Sacred groves in Siddapur Taluk, Uttara Kannada, Karnataka: Threats and Management Aspects

Rajasri Ray, M.D.Subash Chandran and T.V.Ramachandra

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Centre for Ecological Sciences
Indian Institute of Science, Bangalore-560012
Web: http://wgbis.ces.iisc.ernet.in/biodiversity/
Email: cestvr@ces.iisc.ernet.in , energy@ces.iisc.ernet.in

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Summary

A short term study was conducted on five selected sacred groves at Siddapur taluk of Uttara Kannada district, Karnataka to assess their potential for conservation and management. Despite their limited spatial extent groves harbour a good number of local and regional woody tree species thus, conserving woody species diversity to a great extent. Moreover, association of perennial and seasonal waterbodies with the groves ensure availability of water throughout the water as well as favourable microclimate inside the area.

Assessment of threats have pointed out that area is a major limiting factor for all the groves. All except one are facing some nominal level of disturbances however; community awareness and active participation are required to protect these for future survival.

Introduction

Sacred groves are traditionally protected forest fragments associated with livelihoods of rural communities. This tradition is the best example of sustainable natural resource management system. This self-imposed restriction on resource utilisation often facilitates conservation of local biodiversity and maintenance of ecological integrity in the area. Although their importance in community life is usually felt through religious-cultural practices their utility and also by their life-sustaining services. A diverse range of products and services is available from sacred grove system.

Uttara Kannada district of Karnataka state is dotted with sacred groves at various conditions. Groves are present in varied ecosystems viz., evergreen and deciduous forests, hill tops, valleys, mangroves, swamps and even in agricultural fields also thus, representing varied vegetation and animal profiles. Studies have already conducted on various aspects of these groves namely, their biodiversity, landscape level distribution, anthropogenic impact and

socio-religious importance. Although these studies have established the importance of these groves at local and regional level, many more issues are yet to address for planning effective conservation strategy for them. Issues like ecological significance of the groves, their importance at local livelihood development, involvement of local community in management and protection require immediate attention from stakeholders.

We have taken a short term study on selected sacred groves of Siddapur taluk in Uttara Kannada district of Karnataka state to assess their current status in terms of woody species diversity and water conservation potential. In addition to that, extensive survey has been conducted to understand the disturbances over the system with an aim to formulate effective protection strategy for them. In this document, we are presenting some key findings of our study.

Methodology

Selection of the groves -

Groves have been selected based on previous literature, field survey and local source of information (village people, forest officials) (Fig 1). We have chosen 5 sacred groves for detail study based on their size, social importance and current level of maintenance. Details of these groves have been provided in Table 1.

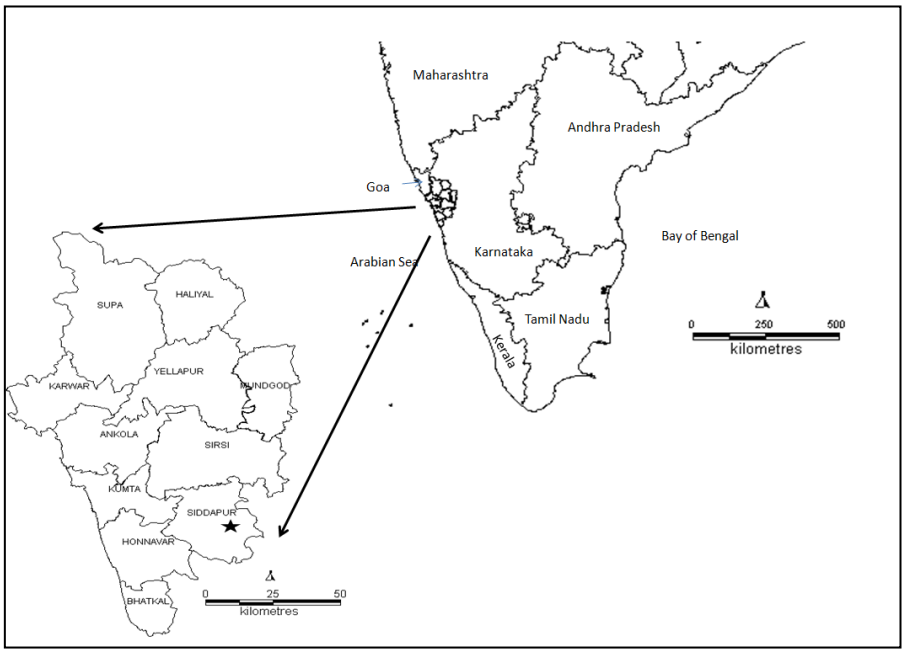
Assessment of woody species diversity –

Selected groves have been surveyed extensively to document the woody species assemblage in the system. Species girth (GBH) and height was measured through standard procedures. Identification was done through published literature and local experts.

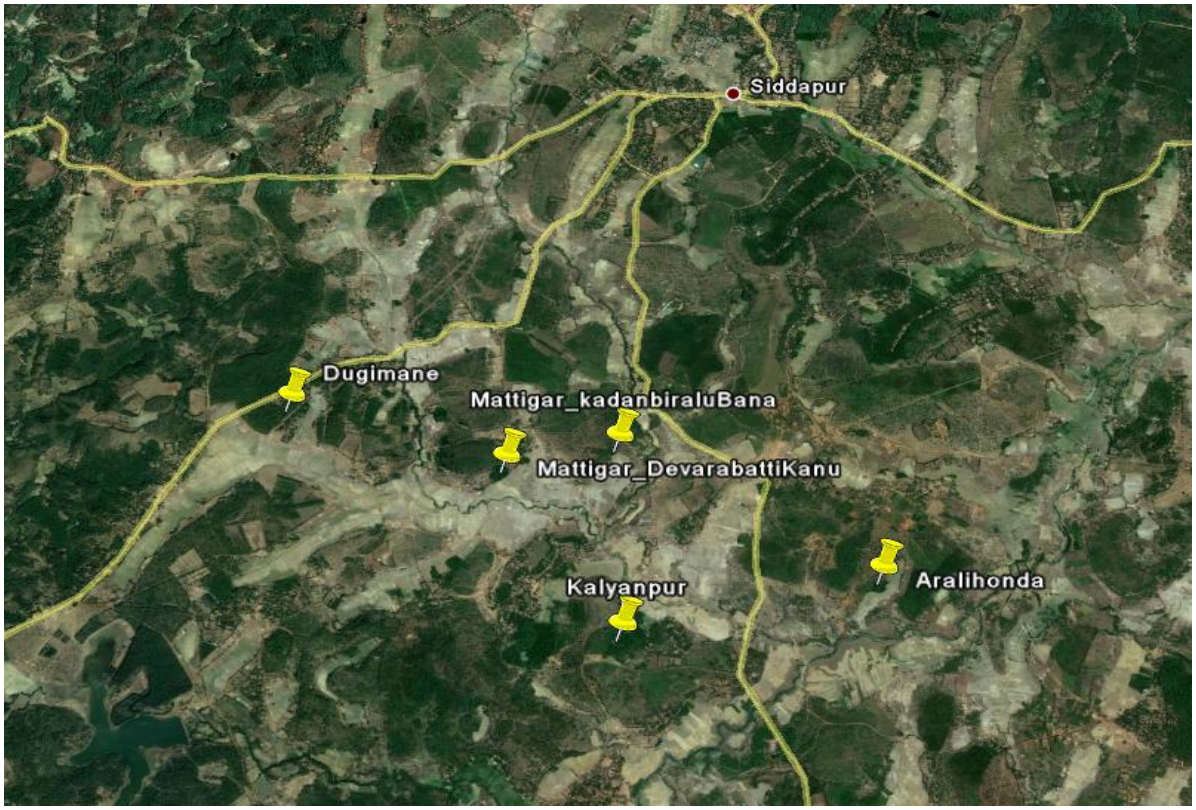
Village	Sacred grove	Deity	Area (ha)	Location	Ownership	Woody species #	Endemic species #	Waterbody
Aralihonda	Kadkod Choudamma Bana	Choudi	1.073	74.89 ^{0} E, 14.29 ^{0} N	Forest	45	11	Seasonal
Dugdimane	Choudibana	Choudi	0.03	74.85 ^{0} E, 14.31 ^{0} N	Forest	26	4	Seasonal and perennial
Kalyanpur	Jattibana / Kereamma	Kereamma	0.9264	74.88 ^{0} E, 14.29 ^{0} N	Forest	51	14	Perennial
Mattigar	Devaravatti Kanu	Choudi, Jhatka	1.822	74.87 ^{0} E, 14.30 ^{0} N	Forest	63	18	Seasonal
Mattigar	Kadanmattibiralu Bana	Birappa, Choudi	0.2183	74.87 ^{0} E, 14.30 ^{0} N	Forest	25	4	Seasonal

Table 1. Details of the selected sacred groves in Siddapur taluk

Fig 1.



Location of Study area



Location of studied groves in modified landscape (Google imagery)

Evaluation of water conservation potential –

Periodical observation and village survey were conducted to gather information on water availability, usage and maintenance.

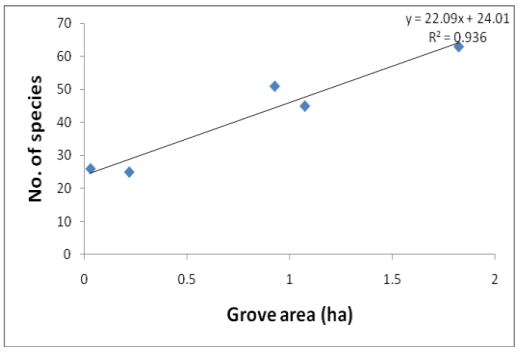
Measurement of Disturbance –

To assess the intensity of disturbance over the grove system, ecological parameters like invasive species, plantation, regeneration condition, presence/absence of waterbody, root exposure due to soil erosion, grove area and anthropological parameters like distance from road, border fencing, cattle grazing etc. have been measured through scoring method with all parameters assuming equal weight. The scoring was numerical scale based but varied as per the parameters evaluated. The value was expressed in terms of relative disturbance ((scored value/maximum disturbance value)* 100).

Result and Discussion –

Woody species assemblage

A total of 90 woody species have been reported from these five sacred groves. There are 37 families, 65 genera among which Clusiaceae is predominant at family level followed by Anacardiaceae, Lauraceae, Meliaceae, Moraceae and Myrtaceae (Annexure 1). A total of 19 Western Ghats endemics have been recorded from these groves. Woody species assemblage is dominated by evergreen members although many are disturbance tolerant and have preference for open place. The total species assemblage in individual grove is highly related to grove area. Girth class distribution in the groves also

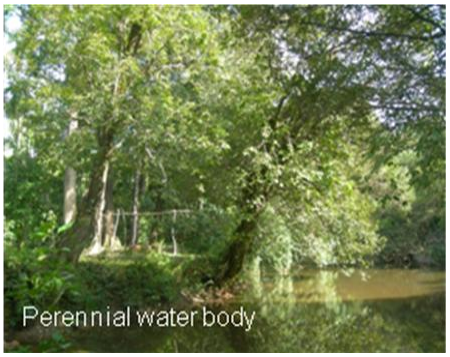


Diverse life forms present in sacred groves

indicates dominance of younger generation thus, representing better potential for future survival if the habitat would protect from further disturbance. A preliminary level estimation of carbon sequestration potential has revealed that these small groves sequester carbon of

148.73 tC/ha. Considering the highly modified landscape in the study area, groves serve as mini reservoir for diverse groups of species.

Water conservation potential –



All these five groves are associated with water bodies (either seasonal or perennial). The pond belongs to Jatti bana or kereamma in Kalyanpur is a part of grove area and is considered as sacred by local community. While in Choudibana of Dugimane village, a perennial pond is associated with the grove and the grove is seasonally flooded with rainwater. Remaining three groves i.e. Devarabatti kanu and Kadanmattibiralu bana of Mattigar village and Kadkod Choudamma bana in Aralihonda have seasonal water bodies. The ponds are perennial in nature and are used at local level for domestic purpose. On the other hand, seasonal water bodies have water for longer time period except extreme summer months i.e. April and May. Although these seasonal water bodies have no direct use for local community it keeps the temperature down inside the grove, provide necessary moisture for germination and establishment of seedlings, support decomposition activities at grove floor and numerous life forms (lower group of plants and animals) in the system. Presence of moisture sensitive woody species in the grove indicates favourable microclimate in the area.

Threats to the groves

We have studied nine (9) disturbance factors for all five groves (Table 2). Based on the relative disturbance scores groves have been categorised into highly disturbed (76-100%), moderately disturbed (51-75%), disturbed (26-50%) and undisturbed (0-25%). All except one comes under less disturbed condition (i.e. 26-50% disturbed). Their area ranges from 0.2-1.8 ha and protection ensured by either boundary demarcation or existing social norms Moreover, factors like proximity to water body, comparatively undisturbed interior provide suitable microclimate for diverse members therefore provide ecological security. On the contrary, Choudibana in Dugimane village find to be in moderately disturbed condition, principle factors are small area (0.03 ha), lack of protection and maintenance.

Land Conversion construction work Leaf litter collection Invasive species

However, interactions with the villagers have revealed that, it is the changing religious practices which effects grove maintenance and existence mostly. Although the studied groves were fairly well protected but peoples inclination towards temple centric worship cannot be overruled. It has been found that, once the focus of worship has shifted towards temple or icon based practices, natural vegetation of the grove becomes irrelevant for further management. Similarly, rapid land use changes in the surroundings often lead to establishment of invasive species at grove border, change in microclimate, blockage of the water sources and gradual reduction of the grove area. However, in studied groves these effects are still at minimal level but active involvement of all stakeholders is very necessary in this regard.

	Invasive species	Acacia/Areca/ Banana plantation at border	Regeneration potential (% of area covered by regenerating members)	Water Body	Distance from main road	Soil erosion (% of roots exposed in the area)	Border / fencing	Cattle grazing	Area (ha)
Kadkod Choudamma Bana	Present at border	Areca plantation	80	Seasonal	Interior to the village	No exposure	Present	No	1.073
Choudibana	Present at border	Areca and Banana plantation	80	Perennial and Seasonal	Interior to the village	No exposure	Absent	Yes	0.035
Jattibana / Kereamma	No invasives	Areca plantation	80	Perennial	On village road	No exposure	Absent	No	0.9264
Devaravatti Kanu	Present at border	Acacia plantation	100	Seasonal	On village road	25	Present	Yes	1.822
Kadanmattibiralu Bana	Present at border	Acacia plantation	100	Seasonal	Interior to the village	No exposure	Absent	Yes	0.2183

Table 2. Details of disturbances over the studied sacred grove

Apart from local community's involvement, it is believed that forest department can play a major role in the protection of sacred grove. Being the legal owner of the land, it is expected that some minimal level of attention should be paid by them for management and maintenance of these groves. Groves can be maintained under community forestry / community reserve category. Innovative approaches like, carbon credit, restoration programs, incentive for conservation of rare, threatened and endemic species could be introduced to motivate the community people for grove management and conservation.

It is worthwhile to mention here, how simple protection measures at community level can boost up the entire grove system in terms of vegetation profile and water availability. The Devarabatti kanu of Mattigar village, had been studied by the researchers from Centre for Ecological Sciences, Indian Institute of Science (CES, IISc) in 1991 and based on their observation few protection measures were suggested to the local villagers. As a part of their current activity, very recently CES researchers have studied the same fragment to assess the impact of the conservation measures taken by the villagers. Comparative assessment of the vegetation profile has shown that all the characteristic features like tree density, basal area, endemism, species richness and others have increased over time. Natural disturbances like tree felling facilitates introduction of generalist species but forest species occupy a good percentage of the current vegetation. Regeneration study shows good potential for forest and endemic species. However, few recent disturbances (e.g. cattle grazing, leaf manure collection, uncontrolled entry etc.) have been noticed which require urgent attention from concerned authority. Overall, this study has pointed out that proper protection and maintenance of natural condition could be enough to protect sacred grove fragments from degradation.

Conclusion

Sacred groves are important for both conservation and livelihood development. This tradition itself is a natural balance between resource usage and its conservation which can be applied even today with newer approaches. Groves which are present in degraded or modified landscape are vital for their species richness and sheltering services they offer to diverse organisms. Our study has found that, despite their severe area limitations groves still harbour a good number of regional species as well as play a vital role in water conservation at local level. Their role in water conservation can be seen either at macro level (pond etc.) or at mini scale (moisture availability inside the area). It has been felt that, these mini pockets of forests must be getting priority in species or habitat conservation planning at local and regional level. An active conservation program including all stakeholders, with efficient ground plan could be helpful to preserve this age old tradition in today's' world.

Recommendation

The current status of the studied groves suggests that, they require immediate attention from stakeholders at different level. The following steps could be taken to secure their future in ever changing landscape and social fabric of the region (Table 3).

Apart from these grove specific activities, some very known but effective measures can applied for all of them viz.,

- Community level awareness and capacity building program
- Active participation by local and regional governing bodies (e.g. Panchayat, Forest department, Biodiversity board and others)
- Inclusion in regional species and habitat conservation planning

- Incentive based approaches to attract younger generations towards this traditional resource management system (eg. Carbon credit, species restoration and nursery program, incentive for endangered and endemic species protection)

Grove Name	Location	Threats	Recommended mitigation measures
Kadkod Choudamma Bana	Aralihonda	• Inadequate fencing Presence of invasive species • Surrounded by highly modified land forms	• Bamboo or iron fencing is necessary • Removal of invasives from grove border • Surrounding land forms must not interrupt the grove system
Choudibana	Dugdimane	• No fencing • Grove size is very much reduced due to land conversion for plantation • Cattle grazing is prominent • Presence of invasive species	• Bamboo or iron fencing is necessary • Land conversion activity must be controlled • Removal of invasives from grove border
Jattibana / Kereamma	Kalyanpur	• Grove is on the jeepable road • No fencing • Construction of permanent well • Plan for temple establishment	• Unnecessary entry must be restricted • Bamboo or iron fencing is necessary • Construction of permanent structure must be discouraged
Devaravatti Kanu	Mattigar	• Grove is on the jeepable road • Earlier fencing is partially destroyed • Presence of invasive species • Acacia plantation at border	• Unnecessary entry must be restricted • New fencing should be established • Removal of invasives from grove border • The extent of Acacia plantation should be monitored
Kadanmattibiralu Bana	Mattigar	• No fencing • Presence of invasive species • Cattle grazing activity is present	• Bamboo or iron fencing is necessary • Removal of invasives from grove border

Table 3. Grove specific threats and their probable mitigation measures

Annexure I

Family	Species	Karikod Choudamma Bana	Choudibana	Jattibana	Devarabatti Kanu	Kadanmattibiralu Bana
Mimoseae	*Acacia auriculiformis*			√	√	
Lauraceae	*Actinodaphne malabarica*			√	√	
Meliaceae	*Aglaia elaeagnoidea*			√	√	
Meliaceae	*Aglaia annamalayana*			√		
Meliaceae	*Ailanthus excelsa*	√			√	
Fabaceae	*Albizzia sp.*	√			√	√
Apocynaceae	*Alstonia scholaris*		√	√		√
Euphorbiaceae	*Aporosa lindleyana*	√	√	√	√	√
Moraceae	*Artocarpus heterophyllus*			√		
Moraceae	*Artocarpus hirsutus*	√	√	√	√	
Moraceae	*Artocarpus gomezianus*			√	√	
Lauraceae	*Beilschmiedia bourdillonii*			√	√	
Bombacaceae	*Bombax ceiba*				√	√
Euphorbiaceae	*Briedelia sp.*			√		
Anacardiaceae	*Buchanania lanzan*	√			√	√
Fabaceae	*Butea monosperma*					√
Clusiaceae	*Callophyllum apetalum*				√	
Clusiaceae	*Callophyllum tomentosum*		√			
Burseraceae	*Canarium sp.*				√	
Rubiaceae	*Psydrax umbellata*	√	√	√	√	
Rhizophoraceae	*Carallia brachiata*				√	√
Lecythidaceae	*Careya arborea*	√				√
Aracaceae	*Caryota urens*	√	√	√	√	√
Flacourtiaceae	*Caseaeria sp.*				√	
Caesalpiniaceae	*Cassia fistula*	√	√		√	√
Lauraceae	*Cinnamomum malabaricum*			√	√	
Lauraceae	*Cinnamomum microcarpa*	√			√	
Lauraceae	*Cinnamomum zeylanicum*		√		√	√
Dilleniaceae	*Dillenia pentagyna*	√	√		√	
Sapindaceae	*Dimocarpus longan*			√		
Ebenaceae	*Diospyros assimilis*	√		√	√	
Ebenaceae	*Diospyros candolleana*			√	√	
Ebenaceae	*Diospyros crumenata*				√	
Ebenaceae	*Diospyros montana*	√	√		√	
Ebenaceae	*Diospyros sp.*	√	√	√		
Euphorbiaceae	*Drypetes confertiflora*				√	
Meliaceae	*Dysoxylum filiciforme*	√				
Apocynaceae	*Tabernaemontana heyneana*		√	√	√	√
Moraceae	*Ficus calosa*			√		√
Moraceae	*Ficus sp.*	√		√	√	
Moraceae	*Ficus tomentosa*			√		

Flacourtiaceae	*Flacourtia montana*	√		√	√	
Clusiaceae	*Garcinia cambogia*			√		
Clusiaceae	*Garcinia indica*			√	√	
Clusiaceae	*Garcinia morella*	√	√	√	√	
Clusiaceae	*Garcinia xanthocyamas*			√		
Euphorbiaceae	*Glochidion sp.*	√				
Tiliaceae	*Grewia tilifolia*	√				
Anacardiaceae	*Holigarna arnottiana*	√	√	√	√	√
Anacardiaceae	*Holigarna grahamii*	√		√	√	
Flacourtiaceae	*Hydnocarpus pentandra*	√	√	√	√	√
Rubiaceae	*Ixora brachiata*	√		√	√	√
Myristicaceae	*Knema attenuata*			√	√	
Lythraceae	*Lagerstroemia microcarpa*	√	√		√	√
Anacardiaceae	*Lannea coromandelica*				√	
Oleaceae	*Chionanthus mala-elengi*	√	√		√	
Alphioidea	*Macaranga peltata*				√	
Sapotaceae	*Madhuca indica*				√	
Malphigiaceae	*Malphigia sp.*	√				
Clusiaceae	*Mammea suriga*	√		√	√	√
Anacardiaceae	*Mangifera indica*	√	√	√	√	√
Melastomataceae	*Memecylon umbellatum*	√			√	
Clusiaceae	*Mesua ferrea*			√	√	
Sapotaceae	*Mimosups elengi*	√	√	√	√	√
Rubiaceae	*Nauclea purpurea*	√				
Anacardiaceae	*Nothopegia colebrookeana*		√	√		
Oleaceae	*Olea dioica*	√	√	√		√
Lauraceae	*Persea macrantha*			√		
Pittosporaceae	*Pittosporum dasycaulon*	√				
Fabaceae	*Pongamia pinnata*				√	
Sterculiaceae	*Pterospermum diversifolium*			√		
Sapindaceae	*Sapindus sp.*		√			
Olacaceae	*Strombosia ceylanica*				√	
Symplocaceae	*Symplocos beddomei*	√		√	√	
Symplocaceae	*Symplocos sp.*				√	
Myrtaceae	*Syzygium caryophyllatum*	√	√	√	√	√
Myrtaceae	*Syzygium cumini*	√	√	√	√	√
Myrtaceae	*Syzygium gardneri*			√		
Myrtaceae	*Syzygium sp.*	√		√	√	
Myrtaceae	*Syzygium travancoricum*	√	√		√	
Myrtaceae	*Syzygium zeylanica*	√			√	
Combretaceae	*Terminalia bellerica*			√	√	
Combretaceae	*Terminalia paniculata*	√		√	√	√
Combretaceae	*Terminalia tomentosa*	√		√	√	√
Meliaceae	*Toona ciliata*	√				
Dipterocarpaceae	*Vateria indica*	√			√	

Verbanaceae	*Vitex altissima*	√	√	√	√
Fabaceae	*Xylia xylocarpa*			√	
Rutaceae	*Zanthoxylum rhetsa*			√	√

ದೇವರಕಾಡು

ಮುಂದಿನ ಪೀಳಿಗೆಗೆ ಪೂರ್ವಜರಿಂದ ಸಂದ ಬಳುವಳಿ

ಕಿರು ಅರಣ್ಯ ಉತ್ಪನ್ನಗಳ ಆಗರ

ಪರಿಶುದ್ಧ ನೀರು ಮತ್ತು ಗಾಳಿಯ ಮೂಲ

ಆಧ್ಯಾತ್ಮಿಕ ಸಂತೃಪ್ತಿ ದೊರೆಯುವ ಸ್ಥಳ

ಪರಾಗಸ್ಪರ್ಶಕಗಳ ಅವಾಸಸ್ಥಾನ

ಪ್ರಾಚೀನ ಕಾಲದಿಂದಲೂ ಪೂಜಿಸಲ್ಪಡುತ್ತಿರುವ ಪವಿತ್ರಸ್ಥಳ

ದೇವರಕಾಡು ಸಂರಕ್ಷಣೆಯ ಪಾಲುದಾರರು

ಸ್ಥಳೀಯ ಜನತೆ

ಗ್ರಾಮ ಪಂಚಾಯತಿ

ಪಶ್ಚಿಮ ಘಟ್ಟ ಕಾರ್ಯಪಡೆ

ಕರ್ನಾಟಕ ಅರಣ್ಯ ಇಲಾಖೆ

ಕರ್ನಾಟಕ ಜೀವವೈವಿಧ್ಯ ಮಂಡಳಿ

ಸಂಶೋಧಕರು ಮತ್ತು ವಿಜ್ಞಾನಿಗಳು