

Ethnobotanical Survey on Trees of Seminary Hills, Nagpur (M.S.): An Approach Towards Plant Conservation

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Abstract

Seminary Hills (Latitude 21°9'57" North and Longitude 79°3'47" East) play an important role in maintaining ecological and environmental balance of the rapidly- growing Nagpur city. Majority of the area of Seminary Hills lie under protected forest area. Seminary Hills Forest represents the unique vegetation of tropical dry deciduous forest, and shows presence of trees like *Tectona grandis* L.f., *Butea monosperma* (Lam.) Taub., *Azadirachta indica* A. Juss., *Acacia catechu* (L. f.) Willd., *Anogeissus latifolia* (Roxb. ex DC.) Wall. ex Guill. & Perr., characteristics of tropical dry deciduous forest. The survey was conducted to explore the valuable tree species and enrich the knowledge of ethnobotanical plants in the area. Study revealed occurrence of 49 tree species belonging to 19 families in the area. Majority of the trees belong to the family Fabaceae (43%). Survey showed that virtually all the recorded tree species have medicinal and economical value. Stem/Bark (78%) of the plants was most useful part followed by leaves (59%), fruit and seeds (45%), roots (33%), flowers (29%), gum (12%). In 6% of the trees, all the parts were found to be useful. Knowledge gained about the diversity and uses of trees will generate awareness among people regarding importance and conservation of these plant species.



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Introduction


Since ancient times humans have been dependent on various plants for diverse needs viz. food, shelter, clean air, medicines. They play key role in regulating air quality, noise pollution, soil erosion, water quality and quantity and reduce the risk of flood, drought and They help in balancing oxygen and carbon dioxide

level in atmosphere, regulate earth's temperature and hydrologic cycle. Wood, which provides raw material for domestic and industrial processes, is the chief product of forests. Forests also are a source of medicinal plants that provide primary health care for majority of population in developing countries. Different plant parts such as bark, leaves,

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flowers, fruits, seeds are used to treat diseases viz. dysentery, diarrhoea, fever, cough, cold, bronchitis, diabetes, skin diseases. Natural plant products have been ascertained to be source of many newly synthesized drugs.¹ Miscellaneous products like bamboo, gums, resins, fibers, katha, some oils are also obtained from forests. Environmental practices which protect and restore forests are indispensable for human wellbeing and alleviation of poverty.

Floral diversity of forests encompasses various herbs, shrubs, trees and climbers. The dense coverage of plants helps in mitigating air pollution, balancing oxygen and carbon dioxide levels in atmosphere thus regulating earth's temperature.² Trees, a major component of forest flora, form a valuable natural resource from ecological and economical viewpoint. Trees store large amount of carbon and contribute significantly in carbon cycle dynamics in forests. Tree diversity has an impact on forest ecosystem stability and services. They are source of fruits, timber, fuel. They provide shade and act as wind breaks. Trees form an important part for water management, especially in an urban ecosystem.³ They also have religious importance and are used in many folklores. Ethnobotany has become a critical need of modern times as it deals with traditional and natural relationship between plant wealth and human societies including cultural beliefs, practices and conservation of environment. Ethnobotanical studies help in proper documentation of the age old knowledge of tribal people about the uses of various plants for human welfare.⁴

Nagpur is located in the Vidarbha region of Maharashtra. It has semi-arid climate with an average annual rainfall of about 1161.5 mm. Temperature of Nagpur during summer range from 28 °C (March) to 46 °C (May). Vegetation of Nagpur can be categorized into Hill forest, Savannah and Pond vegetation. Plant diversity of Nagpur includes 1136 plant species comprising of 679 genera & 142 families.^{5,6} Due to rapid expansion of the city and increased urbanization, it is witnessing increased air and water pollution, shrinking green areas, temperature extremes, increased flash floods.

Seminary Hills, often called as lungs of the Nagpur, play an important role in maintaining ecological

and environmental balance of the city. Major portion of Seminary Hills encompasses closed protected dense forest which has great floristic diversity. Seminary Hills Forest represents the unique vegetation of tropical dry deciduous forest. This study was conducted to explore the valuable tree species in the area. As participation of masses is important, this paper aims to create awareness among people regarding various uses of the trees and the need for their conservation which is an important component of sustainable development.

Materials and Methods

The selected study area Seminary Hills is located with Latitude 21°9'57" North and Longitude 79°3'47" East. Total area of Seminary Hills Reserve Forest is 174.97 Acres (Government Notification No.372-1502 XI of 43. Date 30/3/1944).⁷

To study the trees belonging to different families in Seminary Hills Nagpur, extensive field visits were carried out in the areas like SFS Arboretum, Deer Park, Lourd Mata Temple, Telangkhedi and Childrens' Park during 2021-22.

The plants were observed in their natural habitat and the data was collected. The digital photographs of trees were taken with their unique characteristics that can help in identifying the plants in the natural habitat.

The identification of various tree species has been done using standard literature, floras, research papers and reports.^{5,8,9} The earlier published scientific literature sources were referred for corroborating the ethnobotanical uses of the recorded tree species.^{10,11,12}

Results and Discussion

Seminary Hills, Nagpur has rich vegetation comprising of diverse trees. Floristic study revealed 49 tree species belonging to 19 families in the area. Present report is a result of exhaustive survey of tree species along with their ethnobotanical importance. Highest representation was found to be of family Fabaceae (43 %) with 16 genera and 22 species (Fig. 1). In Nagpur, Fabaceae is a dominant and widely distributed family in other locations also.¹³ (Dulare *et al.* 2021)

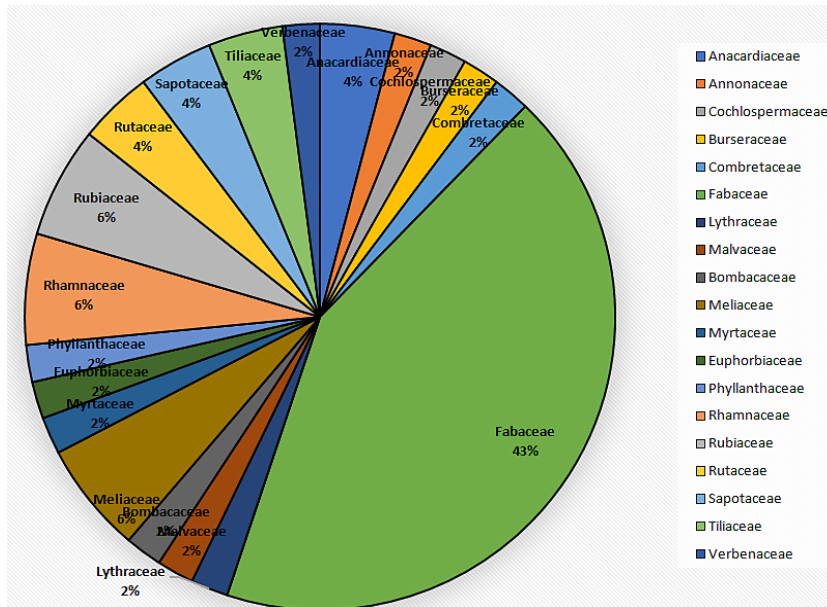


Fig. 1: Percent representation of Trees belonging to different families

Tree species recorded include diverse trees of economic importance like *Azadirachta indica* A. Juss., *Tamarindus indica* L., and *Mangifera indica* L. (Table 1.). All the tree species have medicinal and economic value. Region showed majority of trees

like *Tectona grandis* L, *Butea monosperma* (Lam.) Taub. in Engl. & Prantl., *Azadirachta indica* A. Juss., *Acacia catechu*, and *Anogeissus latifolia* (Roxb. ex DC.) Wall. ex Guill. & Perr. characteristic of tropical dry deciduous forest.

Table 1: Tree diversity in Seminary Hills, Nagpur along with their ethnobotanical uses.

Family	Trees Species	Vernacular Name	Plant Part used	Ethnomedicinal uses	Other uses
Anacardiaceae	<i>Lannea coromandelica</i> (Houtt.) Merr.	Mohin	Leaves, bark, stem and gum	Bark is used in ulcers, wounds, ophthalmia, gout, dysentery, diarrhea and mouth sores. The leaves are useful in elephantiasis, inflammations, neuralgia, sprains and bruises. ¹⁶	Used in plywoods
	<i>Mangifera indica</i> L.	Aam, Amba	Bark, leaves, roots, fruits, seeds, and flowers	The roots and bark are useful in leucorrhoea, syphilis, wounds, ulcers, vomiting, The leaves, flowers and seeds are used in burning sensation, haemorrhages, wounds, ulcers, diarrhoea and dysentery. Fruits are used in sunstroke, ophthalmia, eruption, intestinal	Shade tree

Annonaceae	<i>Polyalthia longifolia</i> (Sonn.) Thw.	Ashok	Bark	disorder, in fertility, night blindness. ¹⁷ The bark is used as antipyretic, cutaneous problems, diabetes, hypertension and helminthiasis. ^{10,18}	Ornamental, Avenue plantation
Cochlospermaceae	<i>Cochlospermum religiosum</i> (L.) Alst	Ganeri, Galgal	Fruits, roots, gum, bark and leaves	The plant has properties like sedative, stimulant and is used in treatment of jaundice, cough, trachoma, etc. Young leaves are used for washing hairs. Gum is used in pharyngitis, dysentery, diarrhea, asthma, eye problems and stomachache. ^{10,19}	
Burseraceae	<i>Boswellia serrata</i> Roxb. ex Colebr.	Salai	Bark, Gum - oleoresin	The bark is used against dysentery, ulcers, skin diseases, and Gum is useful in treatment of fevers, dysentery, bronchitis, asthma, haemorrhoids, cough. ¹⁰	
Combretaceae	<i>Anogeissus latifolia</i> (Roxb. ex DC.) Wall. ex Guill. & Perr.	Dhawda	Root, leaf and fruit	The roots are used in abdominal disorders and the bark is used in wounds, ulcers, inflammations, diabetes, dysentery, skin diseases and leprosy. The fruits are useful in treatment of diarrhoea and dysentery. ¹¹	Fuel, timber, dye
	<i>Terminalia elliptica</i> Willd.	Asan, Ain	Bark	The bark is styptic and cardiogenic. The gum exudates from the stem bark is medicinally useful as a purgative. ²⁰	Fuel, tool handles
	<i>Terminalia catappa</i> L.	Jangli-badam	Leaves, bark and fruit root	The bark is astringent, diuretic and cardiogenic. Leaves are used in headache, colic and skin ailments viz. scabies, leprosy. Fruit is astringent, aphrodisiac; used in bronchitis. ¹¹	Avenue
Fabaceae	<i>Acacia catechu</i> (L. f.) Willd.	Khair	Bark, heart wood, flowers	The bark is used in diarrhea either alone or in combination with cinnamon or opium. It is also used in skin ailments, sore throat, bronchitis, digestive problems, ulcers, boils and inflammations. ^{11,21}	Dye yielding

<i>Acacia leucophloea</i> (Roxb.) Willd.	Himvar,	Bark.	The bark is astringent, styptic, anthelmintic, demulcent, expectorant. It is used in bronchitis, cough, vomiting treatment of wounds, ulcers, dysentery, dental caries, oral ulcers and fevers. ²¹	Dyes and tannins
<i>Albizia lebeck</i> (L.) Benth.	Mothasiras	Seeds, bark, flowers, leaves.	Bark is used in skin diseases, leucoderma, diarrhea, bronchitis and all types of poisoning. Oil from the seeds, is useful in leprosy. ¹¹	Shade, wood for construction, furniture and veneer
<i>Albizia odoratis</i> (L. f.) Benth.	Siris	Bark, leaves.	The bark is useful in skin ailments, diabetes. Leaves are used in cough, bronchitis. ¹¹	Timber,
<i>Albizia procera</i> (Roxb.) Benth.	Safed siris	Leaves	The leaves are insecticide and are used as dressing in ulcers. ¹¹	Furniture, construction, agricultural implements
<i>Bauhinia racemosa</i> Lam.	Apta,	Gum, leaves.	The root bark is astringent, used in diarrhea and dysentery. Leaves given in diarrhea with onion, also decoction of leaves used in malaria. ¹¹	Fibre, agricultural implements.
<i>Bauhinia purpurea</i> L.	Kanchan	Bark, root, flowers.	The roots are carminative. The bark is used to relieve diarrhea. Flower buds are laxative and anthelmintic. ¹¹	Tan, dye
<i>Butea monosperma</i> (Lam.) Taub.	Palas,	Gum, leaves, flowers, seeds	The bark is used in diarrhea, dysentery, rectal diseases, etc. leaves are used in diseases of the eye. The gum is used in dysentery, stomatitis, cough, excessive perspiration. the flowers are used in leprosy, gout, skin diseases, thirst, burning sensation. ¹⁰	Timber, plates, resin, fodder and dye.
<i>Cassia fistula</i> L.	Amaltas	Root-bark, flowers, bark, leaves, roots	The bark is used in boils. The leaves and flowers are used in skin problems. The fruits are abortifacient, diuretic, purgative and anti-inflammatory. ¹¹	Ornamental, timber
<i>Cassia siamea</i> Lam.	Kassod	Bark, Leaves	Aerial parts are useful in ringworm, skin diseases. They are antinociceptive and antiviral, antioxidant	Timber

<i>Dalbergia sisso</i> Roxb. ex DC.	Sisam	Bark, roots, leaves, mucilage.	and antihypertensive. ²² The bark and wood are tonic, abortifacient, aphrodisiac, anthelmintic, antipyretic, expectorant, appetizer, vomiting, burning sensation. It is used in skin ailments, problems of the anus, ulcers, blood ailments, digestive problems. The leaves are used for eye diseases. ¹⁰	Timber
<i>Delonix regia</i> (Boj. Ex Hook.) Raf.	Gulmo har	Bark, Leaves, fruit, seeds	The plants are used as anti-rheumatic and spasmogenic. The bark is used as antiperiodic and febrifuge. The leaves are used in constipation, inflammation and arthritis. Aqueous and ethanol extract of flowers are used against round worms. ²³	Ornamental. Avenue plantation
<i>Gliricidia sepium</i> (Jacq.) Kunth ex Walp.	Undir mari	Leaves, barks, roots	The leaves and bark are used as antimicrobial, antibacterial and anti-inflammatory. ²⁴	Timber
<i>Hardwickia pinnata</i> Roxb. ex DC.	Anjan	Balsam, roots, leaves, bark, seed, wood	Bark is used in the treatment of diarrhea, worms, indigestion and leprosy. Balsam resin is used in leucorrhoea, chronic cystitis and gonorrhoea. Seed used in dysentery. Leave are used, as purgative and in constipation. ²⁵	Timber
<i>Leucaena leucocephala</i> (Lam.) de Wit.	Safed Babool, Subabul	Leaves, Seeds	The seeds are used as antidiabetics, stomachache reliever, contraceptive, abortifacient and antioxidant. ²⁶	Timber, Avenue tree
<i>Peltophorum pterocarpum</i> (DC.) Baker ex K. Heyne	Peela gulmohar	Bark, stem, leaves, flowers	The bark is used in dysentery, toothache, eye troubles, muscular pains, sores. Leaves are used in skin disorders. Flowers are used as an astringent, in eye troubles, muscular pains and sores. ²⁷	Avenue tree
<i>Pithecellobium dulce</i> (Roxb.) Benth.	Jangal Jalebi	Bark, fruits	The root-bark is used as astringent, febrifuge, anti-dysenteric. The seeds are used in inflammation. ²⁸	Ornamental, shade tree
<i>Pongamia pinnata</i> (L.)	Karanja	Leaves, roots,	The roots are used for ulcers, cleaning teeth,	Oil obtained from seeds

	Pierre		bark and seeds	strengthening gums and gonorrhoea. The bark is used in beri-beri, ophthalmology, dermatopathy, and ulcers. Leaves are used in diarrhea, leprosy, dyspepsia and cough. Flowers are used in diabetes. The seeds are used in inflammation, chronic fevers, anaemia and hemorrhoids. The oil is used in ophthalmia, leprosy, ulcers, herpes and lumbago. ²⁹	
	<i>Pterocarpus marsupium</i> Roxb.	Beeja, Vijaysar	Gum	The gum is laxative, anthelmintic, leukoderma, urinary discharges, anal troubles, leprosy, eye troubles and elephantiasis. ¹⁰	Timber
	<i>Samanea saman</i> (Jacq.) Merr.	Rain tree	Root, Bark, leaves	Useful in cold, headache, diarrhoea, stomach-ache intestinal problems. ³⁰	Timber, shade tree
	<i>Tamarindus indica</i> L.	Chincha	Bark, leaves, flowers, fruits, seeds	The bark is used in paralysis, urinary discharges and gonorrhoea. The leaves are used in inflammations, tumours, ringworm, blood ailments, smallpox, eye problems, earache, snake bite. The fruits are laxative, used in liver complaints, skin diseases, mouth sores, scorpion-sting. ¹¹	Shade tree, edible fruits
Lythraceae	<i>Lagerstroemia reginae</i> Roxb.	Jarul	Root, bark, Leaves	Roots are used in mouth ulcers. Bark is used as stimulant, abdominal pains reliever and antipyretic. The leaves are diuretic and decongestant and are used in diabetes mellitus. ³¹	Ornamental, Avenue tree
Bombacaceae	<i>Bombax cieba</i> L.	Kaate Saanvar	Root, bark, flowers and fruit	Roots are stimulant, demulcent and tonic and are used in dysentery. The flowers are in skin troubles. Fruits are used as stimulant, diuretic, tonic, aphrodisiac, expectorant. ¹⁰	Ornamental
Malvaceae	<i>Sterculia urens</i> Roxb.	Kulu, Kondol	Leaves and tender branches	Pulverized bark is given to women to facilitate delivery. Leaves and tender shoots are used for pleuropneumonia in cattle. ¹⁰	Gum

Meliaceae	<i>Azadirachta indica</i> A. Juss.	Kadun imb	Bark, stems, leaves, fruits, flowers, seeds	Bark is useful in leprosy, cutaneous ailments, diabetes, cough and bronchitis. Leaves are used in burning sensation, leprosy, skin diseases, intestinal worms. Flowers are used in dyspepsia and general debility. Fruits are used in skin diseases, tumors, piles, toothache. The oil from seeds is anthelmintic, used in skin diseases. ^{10,15}	Timber, Firewood, Medicinal, Bioinsecticide
	<i>Melia azedarach</i> L.	Mahan imb	Root-bark, leaves, fruit, flowers	The root are astringent, anthelmintic, used in vomiting, skin diseases, belching, blood impurities, ulcers, headache, post-delivery uterine pains, fever, burning sensations, urinary discharges, lung problems. ¹⁰	Agricultural implements, furniture, plywood
	<i>Soymida febrifuga</i> (Roxb.) A. Juss.	Rohani	Bark	The bark is used in fevers, asthma, cough, removes blood impurities, ulcers, leprosy, dysentery, vaginal infections, ulcers. ¹⁰	Timber, tan, dye
Myrtaceae	<i>Psidium guajava</i> L.	Peru, Amrood	Leaves, fruit	The extract of the leaves is used for treating diarrhea, coughs, stomachache, toothaches and dysentery. Fruit is laxative, used in thirst, colic and in bleeding gums. ¹¹	
Euphorbiaceae	<i>Bridelia retusa</i> (L.) Spreng.	Asana, Kaji	Root, bark	The bark and root are astringents. The bark is useful in urinary concretions and in rheumatic diseases. ¹²	Implements for farming
Phyllanthaceae	<i>Cleistanthus collinus</i> Willd.	Garari	Bark, leaves	The fruit and bark are used in skin ailments. Leaves soaked in water are used to bath the head and upper body parts to relieve headache. ¹²	Agricultural implements
Rhamnaceae	<i>Ziziphus mauritiana</i> Lam.	Bor, ber	Root, bark, leaves, fruit	Fruits are used as an antidote to aconite-poisoning and used in nausea and vomiting, abdominal pain in pregnancy. ³²	Tool manufacturing, edible fruit
	<i>Zizyphus xylopyrus</i> (Retz.) Willd.		Root, stem, bark, leaves, fruits, seeds	Alcoholic extract of the bark has anti-convulsant and anti-inflammatory properties. ³³	
Rubiaceae	<i>Gardenia resinifera</i>	Dikam ali		The gum is antimicrobial, anthelmintic; also useful in	Gum

	Roth <i>Mitragyna parviflora</i> (Roxb.) Korth.	Kaim	Root, Bark, leaves, fruits	skin or cutaneous diseases. ³⁴ The roots and bark are used in colic and fever. Bark is used in muscular pain. ¹¹	Timber
	<i>Neolam arckia kadamba</i> Roxb	Kadamb	Bark and Leaves.	The bark is tonic, antipyretic, anti-inflammatory, digestive, relieves flatulence, diuretic, used in cough. The leaves are useful in ulcers, wounds, and metorrhoea. ³⁵	Timber
Rutac eae	<i>Chloroxylon swietenia</i> DC.	Bhirra	Bark and leaves.	The bark is astringent. Leaves are useful in rheumatism and wounds. ¹⁰	Timber
	<i>Citrus auranti folia</i> (Christm. & Panz.) Swingle	Nimbu	Fruit, leaves	Fruit has anti-cancer, antimicrobial, antioxidant, antiulcer, anti-inflammatory, antityphoid and hepato protective properties. The rind of fruit is anthelmintic, stomachic and carminative. It is used rheumatism, dysentery and diarrhea. Lemon juice is useful in scabies. ^{10,36}	Edible fruits
Sapota ceae	<i>Madhuca longifolia</i> (Koen.) Mac. Bride	Mahua	Young plants, leaves, stems, barks, roots, fruits, flowers, seeds	The flowers are used in tonsillitis, pharyngitis and bronchitis, The bark is used for rheumatism, bronchitis, diabetes mellitus, bleeding and spongy gums, swelling, fractures, snake- bite poisoning. Leaves are used in bronchitis, dermatopathy, rheumatism, cephalgia and hemorrhoids. Fruits are astringent and used in ulcer, tonsillitis and pharyngitis. The seeds are used in skin disease, rheumatism, headache, laxative, piles and galactagogue. ³⁷	Plates, Oil obtained from seeds
	<i>Mimusops elengi</i> L.	Bakul	Root, bark, leaf, flower, fruit, seeds	The bark, is used as cardiatonic, antihelmentic, astringent and in diseases of gums and teeth. Flowers are used to cure diseases of the blood. The seeds are used to fix loose teeth. ¹¹	Essential oil
Tiliaceae	<i>Grewia tilifolia</i>	Dhamani	Bark and wood.	The bark is useful in burning sensation, cough, wound	Fibre, wood

Verbenaceae	<i>Tectona grandis</i> L. f.	Sagwan or Sag	Wood	healing and diseases of the blood. ¹⁰ The bark is useful in bronchitis and skin ailments. The wood is pungent, cooling; laxative; sedative to the gravid uterus; used in digestive issues and piles. ¹²	Timber, Dye yielding
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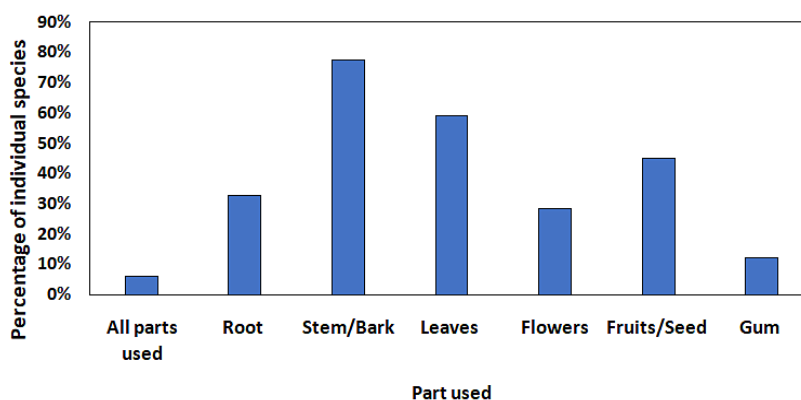


Fig. 2: Distribution of the taxa based on part used

In present study, stem/bark (78%) of the plants were found to be most useful part of ethnobotanical importance followed by leaves (59%), fruits/seeds (45%), roots (33%), flowers (29%) and gum (12%) (Fig. 2). Out of total trees enumerated, in 6% of trees all parts were found to be economically important (Fig. 2). Forest and forest products form one of the most important natural resource. One tree species viz. *Sterculia urens* was found to be endemic to Seminary Hill forest. In recent times, natural forest cover is shrinking at an alarming rate owing to accelerated exploitation and misuse, conversion to agriculture fields and industrialization. Denudation of forests pose severe threat to the environment and mankind in terms of loss of biodiversity and many valuable plant species. Hence, there is an urgent need for creation of public awareness.

Trees besides having medicinal importance also have value for beautification, provides shade, cooling effect, source of economically important products like timber, gum, resins, rubber.¹⁴ Presence of cultivated exotic tree species like *Tectona grandis* L. f., which dominates the area at present may

change the functional activity and food chain of terrestrial ecosystems in near future. These exotic species may affect the native flora and fauna.

Ethnobotany plays a pivotal role in conserving plant diversity and also in educating people about the significance and role of plants to modern civilized society, which is very important for sustainable use. This indicates the close relation between human existence and ethnobotany. The plants which are useful in various ways to the mankind are cultivated and conserved for future use. Many trees are cultivated for its ethnomedicinal purposes by local *Vaidus* as well as the people engaged in ayurvedic medicines. Keeping this in view, during floristic investigation, economic importance of different tree species found in the area was conveyed to local people and they were apprised about the importance of conservation of tree species for future sustainable development.^{4,15}

The species recorded during this study with special reference to their uses for the mankind will encourage people for management, plantation

and conservation of these tree species for future benefits as well as to the researchers in plant sciences. This study will further benefit in research and commercialization of valuable products obtained from them. Documentation of these plants is very much required as information is lost when indigenous knowledge is transferred verbally from one generation to other.

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Conflict of Interest

The authors declare no conflict of interest

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