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RESEARCH PAPER

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# Potential Role of Sacred Groves in the Maintenance of Biodiversity

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## ABSTRACT

*Sacred groves or sacred sites are natural areas that have been protected by the local people from over-exploitation for social and religious reasons. They include the magical, defiled and fetish groves. They provide medicinal plants, act as a sort of insurance against emergencies as well as shelter for important species of animals. Biodiversity is the variety of life on earth that includes variation at all level of biological organization from genes to species to ecosystem. It ranges from species, genetic, ecosystem and functional diversity which supports the evolution of differentiation, representing all forms of plant and animal life and provides materials for modern medicines. The roles of sacred groves in biodiversity maintenance include biodiversity conservation, conservation of rare/ endangered species, habitat for plants and animals, regeneration of plant species as well as water resource conservation. Challenges of sacred groves in the maintenance of biodiversity include farming and logging, weakening of traditional institutions and lack of government support. Traditional approaches of biodiversity conservation should be recognized by the policy-makers. These practices must be integrated in the policies for better management of biodiversity in consultation with the local community.*

**KEYWORDS:** Sacred Groves, Impact, Biodiversity and Conservation.

## INTRODUCTION

Sacred groves are a very ancient and widespread phenomenon in the old world cultures. References about sacred groves

have been made in Greek and Sanskrit classics. Sacred groves have been reported from many parts of the world like Mexico, Ghana, Nigeria, China, Syria

and Turkey, wherein there are areas where the tribal live and practice shifting cultivation. However, it appears that they are entirely unknown to the New World (Rathore and Shekhawat, 2011). Sacred groves were a feature of the mythological landscape and the cult practice of Old Europe, of the most ancient levels of Germanic paganism, Greek mythology, Slavic mythology, Roman mythology, and in Druidic practice. Sacred groves also feature prominently in many Asian and African mythologies and cultures, most notably in India, Japan, West Africa, and Anatolia. In Syria, some sacred groves are believed to have been made during Assyrian times. The most famous sacred grove in mainland Greece was the oak grove at Dodona. Outside the walls of Athens, the site of the Academy was a sacred grove of olive trees, still recalled in the phrase "the groves of Academe."

Since time immemorial conservation of natural resource has been an integral part of diverse cultures in different ways. The traditional worship practices show the symbiotic relation of human beings and nature. Indigenous communities all over the world lived in harmony with the nature and conserved its valuable biodiversity. In course of time, science and technology developed and industries were established and expanded to meet the increasing demands of the people. Various anthropogenic activities have altered the structure and function of different ecosystems all over the world. One of the most conspicuous effects of ecosystem perturbation has been the depletion of biodiversity (Luo *et al.*, 2001). Disappearance of species due to habitat alteration, overexploitation, pollution, global climate change and invasion of exotic species is so fast that many valuable taxa may vanish even before they are identified and their scientific value is discovered.

In view of the adverse effects of biodiversity degradation, ecologists, environmentalists and conservationists has made conservation of biodiversity as an issue of global, national and regional significance. Many areas have been declared as protected areas and various *in-situ* and *ex-situ* conservation practices have also been undertaken in different parts of the world. Many laws governing the biodiversity conservation have also been enacted from time to time. Besides these formal laws, there were many traditional conservation practices of indigenous communities in many parts of the world, which contributed to the conservation and protection of biodiversity. A good example of such traditional practices is the conservation and protection of small forest patches by dedicating them to the local deities by various indigenous communities of the world. Such forest patches are called "sacred groves" (Mgumia and Oba, 2003). Sacred groves are the tracts of virgin forest that were left untouched by the local inhabitants, harbour rich biodiversity, and are protected by the local people due to their cultural and religious beliefs and taboos that the deities reside in them .

#### **Sacred groves: their diversity and distribution**

Sacred groves or sacred sites are natural areas that have been protected by the local people from over-exploitation for social and religious reasons. Sacred sites are established for a number of purposes. Often, they are considered to be the residence of a local deity, or contain an object or body of water that houses the deity. Groves' supportive role in species maintenance, different ecological functions is well recognized (Jamir and Pandey, 2003; Chima and Nuga, 2011). It is believed that these sacred virgin forests

date back to thousands of years when human society was in the primitive state. The area of sacred groves ranges from few square meters to several hectares. There exist some fascinating examples of forest patches harbouring native vegetation, which have been intertwined with various aspects of indigenous, cultural and religious practices along with the associated taboos (Khan *et al.*, 2008).

Sacred groves present in humanized landscapes are especially important in this regard. They are often part of the heterogeneous landscape intermingled with agricultural field, plantation, barren land, water bodies as well as villages. Studies highlight that, groves support a good number of rare and endemic species, which are extra-sensitive compared to common species, and persist only in favourable niches, and the sacred groves are ideal places for them (Jayarajan, 2004; Sukumaran and Raj, 2007). However, there are gaps in knowledge about these endemics, like their population status, reproductive biology and ecology. Most studies on sacred groves have hovered around floral and faunal diversity and maintenance of rare threatened and endemic species with sketchy descriptions of the ecological profiles and disturbance regimes. Sacred groves are a very ancient and widespread phenomenon in the old world cultures. References about sacred groves have been made in Greek and Sanskrit classics. Sacred groves have been reported from many parts of the world like Mexico, Ghana, Nigeria, China, Syria and Turkey, wherein there are areas where the tribal live and practice shifting cultivation. However, it appears that they are entirely unknown to the New World.

#### **i. Magical sacred groves**

A grove may have been innately magical since the creation of the world or have gained its magic through an unusual

event, such as a visit by a deity, the birth of a unicorn, or a dryad or nymph's long-time residence in the grove (Malhotra *et al.*, 2001).

#### **ii. Defiled and cursed groves**

Some sacred groves tell a tragic story: Their plants have been dug up; trees burned or chopped down, water sources fouled, or standing stones overturned and broken. Such groves have been defiled, stripped of all their powers until druids reclaim them. Someone reads a cursed scroll, a deity's avatar passes through, a druid dies violently, or another highly charged event takes place (Malhotra *et al.*, 2001).

#### **iii. Fetish groves**

Some groves are often considered to be the residence of a local deity, or contain an object or body of water that houses the deity. Groves of this kind are commonly referred to as fetish groves. Some sites are burial grounds, or the former location of a village or the site of an important event, and therefore are thought to be the domain of ancestral spirits (Malhotra *et al.*, 2001).

#### **Uses of sacred groves**

Sacred groves provide various ecosystem services which include:

**i.** Medicinal plants are harvested from the site by religious practitioners, who may serve as the primary provider of medical services for the community.

**ii.** Sacred groves act as a sort of insurance against emergencies; in cases of famine or other natural disasters food and materials may be collected from the grove to ensure survival.

**iii.** As some of the last remnants of forest in areas that have been extensively cleared, sacred groves act as sanctuaries for native flora and fauna.

**iv.** They act as seed banks from which other areas are repopulated.

They shelter species important to agriculture such as pollinators and those

that eat crop pests, and for game species that are over-hunted outside of the grove.

### **Biodiversity and what it entails**

Biodiversity is the variety of life on earth that includes variation at all level of biological organization from genes to species to ecosystem (Agbogidi and Aghojare, 2014). Genetic, organization and ecological diversity are all elements of biodiversity with each including a number of components. Biodiversity is a key measure of the health of any ecosystem, and of our entire planet. Every organism in an ecosystem, or biome, relies on other organisms and the physical environment. For example, plant and animal species need each other for food, and depend on the environment for water and shelter. Biodiversity describes how much variety an ecosystem has, in terms of resources and species and also genetically within species. A more diverse ecosystem will have more resources to help it recover from famine, drought, disease or even the extinction of a species. There are several levels of biodiversity, each indicating how diverse the genes, species and resources are in a region. Biodiversity can grope as species, genetic, and ecosystem diversity and very recently functional diversity has added. The way species behave, obtain food and use the natural resources of an ecosystem is known as functional diversity. In general a species-rich ecosystem is presumed to have high functional diversity, because there are many species with much different behaviour. Understanding an ecosystem's functional diversity can be useful to ecologists trying to conserve or restore damaged it, because knowing the behaviours and roles of species can point to gaps in a food cycle or ecological niches that are lacking species (Agbogidi and Okonta, 2011).

### **Importance of biodiversity**

The importance of biodiversity in ecosystem management includes;

- i. It represents the almost variety of plant and animal life, and the variety of the types of earth's ecosystem that support life as we know it.
- ii. It enables human to survive in what would otherwise result in adverse conditions.
- iii. Biodiversity supports the evolution and differentiation among the varying species.
- iv. It is responsible for the differences among groups within the large species.
- v. Much of our modern medicine is based on combinations of biologically diverse substances isolated from various plants.
- vi. Biodiversity provides forest dwellers with their daily need-food, building materials, fodder, medicines and a variety of other products (Agbogidi and Eshegbeyi, 2008).
- vii. Biodiversity also provides us with lumber, granite, and marble to name a few of the building materials much human habitation depends upon we would largely be without shelter (Agbogidi and Okonta, 2011; Agbogidi and Okonta, 2014).

### **Roles of sacred groves in the maintenance of biodiversity**

Since last three decades, conservation scientists and researchers have realized value of these traditional forests managed and protected by local communities. In several countries, extensive research has been carried out to know the role of sacred groves in conservation of biodiversity relating to mainly higher plant and animal diversity. Precise role of sacred groves in biodiversity maintenance are provided below.

#### **i. Biodiversity conservation**

Sacred groves harbours large number of plant species clearly indicating the

diversity maintained in them. These groves harbour various tree species like *Sapindous laurifolia*, *Streterospermum spp*, *Firmiana colerata* and *Antiaris toxicaria*, many epiphytes like *Biophytum sensitivum*, *Remusatia vivipera* lianas like *Gnetum ula* and *Dalbergia sympathetica* with many herbs and grasses. Epiphytic orchids like *Acamphe spp*, *Dendrobium spp* and *Malaxis spp* are seen on the large tree trunks in these groves. *Dentrophoe falcata* a parasitic plant is common in most of the sacred groves. These groves also have ferns like *Adiantum*, *Cheilanthus albomarinatum* *Drynaria quercifolia* and *Athyrium hohenackerium* and bryophytes like *Riccia spp* and *Marchantia spp*. Apart from several plants species, several birds, insects and animals of economic importance are also found in sacred groves (Agbogidi,2010; Chima and Nuga, 2011). Such an ecosystem with various life forms is not prevalent in all the sacred groves but could be observed in certain well-protected sacred groves. It is important to know why certain groves are in better condition though the processes operating for modernization and urbanization are similar. Main reasons include the distance of the sacred grove from the village, terrain of the sacred grove, various legends regarding the sacred groves protecting deity and its religious importance and fame.

#### ii. Conservation of rare/ endangered plants

Sacred groves have preserved many rare and endangered plant and animal species with many important medicinal plants among them. In India, sacred grove which is about 2 ha, healthy populations of *Hydnocarpus pentandra* spp are seen. It is a rare and endemic medicinal plant. Populations of *Nothopodytes nimoniana* an endemic medicinal tree, in demand for its anti cancer properties are seen in many sacred groves. In Hative, sacred

groves healthy specimens of *Aporosa lindleyana* are seen in large numbers. It is also rare plant in the region. Other endemic and rare species like *Antiaris toxicaria*, *Sagerea laurifolia*, *Butea parviflora*, *Canarium strictum* and *Persia macarantha* are best preserved only through this traditional forest conservation system.

#### iii. Habitat for birds and animals

These well preserved or semi preserved habitats offer last refuge to the regional fauna. Birds like large pied Hornbill were once common in several parts of the world, they are observed only in the sacred groves now. The large trees provide resting places to these magnificent birds, with abundant food in the form of various fruits. Number of large pied hornbills is seen in Kulye, Vashi and Marleshwar sacred groves. These birds are not commonly seen in the surroundings. Snakes of Marleshwar cave temple of lord Shiva and surrounding sacred grove of 22 ha on the hill is famous. Such small but rich forest patches are the last refuges for animals like barking dears, and in rare cases Leopards. The birds and animals play important role in dispersal of plants.

#### iv. Regeneration potential

Natural regeneration of plants mainly tree species has become a difficult and rare phenomenon. Most of the land is degraded with soil hardened. Most of the non-agricultural area are devoid of any vegetation and are exposed to heavy grazing. Such areas are devoid of any regenerating tree species. Diversity of grasses is also reducing due to heavy grazing in many parts of the project area. Such areas do not have enough soil moisture for germination of seeds fallen through dispersal. Where as in sacred groves the soil is not hardened, there is enough soil moisture for the germination and further establishment of the sapling.

There are better chances of regeneration of tree species from the sacred groves. In some sacred groves regenerating saplings of trees are seen in large numbers. In case many forest tree species it is difficult to raise the seedlings artificially in the nurseries. In such cases the regeneration potential of sacred groves could be used positively. These saplings from the grove could be collected at right time for plantations on other wastelands or for eco restoration of sacred groves using indigenous species.

#### **v. Water resources conservation**

Many of the sacred groves have water sources in the form of wells, tanks and streams within the groves or in the immediate surroundings. There are taboos and sanction systems associated with management of sacred groves resources especially plant resources in the earlier days. But there was no restriction or taboo associated with use of water from the sacred grove. Problem of water scarcity is acute in summer in this area and people are using water from the sacred groves for drinking and household purposes. Perennial stream of water in sacred groves provide drinking water to villager in some areas from March to May every year. These groves and their catchments are better preserved.

#### **Other uses of sacred groves**

##### **Other uses of sacred groves include:**

- i. Some groves protect actual bodies of water, such as streams or springs. Even those that do not protect a water source directly help to keep their immediate surroundings cooler and moister than the air would otherwise be. Vegetation retains water, and releases it slowly during dry periods. This adds humidity to the air and cools it (Malhotra *et al.*, 2001).
- ii. Similarly, vegetation holds nutrients, and the root systems keep nutrients in the soil from leaching away.

The nutrients in the soil are replenished as leaf litter and other organic material decomposes. This means that the soil in the grove and in the immediate vicinity is more fertile than the soil of the surrounding area that has been intensively farmed (Malhotra *et al.*, 2001).

iii. Sacred groves provide a sanctuary for native species of plants and animals that have no other habitat left, or that are over hunted or harvested. The groves not only protect species of biological diversity value, they also protect species that are important to agriculture. They harbor species of plants that are closely related to local crop varieties and may be used to improve the cultivated types. Sacred groves provide living space for species of insects and birds that control crop pests or act as pollinators for crops (Malhotra *et al.*, 2001).

#### **Challenges of sacred groves in the maintenance of biodiversity**

Factors and challenges that cause degradation or serve as threats to the sustainability of sacred groves in the maintenance of biodiversity are complex and interrelated. They arise from commercial factors such as;

- i. Farming and logging.
- ii. Bush fires.
- iii. Weakening of traditional institutions.
- iv. Lack of governmental support
- v. Lack of intervention of local government agents
- vi. The usurping of the powers of traditional authorities in local government management.

#### **The way forward**

To facilitate the management and conservation of sacred groves, the following steps have been proposed:

- i. Nature reserve managers identify and map the sacred sites within the reserves, identify the main traditional

management institutions, and increase their understanding of the traditional restrictions on natural resources use and the de facto natural resources use by the local community. Sound management should be based on understanding and respecting the traditional practices and involving the local community in the decision-making process.

ii. Involving the traditional approaches in nature reserve management, which can lead to the adoption of conservation goals in traditional communities.

iii. Conservation education through religious rituals, and carried out by the grove keepers, will be more palatable to local people. New sacred mountains could even be created for conservation purposes.

iv. To promote the role of traditional practices in conservation, it is necessary to revive the cultural traditions and help local communities to develop new regulations on sustainable nature resource use to meet the changing environment.

## CONCLUSION

Sacred groves are a new frontier for interdisciplinary research on their own merits and for their relevance for biodiversity maintenance and conservation. The religious or cultural designation of an area as sacred, especially those which are relatively natural, may either intentionally or coincidentally promote the conservation of its associated biodiversity. Such sacred places can complement national parks and other protected areas established by governments. Collaboration among religious, governmental, scientific, and/or conservation agencies may be desirable for the protection of sacred sites and landscapes. Traditional approaches of biodiversity conservation should be

recognized by the policy-makers. These practices must be integrated in the policies for better management of biodiversity in consultation with the local community.

Systematic research is needed on the variety of sacred groves with respect to biological matters such as their size, age, species composition, biodiversity level, and degree of naturalness as well as any historical, social, cultural, religious, economic, political, tenure, and legal matters. In particular, there is a need for controlled comparisons between sacred groves and adjacent secular ones of the same size and type of biotic community in order to describe and assess any differences that might arise because of sacred status.

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