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SACRED GROVE OF PUNYAGIRI HILL, VIZIANAGARAM DISTRICT, AP, INDIA: ECOLOGICAL AND SOCIOLOGICAL STUDY

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Abstract

Sacred groves are important repositories of rare endangered endemic plants and floral diversity that have been conserved by the local people or communities in a sustainable manner. Sri Umakotilingeswara Swami Temple is a famous Siva Kshetra located in Vizianagaram district of the Andhra Pradesh, India. This holy shrine is situated in the Punyagiri hills, 4 kms away from the Srungavarapu Kota and 62 kms away from the Visakhapatnam (a coastal city of Andhra Pradesh). Two study sites were selected, one was in the sacred grove region another was in forest region. Line transects were used for collection of data on species richness and diversity of the flora. Density and basal area were more in the sacred grove region than the nearby forest region. Some important medicinal and valuable plants were reported in this region, plants such as *Saraca asoca* (Roxb.), *Diospyros peregryna* (L.), *Sterculia urens* (Roxb.), *Cleistanthus collinus* (Roxb.), *Ficus relisiosa* (L.), *Strublus aspera* (L.), *Chloroxylon swietenia* (L.), *Firmiana colorata* (Roxb.), *Albizia odoratissima* (L.), *Dalbergia paniculata* (Roxb.), *Dalbergia sisso* (Roxb.), *Azadiricta indica* A. Juss., *Diospyros chloroxylon* (L.), *Holoptelea integrifolia* (Roxb.), *Mangifera indica* (L.), *Eucalyptus globulesv(Labelle), Bombax ceieba* (L.), *Aegle marmelos, Ailanthus excelsa* and some important pteridophytes and Bryophytes were reported in the sacred forest of the Punyagiri hills. Extension of the temple buildings and other developmental activities may be threat to the sacred groves. Invasion by the exotic weeds may further degrade the structure and composition of the sacred forests as a whole.

Key words: Sacred groves, Vizianagaram, ecological and Sociological study

Introduction

Sacred groves are a group of plants or fragments traditionally protected by the communities in reverence of the deity. Sacred groves are ideal places for conservation of biodiversity. Some important medicinal plants which are not available in the forests also maintained in these groves. These are providing vital service to locals in terms water sources and others needs. Many streams are originated from the groves which in turn provide water source for the local inhabitants for their needs. India is a mother land for Gods and Goddess, people worship local deities as well as offer prayers to some plants such as Neem,(*Azadirachta indica*) Amla(*Phyllanthus emblica*) and Banyan(*Ficus benghalensis*) trees and several other plants also. In ancient times, Sacred Groves were places of sanctuary and worship for the Druids. Like a temple or chapel set with in the world, they were places of spiritual refuge; places to calm the mind, refresh the spirit, and give comfort in times of distress. These groves from a network of woodland sanctuaries that radiate peace offer refuge to both wildlife and humankind. Sacred groves have a great significance from the point of view of biodiversity conservation because of they contain some important species of flora and fauna that have been lost in the surrounding area. Unfortunately, most sacred groves India are fast disappearing due to pressures of development and the changing attitude and values of the communities that protected them. In India and in Many other countries such as Ghana, Nigeria, and Turkey people used to set aside tracts of forest because they believed that a particular pockets of the forest had a resident god who must be protected, these areas called "Sacred Groves" have been protected by local communities over the ages. As a result of protection, these groves harbour a great diversity of plant and animal life. The sacred groves of ancient times of become in many cases, the Biosphere Reserves' of today and are found in several parts of India. The states with large tribal populations have the highest number of biosphere reserves in the form of wild life sanctuaries and national parks. In, India the number of sacred groves ranged from 1, 00,000 to 1, 50,000 and in Andhra Pradesh nearly 750 sacred groves are reported (Malhotra et al. 1998). In Andhra Pradesh some investigators (Lakshminarayana et al., 1998; Ravi Prasada Rao et al.,2011; S.K.M Basha, 2012 and Savithramma et al., 2014), worked on the sacred groves distributed in different parts of the state. In the present investigation, a study was undertaken on Punyagiri Hill and nearby forest region to assess the diversity of the plant populations in these two different localities.

Materials and methods

Punyagiri hill is located 4 kms away from the Srungavarapu Kota and 62 kms away from the Visakhapatnam. The latitude and longitude of Punyagiri temple is 18^0 11' 190''N and 83^0 11' 191''E respectively. Sri Umakotilingeswara Swami Temple is a famous Siva Kshetra situated in the Punyagiri hills. The local temple authorities are maintaining the plant populations in and around the temple. There are several perennial streams in the hill which help the growth of the many bryophytes, Pteridophytes and even algal forms such as blue green algae and Chlorophyceae members. Maha Sivarathri is famous festival on this holy shrine, people from different villages attend and perform pujas and prayers. Phytosociological studies were carried out during July 2011 to June 2012 to cover over all spectrum of vegetation. The structure of sociological order cannot be studied by observing each and every individual in an area. Some sort of vegetation sampling as to be done. In the present investigation, Two study sites were selected, one was in the sacred grove region another was in forest region to get the information on species richness and distribution in two different locations of the forest. Line transects were used for collection of data on species richness and diversity of the flora.

Data Analysis

The main purpose of the Phytosociological analysis is to understand floristic, vegetation characteristics, to estimate the species richness and diversity which is existing in the study area. Standard protocols of Curtis and Mclntosh (1950) and Mueller- Dombois and Ellenberg (1974) have been adopted to analyze the density, frequency and abundance. For calculation of frequency, density and abundance the following formulas have to be used

$$\textbf{Density} = \frac{\text{Total number of Individuals in all sampling units}}{\text{Total number of sampling units studied}}$$

$$\textbf{Frequency} = \frac{\text{Number of sampling units in which species occur} \times 100}{\text{Total number of sampling units}}$$

Basal area

It is the area occupied by the base of a tree, is considered as a good indicator of the size, volume or weight of a tree. It provides information on the proportion or dominance of the larger

and smaller trees in an ecosystem and is one of the most important parameters in estimating the standing biomass in an area.

Basal area = $Cbh^2/4\pi$

Where

Cbh = Circumference of the tree at breast height.

Usually after the quantitative estimation of relative values of density, frequency and dominance, the species are listed in order of decreasing importance.

Important value index (IVI)

The total picture of the relative ecological important and the sociological structure of a given plant species in any community can't be obtained by relative parameters (Relative Frequency, Relative Density, Relative Dominance, etc.,) singly , which give individual clues , although the quantitative value of each such parameter has its own importance . Frequency gives an idea as to how a species is dispersed in the area but we will not get an idea about its number or the area covered. Density on the other handed gives the numerical strength and nothing about the spread or cover. Dominance gives the basal cover only. In order to express the dominance and ecological success of any species with a single value, the concept of important value index have been developed. This index utilizes three characteristics, viz., Relative Frequency, Relative Density and Relative Dominance.

On the basis of these analytical quantitative character values , the idea of obtaining a statistical quantity was proposed in order to have a really overall picture of the ecological importance of the species with respect to the community structure , for which the percentage value of Relative Frequency, Relative Density and Relative Dominance are added together . This value out of 300 is called Important Value Index (IVI). It thus incorporate three important parameters that measures of productivity and diversity of every species therefore.

IVI= Relative Density + Relative Frequency+ Relative Dominance

$$\text{Relative density} = \frac{\text{Density value of species}}{\text{Sum of density value of all species}} \times 100$$

$$\text{Relative frequency} = \frac{\text{Frequency value of species}}{\text{Sum of frequency value of all species}} \times 100$$

$$\text{Relative dominance} = \frac{\text{Total basal area of the species}}{\text{Total basal area of all species}} \times 100$$

Biodiversity indices

Ecologist have developed and proposed a number of indices of species diversity from time to time, the values of which depend upon mathematically combined effects of species richness (S) and evenness (E). The numerical strength and biomass has a direct effect on the functioning of ecosystem in the course of millions of years, numerous biotic communities have evolved and established themselves. It is there four important to know the diversity of these communities in space and time so as to understand their role in the development of the ecosystem , evaluation and in the maintenance of stability for the quantification of diversity and comparison of species diversities between different ecosystems in various climatic conditions, is useful to calculate an index of diversity and dominance .

Species richness (Species diversity)

Species diversity richness is an expression of community structure. It is described as the number of species present in a sample or habitat per unit area. They are certain indices that can bring them to a similar scale. The simplest species richness index is based on the total number of species and the total number of individuals in a given sample or habitat, higher the value greater the species richness. The more different species present the more diverse the community and is generally considered healthier. Richness tends to increase over area; larger areas will harbors more different species probably because of larger variety of micro habitats and resources. Additionally, sampling over a large area increases the chance of find in rare species.

On the other hand, evenness is a measure of how similar the abundances of different species are categories are in a community. Evenness is ranged from zero. When the evenness is close to one, it indicates that each species categories consist of almost same number of

individuals. However, when the abundances of species are very dissimilar (Some rare and some common) then the value increases. The commonly used biodiversity index is Shannon–Wiener index and that of dominance index is Simpson's index.

Simpson's Index (1949):

Species dominance is measured by using this index

$$Cd = \sum(ni/N)^2$$

ni = Total number of individuals of each species

N = Total number of individuals of all species

Shannon – wiener Index (1963)

It is also called species diversity index. This index is based on information theory and improves upon the Simpson's by giving more importance to the rare species.

$$H = \sum(ni/N)\log(ni/N)$$

ni = Total number of individuals belonging to ith species

N = Total number of individuals in the study area

Results and Discussion:

Table: 1 shows the plant species present in the sacred grove region and Table 2 shows the plant species present in nearby forest region. In sacred grove region (station 1) a total of 57 plants were present, out of these 40 were trees, 8 shrubs and 7 herbs. While in the station 2 (nearby forest region) a total of 40 plant species were present and 20 were trees 6 shrubs, 3 herbs and only one climber. Density of the plant species was more in the station 1 when comparing with station 2. List of the plant species along with their respective families were presented in **Table 1 & 2**. More number of plant species were reported in the sacred grove region than the nearby forest region. Different plant species such as medicinal plant species were also reported in the sacred grove region. **Table 3& 4** shows the RF, RD and IVI for the important species in two study sites. Table 3 shows the IVI in the sacred grove region. In the area maximum IVI was reported for the species such as *Mangifera indica* (31.6). *Xylia xylocarpa* (11.1) and *Haldinia cordifolia* (10.6) while the **Table: 4** shows the IVI in the station 2. In the region maximum IVI

was reported for the species *Tamarindus indica* (39.4), *Ceiba pentendra* (L.) (22.6) and *Bombax ceiba* (18.1)

Sri Uma Kotilingeswara Swamy Temple

Sacred grove with floral Diversity

Sacred grove with Perennial Stream

Field survey at Sacred grove area

Non Sacred Grove Area (Forest Region)

Location of Punyagiri Sacred grove area

Table: 1. Plant species recorded in Sacred Grove Area

S.No	Name of the Plant Species	Habitat	Family
1	*Mallotus philippensis*(Lam)	Tree	Euphorbiaceae
2	*Saraca asoca*(Roxb.)	Tree	Caesalpiniaceae
3	*Homonia riperia*(L.)	Shrub	Euphorbiaceae
4	*Baliospermum montanum*(Willd.)	Shrub	Euphorbiaceae
5	*Wrightia tinctoria*(Roxb.)	Tree	Apocynaceae
6	*Diospyros peregryna*(L.)	Tree	Ebenaceae
7	*Srerculia urens* Roxb.	Tree	Sterculiaceae
8	*Diospyros sylvatica*(L.)	Tree	Ebenaceae
9	*Ficus relisiosa*(L.)	Tree	Moraceae
10	*Mangifera indica(L)*	Tree	Anacardiaceae
11	*Premna tomentosa(L)*	Tree	Verbenaceae
12	*Dalbergia paniculata*(Roxb.)	Tree	Fabaceae
13	*Hemionytis aurifolia*(Roxb.)	Herb	Adiantaceae
14	*Adathoda vasica(L)*	Shrub	Acanthaceae
15	*Alangium salvifolium*(L.f.)	Tree	Alangiaceae
16	*Lagerstroemia parviflora* (Roxb.)	Tree	Lythraceae
17	*Terminalia alata(L.)*	Tree	Combretaceae
18	*Grangia maderaspetana(L.)*	Herb	Asteraceae
19	*Annona squamosa(L.)*	Tree	Annonaceae
20	*Emelia sonchifolia(L.)*	Herb	Asteraceae

21	*Hemidesmus indicus* (L.)	Herb	Asclepiadaceae
22	*Gymnema sylvestris*(Retz.)	Herb	Asclepiadaceae
23	*Calotropis gigantia*(L.)	Shrub	Asclepiadaceae
24	*Memecylon edula*(L.)	Tree	Melastomataceae
25	*Canthium parviflorum* Lam.,	Tree	Rubiaceae
26	*Bauhinia purpurea* L.	Tree	Caesalpiniaceae
27	*Bridelia retusa*(L.)	Tree	Euphorbiaceae
28	*Bocapo monirea*(L.)	Herb	Scrophulariaceae
29	*Azadirachta indica* A. Juss.	Tree	Meliaceae
30	*Albizia odoratissima* (L.)	Tree	Mimosaceae
31	*Acacia leucoflova*(L.)	Tree	Mimosaceae
32	*Holoptelia integrifolia(* Roxb.)	Tree	Ulmaceae
33	*Haldinia cordifolia* (Roxb.)	Tree	Rubiaceae
34	*cleistanthus collinus*(Roxb)	Tree	Euphorbiaceae
35	*Colebookia oppositifolia* (L)	Shrub	Lamiaceae
36	*Manilkara hexandra*(L)	Tree	Sapotaceae
37	*Wrightia arborea*(Roxb.)	Tree	Apocynaceae
38	*Xylia xylocarpa* (Roxb.)	Tree	Mimosaceae
39	*Cocculus hirsutus* (L.)	Herb	Minispermaceae
40	*Tylophora indica*(Burm.f.)	Shrub	Asclepiadaceae
41	*Tridax procumbens* L.	Herb	Asteraceae
42	*Terminalia bellerica* (Gaertn.)	Tree	Combretaceae

43	*Holarrhena antidysenterica* Wall.	Shrub	Apocynaceae
44	*Achyranthus aspera (L)*	Herb	Amaranthaceae
45	*Annona reticulate(L)*	Tree	Annonaceae
46	*Lannea coromandelica*(Houtt.)	Tree	Anacardiaceae
47	*Garuga pinnata* Roxb.	Tree	Bursaraceae
48	*Aegle marmelos* L.	Tree	Rutaceae
49	*Dichrostachys cinerea* L.	Tree	Mimosaceae
50	*Grewia tiliaefolia* Vahl	Tree	Tiliaceae
51	*Hugonia mysatx* L.	Tree	Linaceae
52	*Macaranga peltata* L.	Tree	Euphorbiaceae
53	*Morinda tinctoria* Lam.	Tree	Rubiaceae
54	*Pongamia pinnata*(L.)	Tree	Fabaceae
55	*Pterospermum xylocarpum*(Gaertn.)	Tree	Caesalpiniaceae
56	*Strublus aspera(L)*	Tree	Moraceae
57	*Strychnos nuxvomica (L)*	Tree	Loganiaceae

Table 2. Plant Species recorded in Forest area (Station 2)

S.no	Name of the Plant Species	Habitat	Family
1	*Garuga pinnata* Roxb.	Tree	Fabaceae
2	*Leucaena leucocephala(L)*	Tree	Mimosaceae
3	*Bombax ceiba(L)*	Tree	Bombacaceae
4	*Ceiba pentandra (L)*	Tree	Bombacaceae
5	*Sterculia foeitida* Roxb.	Tree	Sterculiaceae
6	*Streblus aspera* Lour.	Tree	Moraceae
7	*Terminalia bellerica* (Gaertn.)	Tree	Combretaceae
8	*Soymida febrifuga* (Roxb.)	Tree	Soymidaceae
9	*Lagerstoremia parviflora*(Roxb.)	Tree	Lythraceae
10	*Tamarindus indicus (L)*	Tree	Caesalpiniaceae
11	*Bambusa arundinacea (L)*	Tree	Bombacaceae
12	*Pterospermum xylocarpum* Gaertn.)	Tree	Sterculiaceae
13	*Albizia odoratissima (L)*	Tree	Mimosaceae
14	*Lantana camera (L)*	Shrub	Verbenaceae
15	*Euphatorium odoratum(L)*	Shrub	Asteraceae
16	*Erythroxylum monogynum(L)*	Shrub	Euphorbiaceae
17	*Elephantophus scaber(L)*	Herb	Asteraceae
18	*Azadirachta indica* A. Juss.	Tree	Meliaceae
19	*Anogeissus acuminata* Wall. ex	Tree	Combretaceae
20	*Anogeissus latifolia :* (Roxb. ex DC)	Tree	Combretaceae
21	*Cleistanthus collinus* (Roxb)	Tree	Euphorbiaceae
22	*Lannea coromandelica* (Houtt.)	Tree	Anacardiaceae

23	*Mallotus philippensis* (Lam)	Tree	Euphorbiaceae
24	*Naringi crenulata (L)*	Tree	Rutaceae
25	*Cipadessa baccifera (L)*	Shrub	Meliaceae
26	*Allophyllus cobbe(L)*	Shrub	Sapindaceae
27	*Pergularia daemia (L)*	Herb	Asclepiadaceae
28	*Hemidesmus indicus* (L.)	Herb	Asclepiadaceae
29	*Callicopteris floribanda(Roxb)*	Climber	Combretaceae
30	*Catunaregum spinosa(Roxb)*	Shrub	Rubiaceae

Table: 3 Phytosociological studies of the Sacred grove Area

S.No	Name of Tree species	Sum of Basalarea	TOI	TNI	Frequency	Fr.Class	Density	R.F	R. D.	R .Do	IVI	Simson index	Shanon weiver
1	*Mallotus philippensis* (Lam)	15398.25	4	18	80	D	3.6	2.59	3.52	0.51	6.63	0.001245675	-0.051257565
2	*Saraca asoca*(Roxb.)	38024.25	2	5	40	B	1	1.29	0.98	1.26	3.54	9.61169E-05	-0.019692159
3	*Wrightia tinctoria* (Roxb.)	15398.25	5	25	100	E	5	3.24	4.90	0.51	8.66	0.002402922	-0.064197557
4	*Diospyros peregryna* (L.)	45252	2	4	40	B	0.8	1.29	0.78	1.50	3.58	6.15148E-05	-0.016513805
5	*Srerculia urens* Roxb.	113444.25	3	7	60	C	1.4	1.94	1.37	3.77	7.09	0.000188389	-0.025563343
6	*Diospyros sylvatica*(L.)	38024.25	5	15	100	E	3	3.24	2.94	1.26	7.45	0.000865052	-0.045043498
7	*Ficus relisiosa* (L.)	181008	3	10	60	C	2	1.94	1.96	6.01	9.92	0.000384468	-0.033481768
8	*Mangifera indica (L)*	785625	4	15	80	D	3	2.59	2.94	26.12	31.6	0.000865052	-0.045043498
9	*Premna tomentosa (L)*	45252	3	9	60	C	1.8	1.94	1.76	1.50	5.21	0.000311419	-0.030941076
10	*Dalbergia paniculata*(Roxb.)	90818.25	4	16	80	D	3.2	2.59	3.13	3.01	8.75	0.000984237	-0.047167065
11	*Alangium salvifolium*(L.f.)	15398.25	5	20	100	E	4	3.24	3.92	0.51	7.68	0.00153787	-0.055158438
12	*Lagerstroemia parviflora*(Roxb.)	25454.25	4	9	80	D	1.8	2.59	1.76	0.84	5.20	0.000311419	-0.030941076
13	*Terminalia alata(L.)*	53108.25	3	15	60	C	3	1.94	2.94	1.76	6.65	0.000865052	-0.045043498
14	*Annona squamosa(L.)*	15398.25	5	15	100	E	3	3.24	2.94	0.51	6.69	0.000865052	-0.045043498
15	*Memecylon edula* (L.)	11313	2	4	40	B	0.8	1.29	0.78	0.37	2.45	6.15148E-05	-0.016513805
16	*Canthium parviflorum* Lam.,	15398.25	3	12	60	C	2.4	1.94	2.35	0.51	4.81	0.000553633	-0.038315034
17	*Bauhinia purpurea* L.	25454.25	5	16	100	E	3.2	3.2	3.13	0.84	7.23	0.000984237	-0.047167065
18	*Bridelia retusa*(L.)	45252	4	17	80	D	3.4	2.59	3.33	1.50	7.43	0.001111111	-0.049237375
19	*Azadirichta indica* A. Juss.	25454.25	3	9	60	C	1.8	1.94	1.76	0.84	4.55	0.000311419	-0.030941076
20	*Albizia odoratissima* (L.)	70706.25	4	5	80	D	1	2.59	0.98	2.35	5.92	9.61169E-05	-0.019692159
21	*Acacia leucoflova* (L.)	25454.25	5	17	100	E	3.4	3.24	3.33	0.84	7.42	0.001111111	-0.049237375

22	*Holoptelia integrifolia (* Roxb.)	90818.25	4	15	80	D	3	2.59	2.94	3.01	8.55	0.000865052	-0.045043498
23	*Haldinia cordifolia* (Roxb.)	181008	3	14	60	C	2.8	1.94	2.74	6.01	10.71	0.000753556	-0.042863118
24	*cleistanthus collinus* (Roxb)	25454.25	3	15	60	C	3	1.94	2.94	0.84	5.73	0.000865052	-0.045043498
25	*Manilkara hexandra*(L)	152097	2	3	40	B	0.6	1.29	0.58	5.05	6.94	3.46021E-05	-0.013120288
26	*Wrightia arborea* (Roxb.)	31425	3	5	60	C	1	1.94	0.98	1.04	3.97	9.61169E-05	-0.019692159
27	*Xylia xylocarpa* (Roxb.)	90818.25	5	25	100	E	5	3.24	4.90	3.01	11.16	0.002402922	-0.064197557
28	*Terminalia bellerica* (Gaertn.)	70706.25	3	12	60	C	2.4	1.94	2.351	2.35	6.65	0.000553633	-0.038315034
29	*Annona reticulata (L)*	25454.25	2	4	40	B	0.8	1.29	0.78	0.84	2.92	6.15148E-05	-0.016513805
30	*Lannea coromandelica*(Houtt.)	113444.25	4	13	80	D	2.6	2.59	2.54	3.77	8.91	0.00064975	-0.04062186
31	*Garuga pinnata* Roxb.	53108.25	4	20	80	D	4	2.59	3.92	1.76	8.28	0.00153787	-0.055158438
32	*Aegle marmelos* L.	31425	5	10	100	E	2	3.24	1.96	1.04	6.25	0.000384468	-0.033481768
33	*Dichrostachys cinerea* L.	15398.25	4	13	80	D	2.6	2.59	2.54	0.51	5.65	0.00064975	-0.04062186
34	*Grewia tiliaefolia* Vahl	53108.25	3	12	60	C	2.4	1.94	2.35	1.764	6.06	0.000553633	-0.038315034
35	*Hugonia mysatx* L.	25454.25	4	8	80	D	1.6	2.59	1.56	0.84	5.01	0.000246059	-0.028305572
36	*Macaranga peltata* L.	181008	4	12	80	D	2.4	2.59	2.35	6.01	10.96	0.000553633	-0.038315034
37	*Morinda tinctoria* Lam.	38024.25	5	10	100	E	2	3.24	1.96	1.26	6.47	0.000384468	-0.033481768
38	*Pongamia pinnata* (L.)	25454.25	5	13	100	E	2.6	3.24	2.54	0.84	6.64	0.00064975	-0.04062186
39	*Pterospermum xylocarpum*(Gaertn.)	53108.25	4	20	80	D	4	2.59	3.92	1.76	8.28	0.00153787	-0.055158438
40	*Strublus aspera (L)*	15398.25	5	14	100	E	2.8	3.24	2.74	0.51	6.50	0.000753556	-0.042863118
41	*Strychnos nuxvomica(L)*	38024.25	4	9	80	D	1.8	2.59	1.76	1.26	5.62	0.000311419	-0.030941076

TOI: Total Occurrence of Individuals; TNI: Total no of Individuals. RF: Relative Frequency; RD: Relative Density; RDO: Relative Dominance; IVI: Important Value Index

Table: 4 Phytosociological studies of the Forest Area:

S.No	Name of Tree species	Sum of Basalarea	TOI	TNI	Frequency	Fr.Class	Density	R.F	R.D	R.Do	IVI	Simson index	Shanon weiver
1	*Garuga pinnata* Roxb.	336.1177407	4	12	80	D	2.4	5.33	4.66	2.07	12.07	0.0021802	-0.062136274
2	*Leucaena leucocephala(L)*	240.6523469	3	21	60	C	4.2	4	8.17	1.48	13.65	0.006676861	-0.08887934
3	*Bombax ceiba(L)*	1789.976134	3	8	60	C	1.6	4	3.11	11.05	18.17	0.000968978	-0.046905623
4	*Ceiba pentandra (L)*	2577.565632	3	7	60	C	1.4	4	2.72	15.92	22.64	0.000741873	-0.042621967
5	*Sterculia foeitida* Roxb.	447.4940334	4	15	80	D	3	5.33	5.83	2.76	13.93	0.003406562	-0.072014117
6	*Streblus aspera* Lour.	161.097852	3	17	60	C	3.4	4	6.61	0.99	11.60	0.004375539	-0.078020356
7	*Terminalia bellerica*(Gaertn.)	717.9793158	4	15	80	D	3	5.33	5.83	4.43	15.60	0.003406562	-0.072014117
8	*Soymida febrifuga*(Roxb.)	447.4940334	3	11	60	C	2.2	4	4.28	2.76	11.04	0.001831973	-0.058575661
9	*Lagerstoremia parviflora* (Roxb.)	286.3961814	4	15	80	D	3	5.33	5.83	1.76	12.93	0.003406562	-0.072014117
10	*Tamarindus indicus (L)*	4972.155927	4	10	80	D	2	5.33	3.89	30.71	39.94	0.001514027	-0.054861211
11	*Bambusa arundinacea (L)*	1145.584726	4	12	80	D	2.4	5.33	4.66	7.07	17.07	0.0021802	-0.062136274
12	*Pterospermum xylocarpum* Gaertn.)	389.8170247	3	8	60	C	1.6	4	3.11	2.40	9.52	0.000968978	-0.046905623
13	*Albizia odoratissima (L)*	574.7812251	4	9	80	D	1.8	5.33	3.50	3.55	12.38	0.001226362	-0.050977492
14	*Azadirichta indica* A. Juss.	336.1177407	3	7	60	C	1.4	4	2.72	2.07	8.80	0.000741873	-0.042621967
15	*Anogeissus acuminata* Wall. ex	447.4940334	4	12	80	D	2.4	5.33	4.66	2.76	12.76	0.0021802	-0.062136274

16	*Anogeissus latifolia* (Roxb. ex DC)	286.3961814	4	10	80	D	2	5.33	3.89	1.76	10.99	0.001514027	-0.054861211
17	*Cleistanthus collinus* (Roxb)	97.45425617	5	24	100	E	4.8	6.66	9.33	0.60	16.60	0.008720798	-0.096160798
18	*Lannea coromandelica* (Houtt.)	644.3914081	4	15	80	D	3	5.33	5.83	3.98	15.15	0.003406562	-0.072014117
19	*Mallotus philippensis*(Lam)	161.097852	5	17	100	E	3.4	6.66	6.61	0.99	14.27	0.004375539	-0.078020356
20	*Naringi crenulata (L)*	127.2871917	4	12	80	D	2.4	5.33	4.66	0.78	10.78	0.0021802	-0.062136274
	Total	**16187.35084**	**75**	**257**	**1500**		**51.4**	**100**	**100**	**99.99999997**	**300**	**0.056003876**	**-1.276013169**

TOI: Total Occurrence of Individuals; TNI: Total no of Individuals. RF: Relative Frequency; RD: Relative Density; RDO: Relative Dominance; IVI: Important Value Index

Conclusion

Therefore a holistic understanding of the current status, structure and function of sacred grove is essential for assessing their ecological role and formulating strategies for their conservation. This paper briefly reviews the studies on sacred groves across the globe in general and India in particular highlighting that the tradition of sacred groves could provide a powerful tool for ensuring biodiversity conservation through community participation. It is very important to upload traditions and belief in order to protect and conserve these unique forest patches which represent the relict vegetation of the concern area. Ecological services rendered by sacred groves needs to be highlighted and people should be made to realize that the conservation of groves in crucial for their sustenance. These sacred groves are the only remnants of the original forest, maintained in near complex condition in many parts of the forest area, as such groves now play a vital role in conservation of biological diversity. The present sacred grove area having 60% of the plants are medicinally use and others are economically important, many rare, endemic and threatened plants like *Saraca asoca* (Roxb), *Diospyros peregryna* (L.), *Baliospermum montanum* (Willd) and *Sterculia urens* (Roxb) are conserved in the sacred grove area. They could be used as germplasam collection of all the plants in an area, micro propagation and tissue culture of the fast disappearing plants of these groves are to be undertaken on a priority base for conservation.

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