

*Full Length Research Paper*

## Role of sacred groves in the conservation and management of medicinal plants

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Sacred groves play a vital role in context of sustainable use and conservation of medicinal plants. The involvement of local communities offers several advantages in the management of traditionally known medicinal wealth of forests. Considering the importance of sacred groves in the conservation of medicinal plants, a study was carried out in Phulbani forest division of Odisha to record the status, distribution and use of medicinal plants in different sacred grove areas of this division. The study recorded about 40 medicinal plants (including trees, shrubs, herbs and climbers) across different sacred groves and their use for human welfare. The local people were consulted to know about the use of different medicinal plants and the existing management strategy. The study suggested the promotion of medicinal plant conservation through effective capacity building activities for the sacred grove committee members and local people to realize the goals of sustainability.

**Key words:** Sacred groves, Phulbani, Odisha, Kondha tribe, medicinal plants.

### INTRODUCTION

India, a mega diverse country with only 2.4% of the world's land area, harbours 7 to 8% of all recorded species, including over 45,000 species of plants and 91,000 species of animals. It is also one of the 12 primary centres of origin of cultivated plants and domesticated animals (MoEF, 2014). In regard to medicinal plant biodiversity, there are some estimated 6560 species of medicinal plants found in different parts of India (MoEF, 2014). The uniqueness in India's medicinal plant diversity lies with the interlinkage or traditional association between community and nature. However, the culturally linked and traditionally well managed biodiversity of India

is under severe threat due to various anthropogenic causes (Yadav et al., 2010). The situation seems to be more critical in near future as India has been predicted to surpass China to become the most populous country in the world by 2050. Thus the issue of biodiversity conservation and environmental sustainability has undergone a substantial transformation across the country. The importance of sustainable community involvement programs for effective conservation and management of biological wealth has been well recognized in India (Gadgil and Vartak, 1974). The traditionally managed and socio-culturally linked small

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patches of forest trees located inside or near to the forest area better known as sacred groves (Bhakat and Sen, 2008), scientifically and culturally considered as treasure house of plants (Basu, 2000) and folk medicines are gaining more attentions with policy makers, researchers, academicians and environmentalists are exploring the critical role of sacred groves in the management and conservation of a variety of medicinal, rare and endemic plants.

Sacred groves are traditionally managed by the local communities. Sacred groves remain untouched and well-guarded by the local people due to their traditional and religious attachments with the area and their belief in the local deities (Khumbongmayum et al., 2005). Since time immemorial, the local communities mostly tribals have been using different medicinal plants mostly found in these sacred groves to cure different diseases. The medicinal properties of different plants are well known to the local inhabitants and it gets transferred from generation to generation (Semwal et al., 2010). Sacred groves have been reported and well documented from across different states of India. The sacred groves in India are known by different names (Khan et al., 2008; Bhakat and Sen, 2008) at different places such as 'Devray' in Maharashtra, 'Devarkand and Siddarvanam' in Karnataka, 'Oraans, Kenkari, Malvan and Yogmaya' in Rajasthan and 'Saranya' in Bihar.

In tribal regions of Jharkhand and Orissa, sacred groves are popularly known as Jaher. In Odisha, these are mostly confined to the districts like Kandhamal, Koraput, Rayagada, Deogarh, Mayurbhanj and Keonjhar etc. Sacred groves have potential to conserve the medicinal plant biodiversity due to the advantage of community ownership and traditional sustainable management practices. However, the concern is that most of these sacred grove areas are evincing degradation and conservation threats. The degradation of sacred groves has an adverse impact on tribal communities and their traditional knowledge on plants (Basu, 2009). The present study was conducted to document the medicinal plant wealth and their uses by the local communities of different sacred groves under Phulbani forest division of Odisha which is mostly dominated by the culturally rich and traditionally dressed Kondha tribes. Figure 1 provides a view of a sacred grove located in Phulbani forest division of Odisha. The aim was also to investigate the traditional management practices, role and status of sacred groves in regards to medicinal plant biodiversity and its conservation.

## MATERIALS AND METHODS

The study area Phulbani is situated in the southern parts of Odisha and comes under the North-Eastern Ghat Agro-climatic zone of the

State and the altitude Ranges from 300 to 1100 m from the mean sea level. The district is mostly inhabited by the Kondh tribes. The study was carried out in 10 identified sacred groves of Phulbani forest division of Odisha. The location details are provided in Figure 2. A survey was carried out in the sacred grove areas of Phulbani forest division to record the medicinal plant biodiversity of the sacred grove areas and also to record the ethnobotanical use of different plants by the local people. Individual sacred grove sites were visited and quadrats were laid down randomly to estimate the medicinal plant biodiversity of these areas. A total of 10 sacred groves belonging to 4 different blocks were studied for this purpose.

Efforts were made to organize meetings with the sacred grove committee members to carry out the study with active participation of the local people. The local vaidyas, village old men and school teachers were consulted to record the medicinal uses of different trees, shrubs and herbs. A total of 250 local inhabitants were interviewed for this study. The information was collected in the pre-designed questionnaires of local language. The plant parts collected were processed for herbarium to ensure proper identification of all the medicinal plants and for the same help of Botany Professors of local college, Specimen Collectors of Regional Plant Resource Centre (RPRC) and Professors of College of Forestry, OUAT, Bhubaneswar were sought. The data so obtained were collated to derive the required information as per the objective of the study.

## RESULTS

The present study reported 40 plant species comprising of trees, shrubs, herbs and climbers belong to 30 different families (Table 1). The local people mostly use these medicinal plants to cure a number of diseases such as dysentery, constipation, skin diseases, cardiotoxic, cough, fever, diarrhea, indigestion, wound healing, headache, stomach pain, snake bite etc. They use specific part of plants for curing different diseases. The medicinal plants found in the studied area belong to different families like Asteraceae, Combretaceae and Verbenaceae closely followed by Solanaceae, Rutaceae and Acanthaceae. The number of medicinal plant species found in 10 different sacred groves studied is presented in Table 2. Although all sacred groves have been explored by the local communities for preparing folk medicine, however, there exists significant variation in species distribution by habit and extent of knowledge with the locals to better understand and utilize the medicinal plants as per their specific uses.

Sacred groves such as Maa Dwarapala, Maa Hansa debi, Maa Pitabali and Baba Kapileswar reportedly have more number of medicinal plant species used by local community. On the other hand, sacred groves such as Ram Mandir located in Raikia, Baba Dhabaleswar Rameswar Pithha in Tikabali and Pachamukhi Hanuman in Phulbani have less number of medicinal plant species traditionally used by the locals. Among the medicinal plants listed in Table 2, 50% are herbs, 30% are tree species, 15% are shrub and 5% are climbers

**Table 1.** Use of medicinal plants from sacred grove areas by the local people.

Local name	Scientific name	Family	Parts used	Uses
Agnijala	<i>Clausena excavata</i> Burm.f	Rutaceae	Root	Dysentery
Apamaranga	<i>Achyranthes aspera</i> L.	Amaranthaceae	Barks	Constipation and dysentery
Arjuna	<i>Terminalia arjuna</i> Wight & Arn	Combretaceae	Bark	Skin diseases and cardio tonic
Asoka	<i>Saraca asoca</i> (Roxb.)	Caesalpiniaceae	Bark	Tonic
Aswagandha	<i>Withenia somnifera</i> (L.)	Solanaceae	Root	Cough and fever
Aswastha	<i>Ficus religiosa</i> (L.)	Moraceae	Bark	Vomiting
Bahada	<i>Terminalia bellerica</i> (Gaerth.). Roxb	Combretaceae	Fruit	skin diseases and hair fall
Banakunduri	<i>Coccinia grandis</i> (L.)	Cucurbitaceae	Leaf	Jaundice
Basanga	<i>Adhathoda vasica</i> L.	Acanthaceae	Leaf	Cold fever and cough
Begunia	<i>Vitex negundo</i> L.	Verbenaceae	Leaf	Body pain
Bela	<i>Aegle mormelos</i> L.	Rutaceae	Leaf and fruit	Diarrhoea and indigestion
Bhang	<i>Cannabis sativa</i> Linn.	Cannabaceae	Leaf	Fever and indigestion
Bhejibaigana	<i>Solanum xanthocarpum</i> Schrad & Wendi	Solanaceae	Leaf and fruit	Fever
Bhuinnimba	<i>Andrographis paniculata</i> (Burm.f.) Wall	Acanthaceae	whole plant	Skin diseases and malaria
Bisalyakarani	<i>Tridax procumbens</i> Linn.	Asteraceae	Leaf	Wounds and burns
Brahmi	<i>Centella asiatica</i> (L.)	Apiaceae	Leaf	Headache and memory enhancement
Chara	<i>Buchanania lanzan</i> Sperg.	Sapotaceae	fruits	Indigestion
Dimiri	<i>Ficus recemosa</i> L.	Moraceae	Fruit	Headache
Dubaghasa	<i>Cynodon dactylon</i> (L.)	Poaceae	Leaf	Vomiting
Dudhi	<i>Euphorbia hirta</i> L.	Euphorbiaceae	Leaf and stem	Asthma
Hadajoda	<i>Cissus quadrangularis</i> L.	Vitaceae	stem	Bone fracture
Harida	<i>Terminalia chebula</i> Retz.	Combretaceae	Fruit	digestive problems
Kalamoricha	<i>Piper nigrum</i> L.	Piperaceae	Fruit	Cold, cough and indigestion
Kanchan	<i>Bauhinia variegata</i> L.	Fabaceae	Root	snake bite
Khiralai	<i>Hemidesmus indicus</i> (L.) R. Br	Asclepiadaceae	Root	Wound
Kuluchi	<i>Holarrhena pubescens</i> Wall.ex. DC	Apocynaceae	Root	Headache
Kumbhi	<i>Careya arborea</i> Roxb.	Lecythidaceae	Bark	Diarrhoea
Kumti	<i>Clerodendrum viscosum</i> Vent.	Verbenaceae	Leaf	Diabetes and dysentery
Lantana	<i>Lantana camara</i> L.	Verbenaceae	Leaf	Digestion and wounds
Mayurachulia	<i>Elephantopus scaber</i> Linn.	Asteraceae	entire plant	Head ache
Neem	<i>Azadirachtaindicaa</i> . Juss	Meliaceae	Bark, leaf	Skin diseases and malaria

Table 1 cont'd

Nirmuli	<i>Cuscuta reflexa</i> Roxb.	Convolvulaceae	Stem	Fever
Pita alu	<i>Dioscorea wallichii</i> Hook.f	Dioscoreaceae	Root	Body pain
Pokasungha	<i>Ageratum conyzoids</i> L.	Asteraceae	Leaf	Ulcer
Punarnova	<i>Boerhavia diffusa</i> L.	Nyctaginaceae	whole plant	Jaundice
Sal	<i>Shorea robusta</i> (Gaertn.f)	Dipercarpaceae	Bark, stem	Dysentery and ear pain
Satabari	<i>Asparagus recemosus</i> Wild.	Liliaceae	Root	Stomach pain and indigestion
Satyanasi	<i>Argemone maxicana</i> Linn.	Papaveraceae	Seeds and roots	Malaria and skin diseases
Sitaphala	<i>Annona squamosa</i> L.	Annonaceae	Fruit	Dysentery
Tulasi	<i>Ocimum sanctum</i> L.	Lamiaceae	Leaf	Cold, fever and indigestion

Table 2. Sacred grove wise medicinal plant species distribution in Phulbani Forest division of Odisha.

S/N	Name of sacred grove	FMU/Range	No. of medicinal plant species used by local people by habit				
			Tree	Shrub	Herb	Climber	Total
1	Panchamukhi Hanuman	Phulbani	5	3	8	1	17
2	Maa Pitabali Baba Kapileswar pitha	Phulbani	7	6	13	1	27
3	MaaHansadebi	Sudrukumpa	6	4	15	1	26
4	Maa Dwarapala	Sudrukumpa	5	4	17	0	26
5	Baba Akhandalamani	Phiringia	4	4	12	1	21
6	Baba Akhandalamani	Tikabali	5	3	7	1	16
7	Baba Dhabaleswar Rameswar pitha	Tikabali	4	5	7	0	16
8	Rameswar pitha	G. Udaygiri	5	6	5	2	18
9	Ram Mandir	Raikia	4	5	6	0	15
10	Mandusagiri Veda Bhawan	Raikia	6	3	10	0	19

(Figure 3). In total, these 40 medicinal plants are being used to cure 28 different diseases. Besides the ethno-botanical association, the locals also worship certain tree species such as *Ficus religiosa* (L.), *Aegle mormelos* (L.), *Shorea robusta* (Gaertn.f), *Saraca asoca* (Roxb.), *Terminalia chebula* Retz. and *Terminalia arjuna* in

the sacred grove areas considering the closeness of these species with the local deities.

## DISCUSSION

Odisha is well known for tribal communities with

62 tribes residing in more than 40% of the total geographical area of the state. In Kandhamal, 51.96% of the district population belongs to Kandha tribe (Rath, 2011). Sahu et al. (2013) reported that Kandhas have remarkable detailed knowledge of uses of medicinal plants with some major ailments and diseases such as cancer,



Figure 1. A view of a sacred grove in Phulbani Forest Division of Odisha.

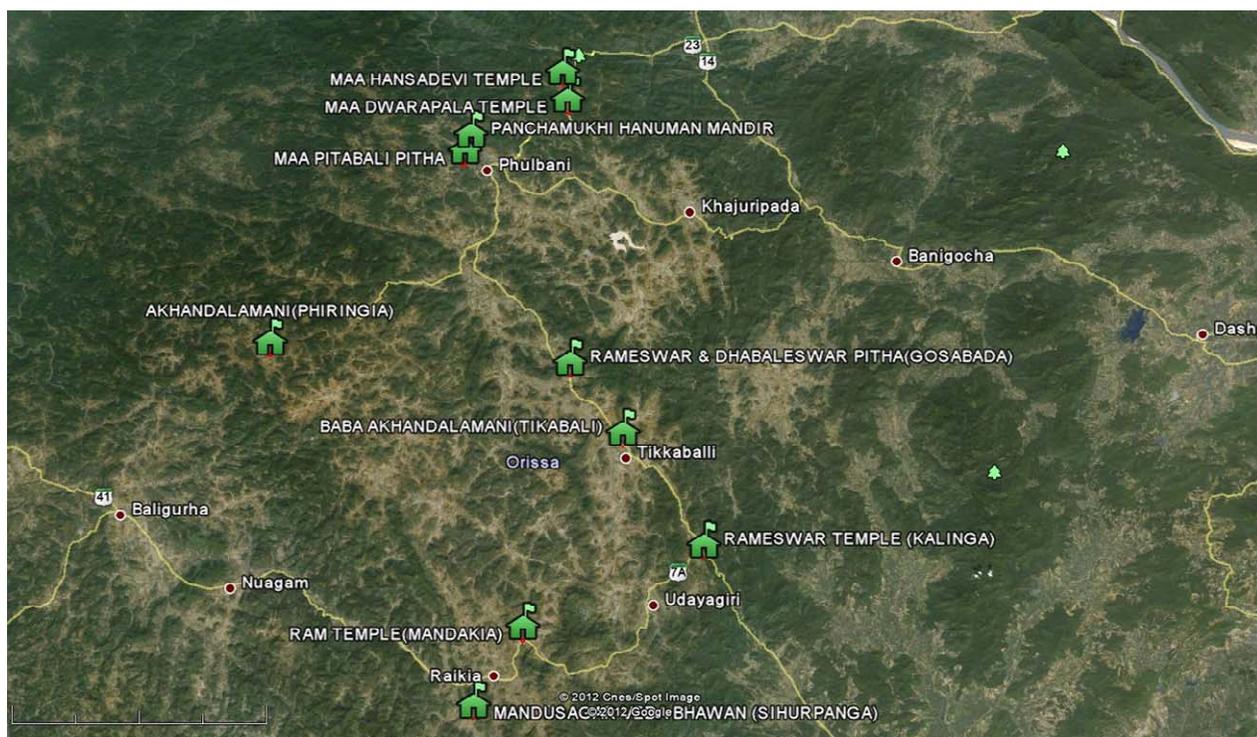
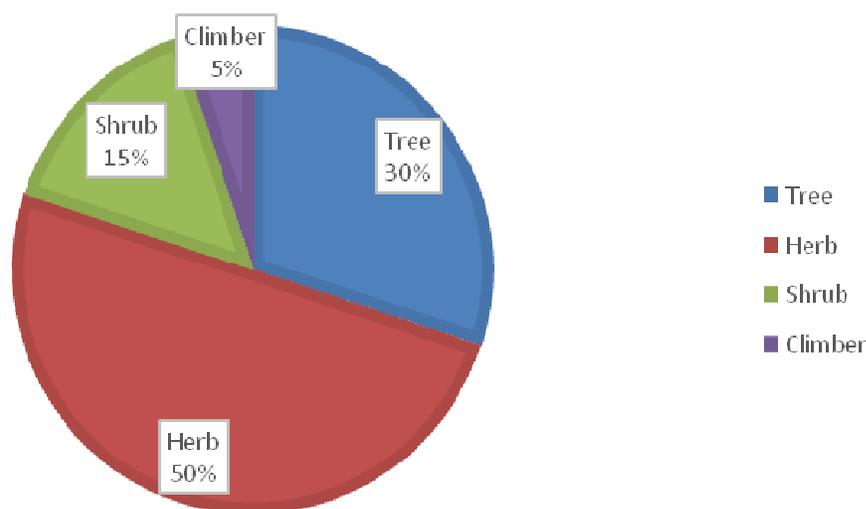


Figure 2. Google earth map of studied sacred groves in Phulbani Forest Divisions of Odisha.

heart diseases, kidney-stones, skin diseases, abortion inducing drugs, respiratory diseases etc. are being effectively treated using traditional knowledge and locally

available plant resources by Kondha community. The present study could come out with the same notion about the culture and traditional knowledge of kondha tribe. It



**Figure 3.** Percentage distribution of different category of medicinal plants in the sacred grove areas.

was found that the local communities with limited knowledge on medicinal uses of different plants depend largely on the sacred grove areas for preparing folk medicines. They are culturally enriched and traditionally trained to explore the uses of different medicinal plants as well as protecting the biodiversity richness and sacredness of these small patches of forests better known as sacred groves.

They use different parts of plants for preparing medicines for different ailments. Generally, leaves of different medicinal plants are used for preparing medicines for a number of diseases. Besides leaves, other plant parts like barks, fruits, stems and roots of different plants are also being used by the local vaidyas or herbal practitioners to treat a myriad of diseases. Medicinal plants such as *Tridaxprocumbens* Linn, *Terminalia bellirica* (Gaerth.). Roxb and *Vitex negundo* have common presence and maximum use by locals in almost all sacred groves studied. This seems to be because of traditional and common uses of these plants by the locals. Among the sacred groves, Maa Pitabali, Maa Dwarapala and Maa Hansa devi sacred groves were found to have maximum number of medicinal plants. Much of this is because of the fact that these are located away from the village (mostly inside the forest) and active participation of the villagers to guard the sacred grove areas. They are certainly aware of the medicinal uses of different plants though not all found in the sacred grove areas. Apart from curing common diseases like cold, cough, fever, diarrhea and indigestion, some critical ailments like cardiotoxic and stomach pain are also being treated by the use of herbal medicines. On the other hand, the reasons behind less occurrence and limited

exploration of medicinal plant species found in sacred groves such as Ram Mandir located in Raikia, Baba Dhabaleswar Rameswar Pithha in Tikabali and Pachamukhhi Hanuman in Phulbani are increased or unchecked movement by locals and outsiders in the sacred grove areas due to location along the road as well effect of modern culture which seems destroying to the tribal culture. The high rate of anthropogenic interventions has led to the narrowing of genetic base of medicinal plants in these important biodiversity rich areas.

All the sacred groves studied are managed by a local committee named as Sacred Grove Conservation Committee (SGCC) with both formal and informal arrangements. The collective understandings among them helped in developing strategy for effective management and conservation of these valuable plant species in the sacred grove areas. It was also found that in some cases, the villagers mostly the committee members have shared responsibilities among them for better safeguard of the sacred grove areas. They have also created certain rules which are binding in nature and any violations of these results in imposition of fines. The traditional practice of worshipping soil (Mati puja) and hills and mountains (Giridebata) by the locals better reflects their belief and traditional practices around natural resources. It is well established that the entranced cultural practices along with the ethno-botanical associations of the local people could decide the future sustainability in the management and conservation of medicinal plants while maintaining the ecological balance. It was also found that some of these sacred groves are critically threatened because of heavy soil

erosion influenced by undulating terrains. This is also adversely affecting regeneration of medicinal plants in the sacred grove areas. Above all, as mentioned earlier, the adulteration of tribal culture coupled with degradation of sacred grove areas due to edaphic, biological or anthropogenic causes could derail the path of sustainable use and conservation of medicinal plants, traditional knowledge and practice.

## Conclusion

The importance of sacred groves has been well recognized for effective conservation of both biodiversity as well as culture of the tribals. The sacred groves of Phulbani forest division of Odisha are repositories of important medicinal plants and represents ancient cultures of Kondha tribe associated with these forest patches. The existence of sacred groves is contributing immensely towards conservation of traditional knowledge and medicinal plants as both are interlinked. In order to sustain the flow of conservation benefits that emanated mostly from sacred grove areas, Government and Civil society organizations shall proactively guide and support the local communities for effective conservation of biodiversity and tribal culture. Furthermore, there is a need to assess the perceived threats to the sacred groves because of land degradation. This can help in designing effective strategies for better management and conservation of the sacred groves. The conservation efforts of local communities need greater recognition and appreciation. They shall be provided financial incentives for conservation efforts. Most importantly, they need training and demonstration on sustainable harvesting, collection, processing, regeneration and management of medicinal plants in the sacred grove areas. By addressing these critical concerns associated with conservation of sacred groves, we can ensure the sustainable use and conservation of medicinal plants.

## Conflicts of interest

The authors declare that they have no conflicts of interest.

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