Sacred groves of Manipur – ideal centres for biodiversity conservation

Since time immemorial, conservation of natural resources has been an integral part of several indigenous communities. Nature worship has been a key force in determining human attitudes towards conservation and sustainable utilization of biodiversity. Various indigenous communities all over the world lived in harmony with nature and thus conserved biodiversity. In the course of time, science and technology developed and industries were established and expanded to meet the increasing demands of people and to take care of various developmental activities. Furthermore, habitat alteration, over-exploitation, pollution and introduction of exotic species also threatened the global biological resources. This has led to the fast depletion of biodiversity in different ecosystems and adversely affected the ecological balance and socio-economic status of the people. These directly or indirectly contribute to the welfare and stability of the environment and society. Therefore, for the conservation of biodiversity, many laws were enacted from time to time. Many traditional conservation practices of indigenous people in many parts of the world such as protection of small forest patches by dedicating them to the local deity, also contributed to the conservation and protection of biodiversity. Such forest patches called 'sacred groves' are tracts of virgin forest harbouring rich biodiversity, protected by the local people based on their indigenous cultural and religious beliefs and taboos. They are the repositories of rare and endemic species and can be regarded as the remnants of the primary forest left untouched by the local inhabitants due to the belief that deities reside in these forests. Various communities in India follow nature-worship based on the premise that all creations of nature have to be protected. As a result, sacred groves still possess a great heritage of diverse gene pool of many forest species having socio-religious attachment and possessing medicinal values. There exist some fascinating examples of forest patches harbouring native vegetation[1]. Various traditional approaches to conservation of nature require a belief system, which includes a number of prescriptions and proscriptions for restrained resource use[2]. The overall concept of the sacred, woven carefully with various indigenous religious beliefs, its role in conservation and maintenance of nature and factors for the erosion of the sacred groves is presented diagrammatically in Figure 1.

The historical links of sacred groves have been traced[3] to the pre-agricultural, hunting and gathering stage of societies, when human society was in its primitive state. Sacred groves are found in Africa, Asia, Europe, Australia and America[4]. Their existence has also been reported in Ghana, Syria, Nigeria, Turkey and Japan[1]. In India, they have been reported from different parts of the country[5–7] and are found mainly in tribal areas. They are named differently[8], viz. 'Sarna' or 'Dev' in Madhya Pradesh; 'Devrai' or 'Devrahati' in Maharashtra; 'Sarnas' in Bihar; 'Orans' in Rajasthan; 'Devarabana', 'Devarakadu', 'Rulidevarakadu' or 'Nagabana' in Karnataka; 'Kovilkadu' in Tamil Nadu; 'Kavu' in Kerala; 'Dev van' in Himachal Pradesh, 'Ki Law Lyngdoh' or 'Ki Law kyntang' in Meghalaya; 'Sarana' or 'Jaherthan' in Jharkhand, and 'Lai Umang' in Manipur. Methods of conservation vary in different states according to their intrinsic nature, distribution and local beliefs.

Various ethnic groups of northeast India have preserved and protected several forest patches and even individual trees due to their belief in nature-worship. The state of Manipur, in northeastern India is known for its ecologically distinctive and rich biodiversity, having many endemic flora and fauna and rich cultural diversity. However, due to population explosion and various developmental activities, forests are being destroyed thereby altering the composition and diversity of species, leading to a rapid loss of many important species, including rare and endemic ones. Besides, in many areas the forestland has been converted into wasteland and the natural environment has been adversely affected. It is in this context that traditional ecological knowledge and resource management systems, practiced by the indigenous communities since ancient time, need to be properly understood and revived in order to conserve relict vegetation[9]. Dedicating a patch of forestland to deities is a common practice with the Meitei community of Manipur. This practice assumes great significance in biodiversity conservation. In ancient Manipuri culture, people worshipped natural phenomena like the sun, moon, sky, water and fire. They followed ancestral practices of animism with the central focus being on the worship of forest patches that they regarded as sacred abodes of various deities. According to their belief, these forest patches (or sacred groves) are the property of

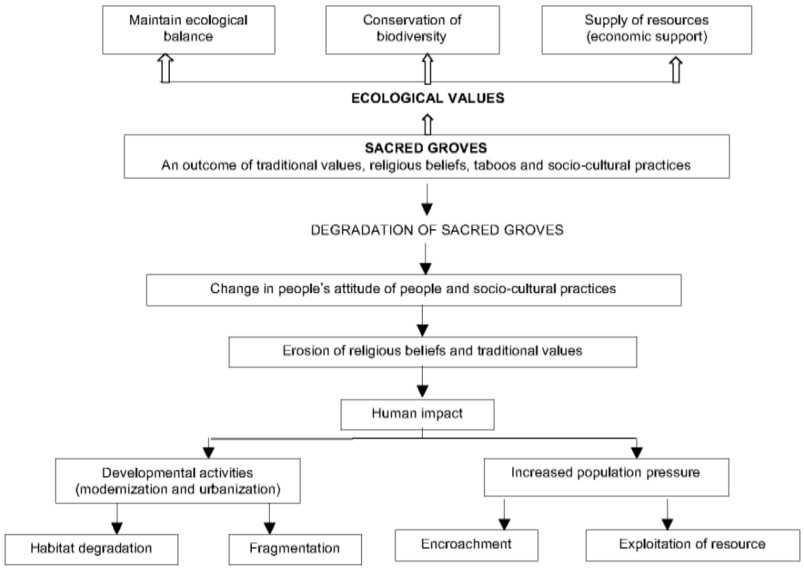

Figure 1. Diagrammatic representation of sacred groves, their ecological value and relationship with changing traditional beliefs of people and human impact.

gods/deities and must therefore not be damaged in any way. The 'Umanglai' (sacred deities or sylvan-deities) are the only mysterious deities believed to reside in sacred groves of Manipur. Umanglais are worshipped annually through celebrations called 'Lai-Haraouba' on the pleasing of God in their dwelling groves.

While on the one hand socio-cultural practices of indigenous people are significant in protecting and conserving sacred groves, on the other hand, sacred groves play an important role in maintaining the ecological balance, fulfiling the needs of people and protecting and conserving their primitive cultures along with wild flora and fauna. Therefore, a symbiotic relationship exists between people and sacred groves as seen in Manipur. An extensive field survey was undertaken during 2000–02 to inventorize the sacred groves of Manipur. Records of the local government and literature were consulted to locate the groves and to ascertain their historical background. Village headmen, *Maiba* and *Maibi* (priests and priestesses or the local medicine men and women respectively), and local people, educated persons, caretakers of sacred groves, etc. were contacted for helping in identifying sacred groves. Data on sacred groves were collected from them. A total of 166 sacred groves were inventoried from Manipur valley during the study period. The inventoried sacred groves were indicated in the map of Manipur valley, which comprises Imphal East, Imphal West, Bishnupur and Thoubal districts of Manipur (Figure 2). Thirty-seven groves are distributed in Imphal East, 99 in Imphal West, 22 in Bishnupur and 8 in Thoubal districts. Most of the sacred groves did not have well-demarcated boundaries. Therefore, the area measured for a given grove was mainly based on information collected from the concerned village headman or caretaker of the grove and through measurements by drawing an imaginary line or boundary (using the knowledge of the caretaker, village headman or some authentic persons) around the grove. The size of the individual sacred grove varied from a clump of a few trees having an area 0.001 to 40 ha within the elevation of 691 to 860 m. The area of the sacred groves of Manipur is smaller in size compared to those of Meghalaya[10], which varied between 0.01 and 900 ha. Area of majority of the groves ranges from 0.09 to 1.5 ha. The total area of all the inventoried sacred groves is 175.62 ha. Sacred groves of Manipur are distributed in different locations; 145 groves were inventoried in the valley, 6 in the foothills, 7 in the hillocks and 4 each near catchment areas or river banks and hills. The percentage area of sacred groves as shown in Figure 3, was highest in the hillocks (39.59) and lowest in the foothills (1.26). The sacred plants have either medicinal or religious importance and are associated with cultural practices and beliefs as well as taboos. The importance of the socially recognized plants that are often

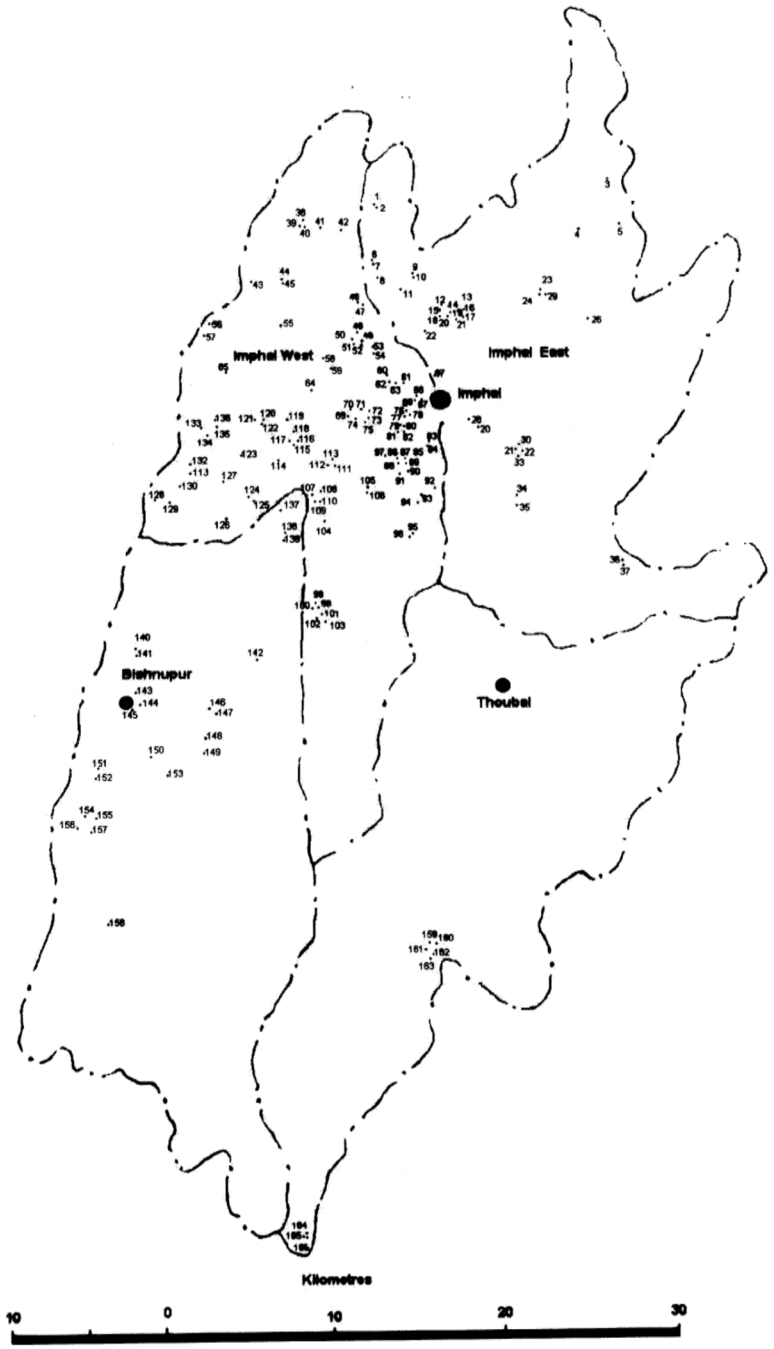

Figure 2. Geographical map of Manipur valley (Imphal East, Imphal West, Bishnupur and Thoubal) showing distribution of 166 sacred groves. (Names can be obtained from the authors).

Table 1. Sacred plant species of the Meitei community

Sacred plant species		
Scientific name	Local name	Beliefs/uses
Artocarpus heterophyllus Lamk.	Theibong	Used in rituals
Blumea balsamifera (Linn.) D.C	Langthrei	Used in rituals and as medicine
Cudrenia nepalensis	Saitingkhang	Repels evil spirits
Cynodon dactylon Pers.	Tingthou	Used in rituals
Dactyloctenium aegyptium Beauv.	Pungphai	Used in rituals
Erythrina indica Lam.	Kurao angouba	Used in rituals
Ficus religiosa Linn.	Sanakhongang	A sacred tree
Mangifera indica Linn.	Heinou	Used in rituals
Ocimum sanctum Linn.	Tulsi	Incarnation of Brinda
Oroxylum indicum Vent.	Shamba	Associated with Meitei legend
Plectranthus ternifolius D. Don	Khoiju	Repels evil spirits
Syzygium jambos Linn. (Alston).	Gulapjat	Sacred in Konthoujam Lairembi sacred grove; believed to be the incarnation of deity, Soraren
Terminalia arjuna (Roxb.) Weight & Arn.	Mayokpha	Sacred in Mayokpha sacred grove. Believed to be the incarnation of Ebudhou Pakhangba, a deity of the Meitei community
Toona ciliata M. Roem	Tairel	Related with the existence of human life on earth and used in rituals
Xylosma longifolia Clos	Nongleisang	Used as medicine
	Yurei	Sacred tree for Channing Lairembi sacred grove

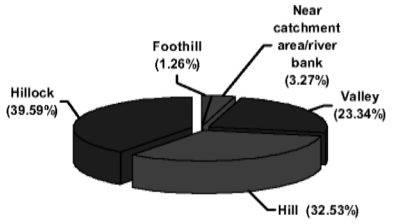

Figure 3. Area (%) of sacred groves in different locations.

ecologically important, has been stressed[11]. The leaves of some sacred species are used in religious practices (see Table 1). Mayokpha sacred grove at Elangbam Leikai Keisamthong, is associated with the deity 'Pungjao Lakpa', an incarnation of 'Pakhangba' (snake). There are sacred groves associated with snakes inhabiting the area in and around these sacred groves and others that provide natural shelter to arboreal birds and mammals, especially the Rhesus monkey and flying fox.

Religious beliefs of certain forest dwelling people help in conserving the sacred groves[12]. Village people living near these sacred groves are poor and less educated. They depend on these groves to meet their domestic needs, such as the fuel-wood, certain edible leaves and vegetables, medicinal plants, etc. It has been argued that the rural poor depend upon biological resources for meeting 90% of their day-to-day needs[13]. Therefore, until and unless a viable option is provided to these people for sustaining their economic condition, efforts in the conservation of sacred groves will not be successful.

The inventory is still rather incomplete and further information in terms of location, area, community involved, conservation practices, kinds of threat, conservation management, people's attitude towards the groves, etc. from different groves in the valley region and also in the hilly districts and religious practices for the conservation of sacred groves is required. Revival of grove practices has also been reported[14]. Among the 166 inventoried sacred groves in the four districts of Manipur located in valley areas, only a few (11%) are well preserved, while most are partly threatened (58%) and others threatened (31%) due to various anthropogenic pressures such as developmental activities, urbanization and population explosion. Thus, the sacred groves of Manipur have become the victim of encroachment and exploitation at different levels. Degradation of sacred groves not only signifies loss of species-rich relict vegetation, but also the rich cultural heritage of the region. Considering the various dimensions of the sacred groves in Manipur, it is clear that these forestlands need proper conservation and protection by formulating consistent conservation strategies in order to save them from the verge of further degradation. Human interference should be regulated by encoding various indigenous practices along with scientific implications rather than only age-old religious prescriptions and proscriptions.

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Oldest known gobiids from Vastan Lignite Mine (early Eocene), Surat District, Gujarat

The family Gobiidae (order Perciformes) constitutes the most diversified of all Recent fish families, represented by nearly 2000 species in the world today. Gobiids popularly called gobies, are the smallest known fishes (usually less than 10 cm in size) that live mostly in shallow marine coastal waters and around coral reefs. Presently, they occur in most parts of the world in the coastal areas of the tropics and the subtropics. The origin and early evolutionary diversification of gobiids have attracted interest in recent years[1,2].

In the fossil record, gobiids occur rather abruptly at the Eocene–Oligocene boundary and are extremely scarce in the Eocene. The few known Eocene occurrences include a skeleton from the late Eocene (Priabonian) of southern England[3]; a poorly preserved skeleton from the early middle Eocene (Lutetian) of Catalonia, Spain[4]; a single otolith from the middle Eocene (late Lutetian) of Kutch, western India; two otoliths from the middle Eocene (Bartonian) of Java[5] and, more recently, over 50 otoliths from the late Eocene (Priabonian) Yazoo Clay, Louisiana, USA[2]. Here we report the globally oldest occurrence of gobiids on the basis of a large number of otoliths, numbering over 200, from the early Eocene (Ypresian) sediments at Vastan lignite mine, Surat District, Gujarat, western India. This open pit mine, located about 3 km northeast of the village Nani Naroli, Surat District (Figure 1), is managed by the Gujarat Industrial Power Corporation Limited (GIPCL). Otoliths from the same area were recently reported by one of the authors[6], but that assemblage came from a limited sample of borehole clays and the gobiids were not discovered by then. The present collection was recovered by screenwashing dark-green shales that occur about 3 m below the base of the first (or uppermost) lignite seam exposed in the northern side of the lignite mine at Vastan (Figure 1). This collection occurs in association with a large number of other teleost otoliths. Ongoing study suggests that ambassids form the most dominant family in this assemblage. Other associated biota comprise a diverse assemblage of rays, molluscs as well as a large number of benthic foraminifera, including the age diagnostic species *Nummulites burdigalensis*, which

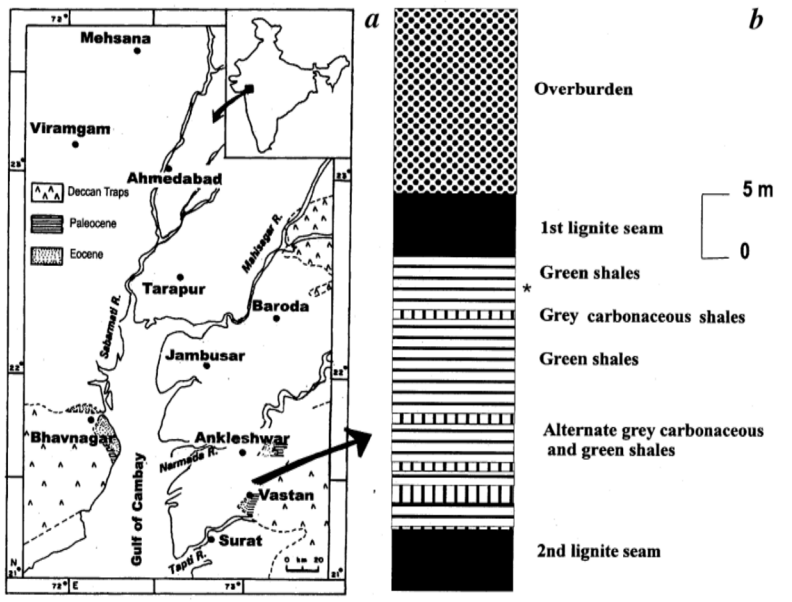

Figure 1. ***a***, Location map of fossil locality. ***b***, Lithostratigraphic section at Vastan showing otolith-bearing horizon (marked by *).