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Ethno-medicinal plants in waghai forest in Dang's district, South Gujarat, India

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Abstract
The present paper deals with the ethno-medico-botany of Dangs forest, extreme northern part of Western Ghats, South Gujarat. About 86 plant species belonging to 75 genera and 36 families have been enumerated with knowledge of the tribals for their economic as well as medicinal values in curing various diseases like Asthma, Bronchitis, Cough, Diabetes, Diarrhoea, Fever, Jaundice, Skin diseases Urinary troubles, etc. During 1 yearsurvey, information on ethnobotanically important plant species were documented including family, genera, species, habit, vernacular name and part of the plant used with the ailment for which administered are tabulated.

Keywords: ethnobotany, economic plants, medicinal plants, dangs forest, western ghats

Introduction
The Dangs forest falls on the extreme northern part of Western Ghats. Our knowledge on the vegetation of Western Ghats region is largely derived from the previous work of Nair and Daniel (1986) and few others [1]. The recent work on the Western Ghats were carried out by Gadgil (1991-1996) [2, 6] and Nirmal Kumar *et al*. (1998-2002) [7, 12] covering various aspects of floral and faunal diversity, socio-cultural status and ethnobotany in the forests of Dangs district of Gujarat State. Also in past, Yadav and Mathew (1994) [13] investigated phyto geographical components in terms of western and eastern elements of Rajpipla forest of South Gujarat. The eastern part of Gujarat State was extensively studied by Parabia *et al*. (1978) [14] with respect to the ethnobotanical and medicinal values of various plant species.
In past, some ethnobotanical studies in Gujarat were carried out at by Gopal (1983) [15] and Reddy (1986) [16]. More than 41 million people of different ethnic groups of different ethnic origins, belonging to various social communities following varied religious beliefs, inhabit the Gujarat State. Of which, tribal population spread over 8 districts predominantly inhabits the forest areas all along its southeastern boundary. These tribal people mainly depend on forest produce for their shelter, housing material, food, fuel, fiber and feed. Thus, the dependence of tribals on forests is almost total and inseparable. But presently these forests are degrading to a large extent in country and various parts of State poses large loom of threats. It is very necessary to explore certain pockets associated with local inhabitants of forest areas of Dangs district, which falls on the extreme northern part of Western Ghats with respect to the utilization of existing floral elements having some ethno-medico-botanical values by local tribe. Therefore the present study has been carried out to focus a light on existing floral diversity with special reference to its ethnobotany holding economic and medicinal values, found in different forest areas fall under north extreme part of Western Ghats.

Methodology
Several field trips were conducted in study area throughout the study period. Discussions were made at times with all possible informants like village head, local herbal doctors, vaidyas, priests etc., not only for gathering information but also for conforming values and uses of same plants recorded from different informants at different places. The information was also documented with the help of recording through voice recorder on the spot.
Associated with the ethno-medicinal and economic values of plants, local names were collected. Discussions and communications were made in Gujarati, a mother tongue of Gujarat State to avoid the perplexity in collecting data from local people. In some of the interior parts of lower Dangs region, and in core areas of Waghai forest, where the tribes do not speak Gujarati and are accustomed with slangs only, local guides were engaged in translating the information at possible extent. For an appropriate documentation of existing information on interaction between tribal folk and prevailing floral diversity in study areas, the methodology has been adopted from Cotton (1997) [17]. A systematic position of each recorded floral taxa within the study area was Conformed by literature review by Cooke (1901-03) [18], Patel (1971) [19] and Shah (1978) [20].

Results and Discussion
Ethno-medico-botanical survey of forest pockets of northern extreme part of Western Ghats revealed the occurrence and utilization of 86 plant species represented by 75 genera and 36 families exhibiting family: genera: species ratio of 1:2.08:2.39 (Table 1).

Table 1: Economic and medicinal uses of plant species by local tribes of study area.

Family	Species	Habit	Local Name	Economic Value		Medicinal Value		
				Part/s	Uses	Part/s Used	Form	Ailment
Acanthaceae	*Adhatoda vasica L.*	S	Ardusi		Eating	Lv, Rt	D	Asthma, Bronchitis, Cough, Skin diseases
	Barleria prionitis L.	S	Kanto Seriyu, Pilo			Rt	Ps	Boils
Amranthaceae	*Achyranthes aspera L.*	H	Aghedi, Aghedo, Janjiro			Rt	Ps	Scorpion sting
	Celosia argentea L.	H	Lompdi, Lambdi, Ukhardo	Pd	Eating	Lv	Ps	Skin diseases
Anacardiaceae	*Lannea coromandelica Houtt.*	T	Modad, Mavedo, Mavedi, Moyno	Wd	Packing cases	Bk	G	Cuts & Wounds
	Mangifera indica L.	T	Ambo	Wd	Interior construction work, Agricultural implements, Packing cases	Bk	Sp	Scorpion bite
				Br, Lv	Decoration in marriages & festivals			
Annonaceae	*Miliusa tomentosa Roxb.*	T	Umbh, umbhi, Umbhdi	Wd	Rafters, Agricultural implements			
	Polyalthia longifolia Sonn.	T	Asopalav	Lv	Decoration in marriages & festivals			
Apocynaceae	*HollarhenaantidysentericaHyne ex Roth.*	T	Indrajav, Dudhi	Wd	Tanning, Furniture	Bk, Sd	D	Diarrhoea, Dysentery, Bladder stone
	Wrightia tinctoria R. BR.	T	Kaloindrajav, Kudo, Bhurali, Dudhlo, Mitho indrajav			Bk	Lx	Cuts & Wounds
Arecaceae	*Phoenix acaulis Roxb.*	T	Bhoinkhajuri	Lv	Mats, Brooms	Bk, Lv	Ps	Lactation
	P. sylvestris L.	T	Khajuri, Tadi	Lv	Mats, Brooms, Hand fans			
				Pt	Ropes			
Asteraceae	*Sphaeranthus indicus L.*	H	Gorakh mundi, Bhurandi	WDP	Insect repellent in granary			
	Vernonia cinerea L.	H	Sahadevi, Sedardi			Lv	Ps	Wounds & Sores
	Xanthium strumarium L.	H	Gadariyu			Lv, Rt	D	Leucorrhoea, Urinary & Kidney diseases
Bignoniaceae	*Oroxylum indicum L.*	T	Tetu, Tentu, Aralu			Fr	D	Stomachache
	Soymida febrifuga Roxb.	T	Rayan, Rohan			Bk	D	Skin diseases, Swelling
	Tecomella undulata Sw.	S	Rohan			Bk	D	Skin diseases, Swelling
Bombaceae	*Bombax ceiba L.*	T	Semdo, Shimdo	Wd	Matches, Match- boxes, Packing cases, Curbs	Rt	D	Urinary trouble
				Ct	Stuffing Pillows & Mattresses			
Burseraceae	*Garuga pinnata Roxb*	T	Kakad, Kadakdo	Wd	Packing cases, Fuel	Bk	D	Leucorrhoea
Cesalpiniaceae	*Bauhinia purpurea L.*	T	Kanchner, Champakathi	Twg	Agricultural implements	Bk	D	Body pain, Fever
	B. racemosa Lam.	T	Asortri, Apto	Lv	Bidis	Bk, Rt	D	Diarrhoea
	Cassia fistula L.	T	Garmalo, Bhava	Wd	Agriculture	Rt	Ps	Inflammation
	C. tora L.	H	Puvadiya, Kuvandio			Lv	Ps	Skin diseases
	Tamarindus indica L.	T	Aamli	Wd	Cartwheels, Rice pounders, Oil mills	Bk	D	Diarrhoea
	Cleome viscose L.	H	Talavani, Pilitalavani			Lv	J	Earache
Capparaceae	*Anogeissus latifolia Roxb.*	H	Dhavdo, Dhamod	Wd	Cart axels, Tool handles, Charcoal	Bk	D	Cough
Combretaceae	*Terminalia arjuna Roxb.*	T	Arjun sadad, Safed Sadad	Wd	Furniture, Constructing houses, Agricultural implements	Lv	D	Hair-wash
	T. belliricaGaerth.	T	Bahedo, Baheda	Wd	Packing cases	Bk	G with W	Urinary disorders
	T. cattapa L.	T	Badam	Fr	Eating			
	T. crenulata Roth.	T	Sadado, Sadad	Wd	Construction, Wooden piles, Oil pounder piles, Charcoal	Lv	Ps	Hair-wash
Convolvulaceae	*Ipomoea aquatica Forsk.*	H	Nalini bhaji	Lv	Eating			
	I. batatas L.	H	Shakkariyu	Rhz	Vegetable			

Dioscoriaceae	*Dioscoreaalata L.*	TW	Ratalu	Rhz	Vegetable			
	D.hispida Dennst.	TW	Junglikand	Rhz	Vegetable			
Euphorbiaceae	*Bridelia retusa L.*	T	Asan, Monj	Wd	Agricultural implements	Bk	D	Rheumatoid Arthritis
	Phyllanthus emblica L.	T	Aamlu, Aambda	Fr	Eating, Tanning			
	Securinegavirosa L.	S	Pichrun, Safed fali	Wd	Agricultural implements			
Ebeneaceae	*Diospyros melanoxylon Roxb.*	T	Timru	Wd	Construction	Rt	D	Syphilis
Ehretiaceae	*Cordia dichotoma Forst.*	T	Gundo, Moto gundo	Fr	Preparation of Pickle	Fr	D	Dysentery
Liliaceae	*Asparagus racemosusWilld*	S	Shatavari, Shatmuli			Rt	D	Dysentery
Mimosaceae	*Acacia catechu Willd.*	T	Khair, Kair	Wd	Agricultural implements, Preparation of *Katho*used in *Pan*			
	Albizia lebbeck L.	T	Siris, Kalosares	Wd	Furniture, Construction, Carving, Paneling, Cane crushing	Bk, Lv	D	Stomachache, Dysentery
	A. proceraRoxb.	T	Kilai, Kelai	Wd	Carts, Beams, Rice pounders	Lv	Ps	Hair-wash
				Bk	Fish poison			
	Pithecellobium dulce Roxb.	T	Gorasamli, Vilayatiamli	Fr	Eating			
Malvaceae	*Sida cordifolia L.*	S	Bala, Baladana			Rt	Ps	Wounds, Bruises & Lesions
	Thespesia populnea L.	T	Paras piplo			Fl, Fr, Rt	Ps	Skin diseases
Meliaceae	*Azadirachta indica A. Juss.*	T	Limdo, Neem	Wd	Agricultural implements, Construction	Lv	D	Fever
				Twg	Tooth brushing as *Datan*			
				Sd	Preparation of Soaps & Cosmetics			
Menispermiaceae	*Cissampelos pareira L.*	CL	Pahad vel, Venivel			Rt	D	Gastric troubles
	Cocculus hirsutus L.	S	Vasan, Tanvel, Vevdi vel			Rt	D	Kidney troubles, Skin diseases
Moraceae	*Ficus racemosa L.*	T	Umro, Umbar	Fr	Eating	Bk	Lx	Diarrhoea, Piles
	F. religiosa L.	T	Pipdo, Peepal			Rt	D	Cough, Asthma
						Bk	Ps	Skin diseases
Myrtaceae	*Eucalyptus globules Labill.*	T	Nilgiri	Wd	Timber, Fuel, Paper pulp	Lv	D	Cough, Cold
	Sygyziumcumini L.	T	Jambu, Jamun	Fr	Eating	Sd	Pwd	Diabetes
				Wd	Agricultural implements, Carts			
Oleaceae	*Schrebera swietetenoides Roxb.*	T	Mokha, Mokh	Lv	Eating			
				Fr	Preparation of Pickle			
Papilionaceae	*Abrus precatorius L.*	TW	Chanothi	Lv	Eating	Lv	Ps	Local pains, Swellings, Rheumatoid Arthritis
	Butea monosperma Lam.	T	Khakhro, Palas, Kesudo	Wd	Curbs, Wooden Piles	Rt	D	Urinary trouble
	Cajanus cajan L.	S	Tuver, Tuvero	Sd	Eaten as *Dal*	Sd	Pwd	Sty
	Cicer arietinum L.	H	Chana	Green Pd	Eating			
	Crotalaria juncea L.	S	Shan, Shun	Fb	Ropes	Lv	Ps	Skin diseases
	Dalbergia latifolia Roxb.	T	Sisam	Wd	Furniture, Agricultural implements, Cartwheels	Bk	D	Fever
	Lablab pupureus L.	TW	Val, Valpapdi	Pd	Eating	Sd	Pwd	Sty
	Ougeinia oojenensis Roxb.	T	Tanachh	Wd	Furniture, Agricultural implements, Cartwheels	Bk	D	Dysentery
	Pongamia pinnata L.	T	Karanj, Kanaj			Lv, Rt, Sd	Ps	Skin diseases
	Pterocarpus marsupium Roxb.	T	Biyo	Wd	Furniture, Agricultural implements, Cartwheels	Bk	D	Dysentery
	Vigna radiata L.	H	Adad, Audad	Sd	Eating	Sd	D	Antisedative
	V. unguiculata Walp.	H	Mag, Mung	Sd	Eating	Lv	Ps	Head cooling
Poaceae	*Bambusa arandinacea Retz.*	S	Kanti Vans	Wd	Baskets, Mats, Hut construction			
	Dendrocalamus strictus Nees.	S	Manvel Vans	Wd	Baskets, Mats, Hut construction			
Rubiaceae	*Adina cordifolia Roxb.*	T	Haldu, Haldarvo	Wd	Furniture, Agricultural implements, Cartwheels			
	Anthocephalus indicus Rich.	T	Kadamb, Kadam	Wd	Packing cases, building Canoes			
	Hymenodictyon excelsum Roxb.	T	Kadvai, Boisal	Wd	Agricultural	Lv	Ps	Scorpion bite

					implements, Toys			
	Mitragyna parvifolia Roxb.	T	Kalam	Wd	Buildings, Bobbins	Lv	J	Jaundice
	Morinda tomentosa Heyne ex Roth.	T	Aal, Aali, Aaledi	Wd	Agricultural implements, Dishes	Bk	D	Stomachache
	Xeromphis spinosa Thunb.	S	Mindhal, Mindhol	Wd	Walking sticks	Bk	D	Diarrhoea, Dysentery
Rutaceae	*Aegle marmelos L.*	T	Bel, Bili	Wd	Tool handles in carts	Lv	J	Snoring
	Murrayakoenigii L.	T	Kadipatta, MithoLimdo	Lv	Curry preparation	Bk, Rt	D	Dysentery
Sapotaceae	*Madhuca indica J. P. Gmel.*	T	Mahudo	Wd	Piles, Buildings, Sugar mills	Bk	D	Easy Delivery of a baby
				Fr Sap	Liquor, Distillery			
Sapindaceae	*Schleichera oleosa Lour.*	T	Kusum, Kosam	Wd	Tool handles in carts			
Sterculiaceae	*Helicteres isora L.*	S	Mardasing, Mordosingi			Bk, Pd, Rt	D	Intestinal disorders
	Sterculia urens Roxb.	T	Kadayo, Kandol	Wd Sap	Gum preparation	Bk	G	Dysentery
	Triumfetta rhomboidei Jaeq.	S	Jipti			Bk	D	Stomachache
Tiliaceae	*Grewia tiliaefolia Vahl.*	T	Dhaman, Dhamni	Wd	Shafts, Tools, Handles	Lv	Ps	Hair-wash
Ulmaceae	*Holoptelea integrifolia Roxb.*	T	Kanjo, Kanaji	Wd	Buildings, Carts, Carving, Agricultural implements	Bk	Ps	Hydrocoele
Verbenaceae	*Gmelina arborea L.*	T	Seven, Sivan	Wd	Furniture, Door panels, Ornamental work	Lv	Ps	Ulcers
	Tectona grandis L.	T	Sag	Wd	Furniture, Agricultural implements, Construction			

Key:
Habit: S=Shrub, H=Herb, T=Tree, TW=Twiner, CL=Climber
Parts Used: Bk=Bark, Br=Branch, Ct=Cotton, Fb=Fiber, Fl=Flower, Fr=Fruit, Fr Sap=Fruit Sap, Green Pd=Green Pods, Lv=Leaves, Pd=Pods, Pt=Petiole, Rhz=Rhizome, Rt=Root, Sd=Seeds, St=Stem, Twg=Twigs, Wd=Wood, Wd Sap=Wood Sap, WDP=Whole Dried Plant
Forms: D=Decoction, G=Gum, J=Juice, Lx=Latex, Ps=Paste, Pwd=Powder, Sp=Sap

For various types of ethnobotanical purposes, tribal people of area use different plant parts e.g. bark, branch, Flower, fruit, root, seed, stem, etc. Of which, 50 percent of the plant species are used for its wood in preparing of An agricultural implements, building construction, cart-making, furniture, firewood, rafters, etc. The tribal People also utilize these resources for their livelihood by making and selling of bidis, cups, handles, matchsticks, Match box, packing cases, plates, ropes, shafts, walking sticks, etc. On the other hand, 13 percent of plant Species are used for leaves, 10 percent for fruits, and 5 percent each for bark and seeds. While 22 percent of the Plant species are used for various parts in different combinations e.g. cotton, fiber, flower, pods, petioles, Rhizomes, stem twigs, etc. Out of 86 species recorded in study area, 96 percent of plant species are used for its Single part for a particular purpose, while only 4 percent of the species are used for its multi-purpose Distinctiveness.

Table 2

Parts used for Medicinal Purposes	Species	
	No.	%
Bark	23	33.82
Fruit	2	2.94
Leaves	17	25.00
Root	11	16.18
Seeds	4	5.88
Bark, Leaves	2	2.94
Bark. Pod, Root	1	1.47
Bark, Root	2	2.94
Bark, Seed	1	1.47
Flower, Fruit, Root	1	1.47
Fruit, Root	1	1.47
Leaves, Root	2	2.94
Leaves, Root, Seed	1	1.47

Out of 86 species, 80.95 percent plant species (68) are utilized as a symbol of traditional medicines to cure Various ailments e.g. Asthma, Arthritis, Bronchitis, Boils, Cough, Diabetes, Diarrhoea, Fever, Hydrocoele, Jaundice, Leucorrhoea, Ulcers, etc. Sometimes, paste made from plant parts are also applied in the form of a Topological application on Skin diseases, Inflammation, Sprain, Swellings, Sty, Snake Bite, etc. as an appropriate Medication. For an effective treatment of a symptom or a disease, different parts of plants are used such as Bark, fruit, leaves, root, seeds etc. And for a particular ailment, a combination of such parts is used for an Effectual action. Of the 68 species, 33 percent of the plant Species is used from bark, followed by leaves (25%), Root (16%), seeds (5%) and fruits (2%) (Table2).

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