cover estimate was employed to understand the status of these groves. In Meghalaya, considering the vast areas under the sacred groves, size of individual grove, their location on critical sites and religious taboos attached to them, the sacred groves conservation concept seems to be an indigenous knowledge system conceived, developed and perpetuated by the indigenous tribal people of the state. It was found that generally 70% of the local people around the sacred forest areas are quite ignorant about the available resources and its status [17].

3.5 Jammu and Kashmir:From Jammu and Kashmir, about 150 groves have been reported.Whereas normal forestry operations are carried out in larger groves, small groves are highly protected. The income from the forestry operations goes to the shrine. Any removal of plant parts is a taboo here. Protection of the groves is offered voluntarily by the people living around.

3.6 Goa:The state of Goa is estimated to harbour about 100 sacred groves, each reflecting unique micro climatic conditions with diverse flora and fauna [18].Presence of sacred mangroves has also been reported from Gujarat, Goa, Maharashtra West Bengal and Karnataka [19, 20].From the state of Goa, about 60 mangrove species belonging to 41 genera and 29 families were identified.

3.7 Bihar:In Bihar, the sacred groves are termed as *sarnas* and the majority of them are located in the Chotanagpur area. It is believed that the conservation of *sarnas* started from around 600 BCE and it is associated with the settlement of Munda tribals from Rohtasgarh.The *sarnas* are not very large in size. Some of the *sarnas* are so small that they comprise of only 2 to 20 trees each. They usually consist of creepers, shrubs and grasses.Not much information is available regarding the sacred groves of Bihar as they are yet to be identified and documented [21].

3.8 Chhattisgarh:From Kabirdham district in Chhattisgarh, 57 sacred groves have been documented. These groves cover 185.65 acres and have a significant role in conserving

the floristic diversity of plants used for medicinal purposes [22]. Endangered and endemic medicinal plant species have been recorded from Amritdhara sacred grove in Chhattisgarh state [23].

3.9 Uttar Pradesh: In Uttar Pradesh, 33 sacred groves have been reported. Future protection of sacred groves and their potential for the conservation of biodiversity are depended on factors such as tourism, income and job development. Preservation of sacred groves and the conservation of biodiversity are based on the promotion of indigenous cultural heritage and further evolving influences [24].

3.10 Haryana: Over 50 plant species have been documented when 20 sacred groves were surveyed in Haryana. From the Sankaracharya sacred grove of Srinagar, angiosperms and gymnosperms numbering 256 plants belonging to 60 families and 229 genera were identified [25]. In Haryana, only a few groves are well-protected while most of the sacred groves are partially under threat due to anthropogenic factors. Degradation of sacred groves in this state can be attributed to loss of vegetation and the rich cultural heritage. Limited studies only have been conducted to understand the floristic diversity of the state. Detailed biodiversity studies and further related information on sacred sites in Haryana are lacking [26].

3.11 Rajasthan: There are about 25,000 major *orans* in Rajasthan, covering about 600,000 hectares. About 1100 major orans covers 100,000 hectares, and in Thar Desert alone, 5,370 sq. km is covered by *orans*. These orans fulfil the real needs of local people [27]. Sacred groves in the western arid tract of Rajasthan are a major source of green fodder and water. In case of emergency or in controlled manner only, the resources in groves are used in other parts of the state [28].

3.12 Odisha: From the 20 identified sacred groves of Bhadrak district of Odisha, plant species numbering 42 representing 39 genera and 26 families are documented [29]. Diverse spectrum of ecosystems has been reported from the sacred groves of Odisha. Many species facing extinction have been identified from these groves. Groves can be found in grasslands, barren landscapes, agricultural landscapes, coastal plains, hill slopes, or deserts. [30] reported that avoidance of human and animal interferences in a sacred grove in Odisha resulted in rich, varied and storeyed vegetation compared to the adjoining areas. Field surveys conducted in several villages of West Bengal and Odisha revealed that strict cultural taboos existed in the harvesting of trees and hunting in sacred groves and no forest produce was exploited for commercial purposes. Even in the absence of policing or monitoring, most of these groves were found undisturbed [6].

3.13 West Bengal: An enumeration of sacred groves was conducted by [31] in West Bengal. The findings of the enumeration revealed that more than 560 sacred groves currently exist in the state and are known as Gramthan. A study conducted in an 8.16-acre sacred grove maintained by the Muslims of West Midnapore district in West Bengal recorded a total of 272 species of angiosperms under 238 genera covering 104, 63, 68 and 37 species of herbs, shrubs, trees, climbers, respectively [32]. Two-hundred and seventy-seven species belonging to 238 genera and 77 families under 36 orders were reported

when floristic diversity studies were undertaken in Kankabati Sitabala *Than* in West Midnapore district in the state [32].

3.14 Uttarakhand: When carbon storage studies were undertaken in the Chanderbadni sacred grove in Garhwal Himalaya, Uttarakhand, 688 trees per hectare was observed to be the tree density. Total carbon density calculated was 587.190Mgha^{-1} and total biomass density $1159.900 \text{Mgha}^{-1}$. *Quercus leucotrichophora* exhibited the highest tree density whereas, *Cedrus deodara* registered the highest carbon density and biomass [33]. A study conducted in an important sacred grove in Almora (Banari Devi) revealed the presence of 12 woody species representing 11 families. Many of them are being used for fodder or fuelwood. The species diversity ranged between 1.03 to 1.37 for trees, 1.24 to 1.46 for saplings and 1.46 to 2.15 for seedlings [34].

3.15 Gujarat: Around 25 plant species have been identified when 11 sacred groves were subjected to studies in Banaskantha District, Gujarat. Among them, few groves only are well preserved. Other sacred groves are under threat due to population explosion [35]. For the local inhabitants, the inland mangrove in 'Shravan Kavadia' is a very important sacred grove of Gujarat. The local inhabitants believe that logging, harvesting, collection of fire wood or long fire are religiously inauspicious and therefore, have been totally prohibited. The surviving mangrove patch in Shravan Kavadia belongs to one of the ancient bio-genetic pools. Near the Shravan Kavadia temple, though the place is situated over 100 km away from the coast, it has a mangrove area of 0.7 ha. This area has neither any connectivity with sea water nor is regular water supply available for the survival of trees. Therefore, it is a unique mangrove system and found anywhere else in the world. From this temple forest, represented by inland mangrove, no one cuts or causes any damage to old trees of *Avicennia*. There were 80 adult trees in a dense patch two decades ago. However, during the 1998 cyclone, half of the trees were destroyed. There are no conservation measures adopted for *Avicennia marina* trees, despite a great threat to their survival in this inland mangrove patch [36].

3.16 Maharashtra: In the state of Maharashtra, 400 groves and above occupying an area of 35710 ha have been identified. Plant species numbering 790 belonging to 352 genera have been reported. Sacred groves representing climax vegetation in Western Maharashtra have been documented by [37]. They have enumerated endangered and endemic plant species numbering 38 from 12 select sacred groves. In the deforested areas of the Western Ghats regions of the state, sacred groves form an important landscape feature. From these groves around 790 plant species included in 352 genera have been reported. In Maharashtra, killing of animal or felling of timber in sacred groves is a taboo. However, the non-timber forest produce that grow in them can be utilized by the local community. Slash and burn cultivation is being practiced by Mahadev Kolis tribe of Maharashtra. The only forest region, that is kept without any external disturbances are the sacred groves. Following the studies on arboreal plants and lianas which showed exceptional growth in sacred groves of Maharashtra. [38] emphasized the need for conservation of these groves. Studies made by the Botanical Survey of India in general and contributions of Dr. V.D. Vartak in particular, have greatly helped in understanding the significance of these invaluable resource pockets and their conservation in

Maharashtra state. The increasing pace of deforestation due to the population explosion and commercialization of agriculture were identified as the major reason for the deterioration of many sacred sites in Maharashtra.

3.17 Madhya Pradesh: In Madhya Pradesh, sacred groves are named as Deogudi / Sarnas. In this tribal-dominated state in Central India (19.9%), they conserve a sizable number of plant and tree species in sacred groves. The tribes have immense knowledge on the medicinal uses of these plants. The tribes believe that if the plants are destroyed or not maintained properly, natural disasters may culminate their clan. In Madhya Pradesh, the tribes conserve many medicinal plant species of high value in sacred groves.

3.18 Himachal Pradesh: From the Shivbari sacred grove in the hilly terrain of Himachal Pradesh, 69 angiosperms were identified. They included 14 trees, 9 shrubs, 3 lianas and 43 herbs. In the state, this represents about 2% of the total flowering plant species [39].

3.19 Tamil Nadu: Four-hundred and forty-eight sacred groves were documented from Tamil Nadu. The forested western districts have lesser number of sacred groves whereas, the eastern districts without much forest cover have more sacred groves [40]. However, another report shows that sacred groves numbering 1275 have been documented from Tamil Nadu [41]. Sixty rare, endangered and threatened (RET) species from 40 families were identified from the sacred groves in Kanyakumari district, Tamil Nadu. Forty-two species were endemic to the Western Ghats. Their study pointed out that even climax vegetation of various altitudes and latitudes could be conserved *in situ* in sacred groves.

3.20 Puducherry: 19 sacred groves have been located in Mahe region of Puducherry. 324 angiosperm taxa belonging to 95 families have been recorded from these groves. Of these, 59 species belonging to 58 genera and 35 families are used by the local inhabitants for curing various ailments [42].

3.21 Andhra Pradesh: Over 800 sacred groves have been identified spread over 23 districts from Andhra Pradesh as per a survey conducted by WWF-India. The study also proved that 100 of these groves were rich in bio-diversity. Species numbering 134 were reported to have medicinal properties and belonged to rare and endemic category [43].

3.22 Telangana: Vascular plant species numbering 470 belonging to 318 genera and 95 families were reported from Mallur Gutta sacred grove in Telangana when a floristic study was conducted. Sixty-five sacred groves have been recorded from the state and many rare or medicinal species were recorded from them [44].

3.23 Karnataka: 1214 sacred groves were reported from Karnataka. A new species of fungal genus *Xylaria* have been identified from the sacred groves of Kodagu district of Karnataka [45]. Two types of groves have been recorded from the state (a) smaller groves which are entirely protected with no tree felling or biomass extraction and (b) larger groves which act as resource vegetation, providing both ecological security and sustenance of livelihood [46]. Deadwood, non-timber forest products like pepper, mango, jackfruit can be collected by the villagers. They can also tap toddy from *Cayota*

urens. From Uttara Kannada district in Karnataka, *Myristica* swamps, a unique ecosystem in the Western Ghats have been recorded [47]. It was identified that well-conserved sacred groves had higher densities (5120 seedlings per ha) of the threatened flora than the disturbed sacred groves (4288/ha) as well as reserve forests (4800/ha) in a study of sacred groves of Kodagu, Karnataka. Sacred groves which were well conserved were comparable to that of reserve forest areas in terms of species richness [48]. When comparative studies on the regeneration of medicinal plant species in sacred groves and reserve forests were undertaken, it was found to be almost double in groves than that of the latter [49]. These studies indicated that conservation of sacred groves have saved useful plant species and people have started to discover medicinal values more often among plants unique to sacred groves, than those found in other areas.

3.24 Kerala: A new classification to describe the sacred groves of Kerala have been devised and 21 different associations were identified [50]. Seven-hundred and twenty-two species of plants spread over 474 genera and 128 families were documented from 761 sacred groves of the state. [51] have enlisted the rattan resources of the sacred groves of Kerala. A unique mangrove sacred grove of about 18 acres has been reported from Kannur district of the state [52]. One thousand five hundred sacred groves have been recorded from the state of Kerala with distinction and uniqueness in biological diversity [53]. Two thousand five hundred and eighty-seven sacred groves were reported with GIS mapping from four districts of Kerala [54]. [55] reported 1128 sacred groves from Alappuzha district in Kerala where no natural forest exists. Six-hundred and eighty-seven plant species representing 493 genera and 127 families were documented. Nearly 40% of the groves were associated with sacred ponds enriching the water table of the locality. From a sacred grove in Kollam district of Kerala a new genus and species of leguminous climbing plant, *Kunstleria keralensis*, has been documented [56]. Four threatened species viz., *Buchanania lanceolata*, *Blepharistemma membranifolia*, *Pterospermum reticulatum* and *Syzygium travancoricum* have also been rediscovered [57]. A threatened tree of Western Ghats, *Madhuca diplostemon* has been rediscovered after a period of about 180 years from a sacred grove in Kollam district recently [58]. The occurrence of wild cultivars of cultivated species that are known to have higher resistance to pests and better productivity have been reported from the Kerala groves [59]. *Garcinia* spp., *Artocarpus* spp. *Piper* spp. and mango are some of the notable wild relatives of cultivated plants found in the sacred groves of Kerala. Wild turmeric (*Curcuma* spp.), wild ginger (*Zingiber* spp.) wild rice (*Oryza* spp.) and wild nutmeg (*Myristica malabarica*) have also been reported [60]. There are many sacred groves in Kerala from which no plants are removed [61] whereas some of the groves provide livelihood to many artisans [62].

Floristic diversity studies in *Iringole Kavu*, an important sacred grove of Kerala spread over 20 ha, revealed 94 plant species belonging to 85 genera and 52 families with Euphorbiaceae as the dominant family. Analysis of its flora revealed similarity to pure climax evergreen vegetation typical to the lower altitudes of the Western Ghats. Eight endemic species to the Western Ghats were also recorded from the grove [63]. [64] undertook vegetation studies in a highly specialized fresh water swamp sacred grove near Thrissur in Kerala and reported the dominance of an endemic species, *Syzygium*

mundagam. [65] reported the results of the study on the life forms of angiosperms in 200 groves sampled throughout Kerala. The similarity between Raunkiaer's normal life form spectrum [66] and that of the sacred groves indicated that the vegetation of the groves represents a relic of the evergreen tropical rain forest. A study revealed that the biological spectrum of sacred groves in Kerala resembled the spectrum of tropical forests [61]. Sacred groves of Kerala are mainly owned and conserved by ancestral families, joint families, communities or temple trusts. Some are under the control of the Government of Kerala.

4. Major Threats

This review revealed a number of major threats on sacred groves of India. Severe damage and destruction to many sacred groves have been reported from a number of areas in India [67]. [68] conducted a sociological and cultural evaluation of sacred landscapes in North Western Himalaya (Kullu district, Himachal Pradesh) and reported that social change and agricultural development such as monocropping were the major reasons leading to the destruction of these remaining patches virgin forests. Remnants of ancient sacred groves containing 10-20 trees, amidst denuded lateritic expanses were found in almost every tribal village in the western Midnapore district of West Bengal [69]. The status of the sacred groves in Andhra Pradesh was examined by the WWF-India and identified threats for their existence. The major reasons for deterioration of sacred groves were identified as changes in socio-economic scenario, religious beliefs, increasing human population and developmental pressures [43]. Uncontrolled visits by the outsiders and soil excavation works were found to upset the balance of a rare fresh water swamp sacred grove ecosystem in Kerala [64]. [70] reported that many sacred groves in Maharashtra were converted to green lands under social forestry by planting short rotation species like *Acacia auriculiformis*. Transferring deities to concrete or stone structures after offering expensive spiritual rituals and clearing the vegetation was the major threat to sacred groves in southern parts of Kerala. Sanskritisation and invasion of exotic weeds were also observed to be serious threats to the existence of sacred groves [55].

5. Conclusions and Recommendations

The available literature shows discrepancy in the number and documented sacred groves in different states. Different agencies have reported different numbers within the same state. For example, presence of 761 important sacred groves has been reported from Kerala, whereas an exhaustive study performed by the ICFRE - Institute of Forest Genetics and Tree Breeding (IFGTB), Coimbatore, Tamil Nadu could record 1128 sacred groves from Alappuzha, the smallest district of Kerala alone. This shows a lack of coordinated efforts. For states like Bihar much information is not available regarding the sacred groves as they are yet to be identified and documented. It was found that generally 70% of the local people around the sacred forest areas in the north-east are quite ignorant about the available resources and its status. It is essential to document all the existing sacred groves in India which are invaluable treasures of biodiversity. Area of the grove need not be given priority while documenting as a recent study has rediscovered a threatened species, *Madhuca diplostemon* after 185 years from a very small sacred grove near Kollam in Kerala. Similarly, a critically endangered tree species, *Syzygium travancoricum* was found only in one grove having an area of less than 5 cents (200 sq m) from a sacred grove in Alappuzha. Like any growing natural vegetation, sacred groves can also perform the function of carbon sequestration and contribute substantially towards reversing climate change. Sacred groves can be integrated in REDD+ (United Nations Programme on Reducing Emissions from Deforestation and Forest Degradation) and other climate change-related programmes considering their carbon stock and capture potential. It is clear that sacred groves need proper conservation and protection strategies in order to save them from the verge of further degradation.

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Conflict of interest

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