



SACRED GROVES OF INDIA: BASTIONS OF BIODIVERSITY CONSERVATION IN A CHANGING WORLD

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Abstract

With 24% of its land area covered by forests, India ranks tenth in the world in terms of total forest area, making up 2% of the world's total. India, home to 1.428 billion people, faces the difficult task of maintaining its unique wilderness to safeguard biodiversity. The main causes of the decline in biodiversity are human activities associated with the utilization of forest resources. One of the seventeen countries with the highest level of biodiversity, India uses three different land management strategies to conserve its natural resources: biosphere reserves, which include protected areas, adjacent forest areas, and rivers, protected areas (like National Parks and Sanctuaries), and private lands (like agricultural lands and community conservation areas like sacred groves). Forest patches preserved for cultural and religious purposes are known as sacred groves. These forest fragments, numbering over 100,000, are revered as sacred spaces that serve as critical refuges for biodiversity. This article delves into the profound significance of sacred groves, highlighting their contribution to conservation, the escalating threats they face from modernization and resource demands, and the urgent need for robust management strategies to ensure their continued protection.

Keywords

Biodiversity; Conservation; Ecosystem services; India; Protected Areas; Sacred forests.

1. INTRODUCTION

The loss of productivity and ecological stability brought on by widespread species extinctions is causing an alarming decline in global biodiversity, which in turn is changing the processes within ecosystems. The loss of biodiversity causes ecosystems to become less productive, and increasing human pressure has changed the majority of natural environments worldwide. The most secure havens for animals and the cornerstones of biodiversity protection are believed to be protected areas (Bruner et al., 2001). A growing number of Indian anthropologists, botanists, traditional medicine experts, and environmental nongovernmental organizations (NGOs) have expressed a great deal of interest in the phenomenon known as "sacred groves," which are small forests or stands of trees whose produce is reserved for a deity's exclusive use (Kent, 2013). Often called sacred groves, sacred forests are places of cultural significance. Sacred forests, often called sacred groves, are places associated with religious and cultural beliefs. Indigenous cultures around the world have revered and inherited nature from their predecessors since the beginning of time. These areas of a forest were thought to be home to spiritual beings, and it was forbidden to carry out commonplace tasks like felling trees, gathering plants, wood, and leaves, fishing, hunting, grazing domestic animals, lowing, or harvesting crops, and constructing regular homes (Hughes and Swan,

1986). Dietrich Brandis, a German forester and the first General Inspector of Forests is credited with coining the term "sacred grove" to describe the phenomena of religiously motivated forest conservation in India (Brandis, 1897).

Sacred groves have been documented in India from the Central Indian Plateau, the North-East Himalayan region, the Western and Eastern Ghats, the Coastal region, and the Western desert. For decades, Indian indigenous people have preserved small areas of forest near their towns as sacred groves. Grove tradition preserves a wide variety of ecosystems as well as its local and regional identities, which are reflected in the names, customs, and maintenance of groves. There are several regional names for The Sacred Groves in every Indian state. Some of the names of these holy forests in the various Indian states are shown in Figure 1. India's sacred groves date back to pre-Vedic times. This ancient custom is still widely practiced today and is essential to resource conservation. In addition to their cultural and spiritual significance, they serve as repositories of the region's diversity, protecting its distinctive flora and animals. India's sacred woods are made up of a variety of ecosystems, such as the rainforests of Karnataka and Kerala's Western Ghats, the scrub forests of Rajasthan's Thar desert, and the rich biodiversity of the northeastern provinces and parts of the western Himalayas (Singh et al., 2017). With their close

and direct ties to the natural world, indigenous tribes find cultural and spiritual importance in sacred groves. People who live near or in woods typically use voluntary collaboration and group efforts to maintain and conserve biodiversity (Rath and Ormsby, 2020). Historically, sacred groves have been linked to culture-based conservation strategies as shared property resource systems.

Most nations in the world have made the creation of protected areas or nature reserves a key component of their biodiversity preservation strategies. Various classifications of protected places are acknowledged based on the intent and level of human exploitation. The most well-known community conservation zones, often known as sacred forests, have been essential in preserving biodiversity. Sacred groves are areas of a biodiversity-rich natural environment that the local people set aside for ceremonial purposes. They kept these areas pristine because they believed that the presence of strong spiritual forces would shield them from disease and natural disasters. However, these areas are currently in danger due to the waning of traditional beliefs and pressure for land (Parthasarathy et al., 2020). The Indian subcontinent is severely affected by human influences; for instance, 90% of the vegetation cover has been lost in the Indo-Burma region, 77% in the Western Ghats–Sri Lanka region, 75% in the Himalayan region, and an equivalent amount in the dry tropical forests of central India (Singh and Kushwaha, 2008). These effects significantly change the ecology and cause the extinction of species.

Sacred groves are excellent indicators of the achievement of resource conservation and biodiversity. Many Indians who are worried about the consequences of deforestation have claimed the sacred groves of India as an ancient indigenous ecological heritage in response to the worsening global environmental catastrophe (Kent, 2013). Numerous sacred groves were losing their integrity due to mishandled care, lack of belief, and changes in social values. People began destroying these last remaining areas of native plants as soon as the taboo was lifted. There are different degrees of annihilation in different sacred woods. Sacred groves in India are often portrayed in the environmental discourse as a dying tradition, a remnant of ancient knowledge that is being lost as Indian civilization grows increasingly industrialized, educated, materialistic, and imbricated. This article discusses the current risks to sacred groves and highlights the importance of appropriate management measures for their preservation. It also covers the value of these small forest patches as sanctuaries for biodiversity restoration and conservation.

2. METHODOLOGY

This review is a comprehensive search of the literature conducted in the following databases; PubMed® (U.S. National Library of Medicine, USA), Web of Science® (Thomson Reuters, USA), MEDLINE, and Google Scholar, with the use of the following search terms; Biodiversity, Conservation, Ecosystem services, India, Protected areas, Sacred Groves.



Figure 1: Terminology variation of Sacred forests across Indian States.

3. Sacred Groves: An Overview

Indian culture responded to the need to protect forests by creating and maintaining sacred groves and woods. The forests have been the source of all South Asian religions and cultures not out of fear and ignorance, but rather because of ecological understanding (Shiva, 1991). Sacred groves can be divided into three categories: burial or cremation or

memorial grounds (groves created around burial sites, cremation grounds, on agricultural land or near the grove of the village goddess), temple groves (groves created around a temple), and traditional sacred groves (places where the village deity resides and is represented by an elementary symbol) (Parthasarathy et al., 2020). Every holy grove has a different state-wide god and a local name (Figure 1). Apart

from the fact that their preservation preserves pockets of rich and varied flora and fauna in otherwise deforested areas, sacred groves throughout different regions have little in common (Kent, 2013). Sacred groves are rich in biodiversity, hold cultural and spiritual value for the Indigenous tribes that look after them, and offer ecosystem benefits to the local populations that have defended them for generations all over the world (Figure 2). The green lung area of the sacred groves, in addition to offering a multitude of physical items, is the sole place that can mitigate the destructive effects of pollution and deforestation. It serves as a storehouse for oxygen, the life gas. Sacred groves are especially crucial for conserving water and soil. They increase the soil's stability.

Because of its great geographic and ethnocultural diversity, India has the biggest concentration of sacred groves in the

world—an estimated 100,000—and these groves may be found across many different locations, each with its own unique set of cultural customs (Malhotra, 2007). For decades, Indian indigenous people have preserved small areas of forest near their towns as sacred groves. A network that maintains "a sizeable portion of the local biodiversity in areas where it would not be feasible to maintain large tracts of protected forests" is made possible by the quantity and spatial distribution of sacred groves (Gadgil and Vartak, 1975). In terms of physical characteristics, it is a small or large plot of forest with a temple inside, but in terms of culture, it is associated with taboos, myths, and ancestral spirits. These central customs appear to play a crucial conservation role in preserving biodiversity and have long maintained the integrity of sacred forests (Parthasarathy et al., 2020).

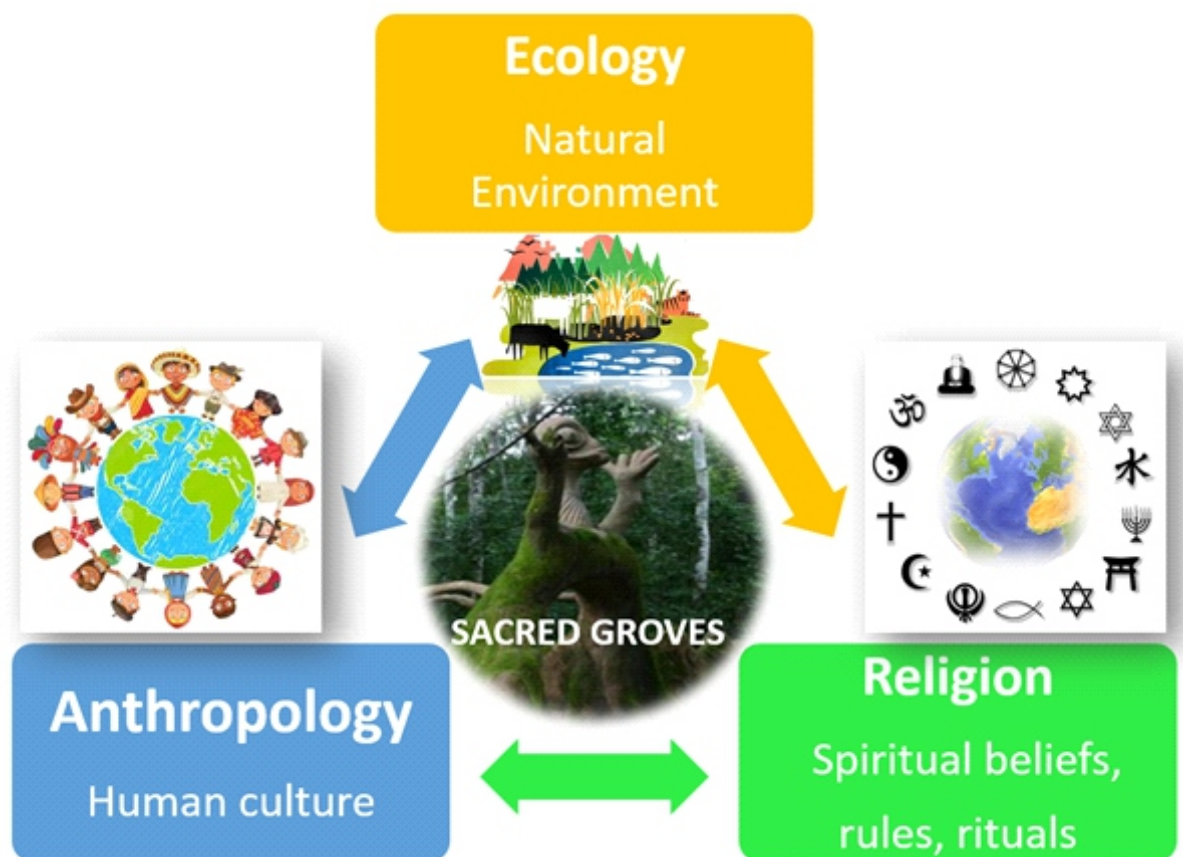


Figure 2: Illustration depicting the interconnected nature of sacred groves, highlighting their influence on diverse societal factors.

3.1 Origin and Distribution

In India, forested areas have long been set aside and preserved due to the religious convictions of the local communities. This practice dates back many centuries. Indian society is made up of several cultures, each of which has its customs for protecting the environment and the animals that live there. India is full of sacred trees, particularly in the areas inhabited by native populations. India's first Inspector General of Forests, Brandis, admitted that sacred forests existed (Brandis, 1897). The sacred groves have a historical

connection to the pre-agricultural, hunting, and gathering stage of societies (hunter-gatherer people), before humans had settled down to cultivate land or raise cattle. This connection has been established by Gadgil and Vartak (1975). Thus, it is thought that the idea of the primordial forest dates back to the pre-Vedic era, which occurred between 3000- and 5000 years BC. Before the development of religion, tribes believed that gods lived in woods, animals, trees, and stones. This animism appears to be a way for people to honour and be grateful to nature for giving human civilization commodities

and benefits (Parthasarathy et al., 2020). Sacred groves can be found practically everywhere in India, but the majority are said to be located in the Eastern Ghats, which include the Coromandel Coast, Northeast India, and the Western Ghats (Ray et al., 2014). Sacred groves are mainly located in areas that are home to native populations, especially in the states of Maharashtra, Kerala, Karnataka, and Tamil Nadu, which are situated along the Western Ghats. The states of Arunachal Pradesh, Meghalaya, and Manipur are considered to hold the majority of sacred groves in northeastern India. About 11669 sacred groves have been recorded to yet, even though there has not been a thorough study of all the sacred groves in the nation. According to expert estimates, the real figure may be far higher, between 100,000 and 150,000. There is a map that displays the locations of India's sacred woods along with an approximation of how many there are in each state (Husain et al., 2018).

3.2 ECOSYSTEM FUNCTION AND SERVICES

We directly rely on different plant types to meet our diverse demands. In the same way, we rely on different animal species and microbial species for varied purposes. Our need for a variety of foods, raw materials, fuel, etc. is met by biodiversity (Husain et al., 2018). Sacred groves are pure, biologically rich parts of the natural world that have been purposefully conserved by local communities for ceremonial purposes that meet a variety of demands (see Figure 3). The ecological functions that forest patches offer might have served as the driving force behind their preservation. These include preserving watersheds, conserving soil, and supplying forest products. Because it is believed that these groves are protected from disease and natural calamities by strong spiritual forces, they are revered. Their physical form

consists of variously sized woodland areas with a central temple, but their cultural value comes from their connection to myths, rituals, prohibitions, and ancestor spirits. These ancient customs have been crucial in maintaining the integrity of holy groves and have been vital to biodiversity conservation and ecosystem management (Parthasarathy et al., 2020).

The holy grove is an essential element of the life of the local people and goes beyond being just a nature reserve. These groves can lessen interactions between people and wildlife and serve as corridors as well. In addition to their significant function in soil and water conservation, sacred woods are frequently the source of numerous water sources. It has often been shown that sacred woods have greater species variety than nearby places and, in many situations, even more than those in similar regions that are under official protection. There is also a great diversity of flora of medicinal significance in sacred forests. According to Boraiah et al., (2003), 60% of the regenerating species (136 out of 241 species) in five holy woods in Kodagu, Karnataka, India, have medicinal significance. In environments outside of protected zones, sacred woods provide protection for numerous species and a wide range of ecosystems. With an emphasis on plant species, numerous sacred forests in India have been investigated, mainly to determine their species richness. The results show that these woods are richer than the surrounding protected areas (Ormsby and Bhagwat, 2010). These pieces may be important biodiversity reservoirs and, in certain situations, the only surviving natural forests outside of protected areas (Parthasarathy et al., 2020).



Figure 3: Sacred Grove's potential for bioresources.

3.3 Community Perspectives

The sacred grove is more than just a natural reserve; it is an essential component of the lives of those who look after it, those who care for it, and other people in the neighbourhood

(Sachs, 1993). To ensure that the sacred trees continue to be protected as both spiritual and subsistence resources, social science research projects have investigated the attitudes of the local populations toward them (Ormsby, 2013). Sacred

woods provide havens for indigenous species and preserve ecosystems that are underrepresented in the current protected area network. Though many are now disturbed due to human activity, these have been described as relict forests and may be the only climax vegetation left in a region (Bhagwat and Rutte, 2006; Upadhaya et al., 2008). One important factor that makes the sacred groves so unusual is their distinct ownership and management. Sacred groves are owned and maintained by local communities most of the time, but occasionally by one or more families or clans (Ormsby, 2011). Some country homes would rather keep fast to the customs and traditions that have preserved the holy forests for hundreds of years. However, other stakeholders would prefer to use sacred trees for other purposes due to the influence of larger cultural, economic, and political pressures.

Ormsby conducted a social science study in the states of Meghalaya and Karnataka to find out how the locals felt about sacred groves, what kind of management the groves practiced, such as limiting the use of resources, and what kind of ceremonies were held there (Ormsby, 2013). According to the community response data from this survey, people who live in sacred groves desire to see the groves stay the same and unaltered for all time. By adding more plants and safeguarding the current grove, they hope to preserve and enhance what is already there. When asked if they thought the sacred woodland should be enlarged, most residents said they thought the sacred grove should (Ormsby, 2013). Additionally, they desire the restoration of the encroached sections of the sacred grove. As a commitment, some farmers still plant traditional trees in the grove, like *Ficus benghalensis*. There are still many sacred groves in both regions where communities maintain limits on the use of resources and perform rituals; however, in Karnataka, ceremonies related to sacred groves are held far more frequently than in Meghalaya (Ormsby, 2013).

3.4 Biodiversity, Bioresources, and Sustainable Utilization

It is commonly known that sacred groves are crucial for maintaining biological diversity. Numerous plant and animal species that are found in the sacred grove are essential to the preservation of biodiversity. A wide range of therapeutic plants, fruits, fodder, fuelwood, spices, and other items can be found in sacred groves. Some of the biological types that inhabit the sacred grove are unique to that area of the nation and cannot be found anywhere else. Because it can withstand any quantity of rain, the forest cover acts as a buffer and storage reservoir for recycled water. Sacred groves offer multiple ecosystem services, including lowering the erosive force of water, conserving soil, preserving the hydrological cycle, supplying desired-quality water, and naturally dispersing seeds of beneficial species. The sacred groves also contribute to the preservation of the ecosystem's desired health, lessen habitat destruction, protect viable populations of pollinators and predators, act as a potential source of propagules needed to colonize wastelands and fallow areas, preserve Indigenous flora and fauna, and uphold the moral and cultural norms that have been cultivated through

generations of Indigenous knowledge (Khan et al., 2008). The species' significance in religion and culture plays a role in encouraging both their sustainable use and conservation (Sinha and Maikhuri, 1998).

One significant source of a variety of bioresources is sacred groves. Sacred groves continue to be valuable providers of bioresources, including fruits, fuelwood, medicinal plants, fodder, spices, and other items that are valued for their secular qualities by the local populations and help to encourage sustainable use. Sacred groves play an important role in the conservation of medicinal plants because of their species diversity and contribution to total individuals. Studies conducted not just in India but also in other parts of the world have highlighted the ecological and economic value of medicinal plants (Parthasarathy et al., 2020; Junsongduang et al., 2013). Sacred groves hold significance for conservation efforts in India; yet, the biodiversity found within them is significantly impacted by the surrounding terrain (Bhagwat et al., 2005). Crop production that is compatible with biodiversity has been crucial to the sustainable use of the bioresources around the holy woods. One of the key components of this procedure is the protection of native trees.

3.5 Current Status and Threats

India is one of the world's twelve mega biodiversity countries, home to 25 hotspots inside the world's richest and most endangered ecoregion (Myers et al., 2000). Forest management is still a difficult undertaking because of the growing population, forest degradation, and forest depletion. Sacred groves have withstood both the British-initiated heavy deforestation and the post-independence upsurge in deforestation. Sacred groves are losing ground to the fast-changing social structures, customs, beliefs, and practices that formerly characterized them. Population expansion, increased firewood use, increased access to electricity for irrigation, and the consequent capacity to cultivate more land are the current threats to them (Kent, 2013). Respecting and considering the values of the community is essential for the effective conservation of sacred woods. One example of a community-based approach to landscape-level conservation that is carried out and upheld locally is the practice of preserving holy forests. People who care for forest shrines find themselves more interwoven into larger social networks, and their perspectives on and actions in the groves are evolving as a result of exposure to new religious concepts. Even so, hundreds of areas of forest throughout India are shielded from development due to religious taboos (Kent, 2013). According to recent studies, there is a persistent need to utilize the natural resources found in sacred groves, including the land and soil there as well as the forest's trees for fuel or lumber (Ormsby, 2013). The conventional belief that groves are immutable, pristine forests is called into question by recent research (Ormsby and Ismail, 2015). Furthermore, the research shows that the locals appear to accept and even embrace the degradation and decline of the forested area.

The movement of spiritual emphasis from the forest to the temple has made it easier for commercial plantations to

encroach on holy groves. Many locals accept the environmental benefits that the trees give, including what they regard as rainfall, despite the loss of some groves and encroachment on the ones that remain. Frequent communication between local temple committees and the Forest Department could enhance the management of the sacred groves. Furthermore, putting rare timber species under silvicultural management could complement efforts to conserve the environment and cultural traditions (Ormsby and Ismail, 2015). In many places in India, Sacred Groves have been destroyed due to a lack of awareness about their long-term benefits. Due to several reasons, these once-thriving regions of vegetation, rich in native species, have been reduced to small clusters of trees. One of the main reasons is the impact of various religious beliefs, which have attracted a lot of pilgrims and tourists and resulted in the axing of plants for financial benefit. In these groves, the native species are further endangered by grazing, lopping, the introduction of alien weeds, and biomass removal. A contributing factor in the Sacred Groves' loss has been human migration and immigration, as well as local communities and government agencies encroaching on their territory. These Sacred Groves are under serious threat now because of urbanization, modernization, and land mafia greed. The development of structures and the emphasis on monetary gain have led to the loss of ecological and cultural significance, especially for the younger residents who do not seem to understand the value of maintaining these holy places. Research indicates that there is still a strong cultural bond with the sacred groves, but from the standpoint of conservation, the temple committee's authority and responsibilities should be increased.

3.6 Management and Conservation

In India, the preservation of forests and biodiversity is linked to various religions, each with its customs, beliefs, and rituals. It is a classic Hindu concept that the five essential elements—Earth (Prithvi), Fire (Agni), Water (Jal), Air (Vayu), and Space (Akash)—are revered by nature. Every one of the five elements is revered and regarded as the body of God (Pal and Mukhopadhyay, 2011). A sustainable ecosystem and the preservation of biodiversity have resulted from this conscience through a variety of mechanisms, such as the idea of sacred groves. One of the best methods for protecting natural resources is the idea and belief that sacred trees and forest groves are important.

The locals have long guarded sacred trees because of taboos and cultural and religious beliefs that the deities dwell there and shield the community from various disasters. But over time, a lot has changed—including how big the sacred groves are, how their vegetation is organized, how people view them, and what taboos and religious beliefs they hold. In several regions, such as the Chamoli district of Uttarakhand state, India, people still hold the traditional belief that the married pair must plant a tree seedling in the bride's home after marrying a rural country girl. In this area, planting tree seedlings is a customary and cultural practice that gained popularity in the late 1980s and succeeded in raising a lot of

awareness among the populace (Kandari, 2014). Taboos are the unwritten, oral traditions that have been passed down through society that dictate acceptable behavior. Many floras and animals in India's rural areas have religious importance; they represent cultural values that are deeply rooted in the lives of tribal tribes. These holy convictions are essential to preserving the existence of threatened forest animals (Pandey, 2003). Due to the enormous variance in various land rights systems inside sacred groves, no one method works for all sacred grove management situations worldwide. For instance, forest ownership differs between and within the states of India (Parthasarathy et al., 2020). Seeking the people's involvement is vital to guarantee the Sacred Groves' vital conservation and maintenance. Maintaining the integrity of these trees and strengthening their inherent uniqueness requires educating and advising the nearby village communities. Together, we can protect these priceless natural regions for future generations.

4. CONCLUSION

Sacred groves are pristine forest regions with significant ecological value that are recognized for supporting a wide variety of species, particularly uncommon, threatened, and endangered ones. Regrettably, encroachments and changes in land use have increased risks to these groves and their fragmentation. Since sacred groves represent harmony and a deep connection with nature, a complete conservation approach that integrates traditional, scientific, and cultural methodologies is recommended, given the unique ecological and biological value of each grove. There will always be natural habitats in India mixed in with human-dominated landscapes, and to maintain the diversity of our biodiversity, we must resolve conflicts on the edges and guarantee strong protection of the central regions. The loss of biodiversity is mostly caused by human activity, which also modifies species composition, richness, diversity, and abundance. A comprehensive comprehension of human influences is essential for efficiently managing protected areas. While there are still some protected places that are entirely unaltered, reducing human intervention within them is crucial to their continued existence.

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