Journal of Medicinal Plants Studies
www.PlantsJournal.com

ISSN (E): 2320-3862
ISSN (P): 2394-0530
NAAS Rating: 3.53
www.plantsjournal.com
JMPS 2020; 8(4): 198-205

Received: 13-05-2020
Accepted: 15-06-2020

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A field study on Indian medicinal plants

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Abstract
This article deals with the current status of 1000 species of Indian medicinal plants. Out these only 180 species are used at commercial scale. They are restricted in distribution, and often seasonal. Due to climate change, over exploitation and the domination of invaded species population of Indian medicinal plants are diminishing. More than 100 field days are spent for the current study. Some of the regular cereals, pulses, vegetables and fruits are considered as medicinal plants. 540 species are herbs (mostly annuals), 100 species are shrubs, 200 species are trees, 160 species are climbers, the names are provided in the table. Ferns and conifers are 20 species, Orchids are 15 species. Availability of biomass is often less than the demand. Medicinal herbs used in Aurvedic, Siddha, Unani and Homeopathy systems of medicine. Herbs like *Withania somnifera, Centella asiatica, Ocimum tenuiflorum, Gloriosa superba* etc. are cultivated in the plains. In high altitude areas *Pycrorrhiza kurroa, Sussurea costus, Inula recemosa, Anacylus pyrethrum Crocus sativus* etc. are cultivated in commercial scale. Vegetable spice crops such as *Moringa oleifera, Piper nigrum, Phyllanthus emblica, Zingiber officinale, Curcuma longa* etc. are cultivated larger scale. Colour images of 8 medicinal plants are provided.

Keywords: Raw drugs, ayurveda, siddha, unani, bioresources, botanicals

Introduction
The Indian subcontinent consists of about 17,000 species of flowering plants. Out of them about 1000 species of useful and medicinal plants are reported. Out of these only 1000 species are considered as medicinal herbs, some of them are our regular food plants. They are trees, shrubs, climbers, herbs and grasses. They are spreading in different habitat such as plains, coastal areas and hills. Some are confined some regions of our country; some plants will be found only particular altitude of Himalayan mountain. . In reality the medicinal plants term is very broad one, it is very difficult bring with in an outline. As per old say food is medicine and medicine is food. If we take our food in a proper manner our system will not require any medicine. Proper food will be a balanced diet which will consist of food items that will give 6 type of taste. Our cereals, pulses, fruits, tuber crops, vegetables, greens, oil seeds, aromatic crops all are coming in medicinal plant category.

Materials methods
The current study involves 5 years field visits to western Ghats, Eastern Ghats, North west Himalayas, Eastern Himalayas, north eastern region and Central Indian plains of the country at different intervals, various types of medicinal herbs are observed in the field, herbarium specimens are stored in the Herbarium, R&D centre, locted in Bangalore. Field observations are made at East and Western Ghats of Peninsular India, plains and Hill areas of the Tamilnadu, Andhra Pradesh, Karnataka and Kerala States. Deciduous forest areas of Madhya Pradesh, Orissa, Jharkhand and Bihar are studied. In some areas 10 x 10 m quadrant study also carried out. Jammu & Kashmir, Himachala Pradesh, Uttrakhand, Darjeeling, Leh Ladakh and Arunachala Pradesh of Himalayan mountain areas are studied. About 90 field days are spent for the present study. More than 1000 species are observed, identified. The images are uploaded in the public forum such as Indiabiodiversity.org, indiatreepix - googleforum (site google – efloraofindia).

Literature review
There are several publications on Indian medicinal plant [1, 2, 3] regional floras published by the British Botanists [4], Indian Botanists [5], Botanical Survey of India [6]. Indian council of Medicinal research is also publishing series of publication on medicinal plants [7, 8]. Ministry of Ayush publications [9, 10, 11] such as Ayurvedic, siddha, Homeopathy and Unani Pharmacopoeia

also provided details about various aspects of medicinal plants. Medicinal plants show more antiviral activity [13]. Local people using medicinal plant for their primary health needs [14]. A detailed review of Himalayan medicinal has been carried out [15, 16]. Medicinal plants of North east India is listed [17]. Review on Medicnal plants of Madya Pradesh and Chattishgarh is available [18, 19] Tripathi YC listed the Rajasthan medicinal plant [20]. Medicnal plants of Jammu and Kashmir and their trade status is discussed by Sonam dawa *et al*. [20].

Results

Out of 1000 Indian medicinal plants [12] 540 species are herbs (mostly annuals), 100 species are shrubs, 200 species are trees, 160 species are climbers. Ferns and conifers are 20 species, Orchids are 15 species. Most of the medicinal herbs are confined to specific regions, because the availability of biomass is often less than the demand. Nowadays the habitats are highly disturbed due to cultivated crops, Industrial development and over grazing. Due to climate variations whenever there is failure of rainfall, the annual crops are drying, not setting seeds, invaded species dominating the native species, consequently there is the shortage of medicinal herbs. Ministry of Environment, forest identified 107 normally traded medicinal plants (http://nbaindia.org/uploaded/pdf/Notification_of_Normally_Tradeded_Commidities_dt_7_April_2016.pdf.) The list classified, vegetables, fruits, cereals and pulses separately. 178 species medicinal plants are used in commercial quantities by the Indian medicine based and nutraceutical industries. Wild, cultivated trees, shrubs, climbers, herbs their common name, part used and their medicinal properties are given in the table. The demand and supply of crude drugs their prices are unpredictable. Mostly the medicinal herbs are growing in unused lands for agriculture and in the boundaries of agricultural fields and in the wild forests. The wild forests are destructed for timber fire wood and cattle browsing. It is very difficult get some wild herbs. One can see some herbs in some protected medicinal Gardens. Maintaining medicinal garden is an art which involves interest and other resources.

Table 1: Commercially important Medicinal plants

Wild trees	Common name	Part used	Properties
Acacia catechu Wild.	Kath	Stem wood	Antioxidant,
Acacia nilotica (L.) Delile	Babool	Stem bark, gum	Antioxidant
Adansonia digitata L.	Gorakimili	Gum	Laxative
Aegle marmelos (L.) Corrêa	Bael	Fruit	Antidiabetic
Aesculus indica (Wall. ex Cambess.) Hook.	Indian Horse chestnut	Seed	Antiinflammatory
Azadirachta indica A.Juss.	Neem	seed, leaf bark	Bitter, antidiabetic
Commiphora wightii (Arn.) Bhandari (=Balsamodendron mukul)	Guggul	gum resin	Anticholesterol, perfume stick
Boswellia serrata Roxb. ex Colebr.	Indian olibanum	Gum resin	Antiinflammatory
Dysoxylum malabaricum Bedd. ex C.DC.	Vellagil	stem wood	Aromatic, Antiinflammatory
Eucalyptus globulus Labill.	Eucalyptus	leaf oil	Aromatic
Ficus benghalensis L.	Banyan	stem bark	Nalpamardhi choornam
Ficus racemosa L.	Fig	Stem bark	Antidiabetic
Ficus religiosa L.	Peepul	stem bark	Nalpamaradhi
Firmiana simplex (L.) W.Wight (=Sterculia urens Roxb.)	Parasol tree	Gum	Filler, binding
Garcinia gummi-gutta (L.) Roxb.	Kodampuli	Fruit	Cholesterol reducing
Gardenia resinifera Roth	Dikamali	gum resin	Aromatic
Gmelina arborea Roxb.	Gambhar	stem/root wood	Dasamoola tonic
Holarrhena pubescens Wall. ex G.Don	Kuda	stem bark	Anti amoebic
Lagerstroemia speciosa (L.) Pers.	Banaba	leaf	Anti diabetic
Mesua ferrea L.	Nagakesar	stamen	Antioxidant
Mimusops elengi L.	Bakul	Flower	Aaromatic
Morinda citrifolia L.	Noni	Fruit	Tonic
Morus alba L.	Mulberry	Leaf	Antidiabetic
Nothapodytes nimmoniana (J.Graham) Mabb.(=Mappia foetida)	Ghanera, Kalgur, Narkya	Stem wood	Anticarcinogenic
Oroxylum indicum (L.) Kurz	Valbadri	Stem/root wood	Dasamoola tonic
Phyllanthus emblica L.	Amla	Fruit	Laxative, antioxidant
Pterocarpus marsupium Roxb.	Vijayasar	Stem wood	Antidiabetic
Quercus infectoria G.Olivier	Oak	Fruit gall	Anti oxidant
Rhus succedanea L.	Kharkatshringi	Fruit gall	Anti oxidant
Salvadora persica L.	Pelu	Stem	Tooth pick
Santalum album L.	Sandal	Heart wood	Aromatic, cooling
Sapindus emarginatus Vahl.	Soap berry	Fruit rind	Natural soap
Sapindus mukorossi Gaertn.	Soap berry	Fruit rind	Natural soap
Semicarpus anacardium L. f	Marking nut	Fruit	Antimicrobial
Shorea robusta Gaertn.	Sal	Gum resin	Antiinflammatory
Stereospermum chelonoides (L.f.) DC.	padri	Stem/ root wood	Dasamoola tonic
Strychnos nux vomica L.	Nux vomica	seed	Anti toxic
Strychnos potatorum L. f	Clearing nut	seed	Water purifier
Symplocos racemosa Roxb.	Lodh	stem bark	Uterine tonic
Syzygium cumini (L.) Skeels	jamun	seed	Antidiabetic
Taxus wallichiana Zucc.	Thalisapatri	Leaf	Anticancer
Terminalia arjuna (Roxb. ex DC.) Wight & Arn.	Arjun	stem bark	Cardiac tonic
Terminalia bellirica (Gaertn.) Roxb.	Bibhitaki	Fruit	Laxative, trifala

Terminalia chebula Retz.	Haritaki	Fruit	Laxative
Wrightia tinctoria R.Br.	Pala indigo	leaf, seed	Psoriasis

Cultivated trees			
Anacardium occidentale L.	Cashew	Seed	Tonic
Areca catechu L.	Arecanut	Seed	antioxidant
Borassus flabelliber L	Palm tree	Jaggery	Tonic
Cocos nucifera L.	Coconut tree	Fruit	Tonic
Garcinia gummi-gutta (L.) Roxb.	Kodampuli	Fruit	Cholesterol reducing
Garcinia indica (Thouars) Choisy	Kokam	Fruit	Cholesterol reducing
Madhuca longifolia (J.Koenig ex L.) J.F.Macbr.	Mahua	Fruit	Antiinflammatory
Mangifera indica L.	Mango	Bark, fruit	Tonic
Moringa oleifera Lam.	Drumstick	Drumstick	Tonic
Morus alba L.	Mulberry	Leaf	Antidiabetic
Murraya koenigii (L.) Spreng.	Curry leaf	Leaf	Hair tonic
Myristica fragrans L.	Joy phal	Fruit	Aromatic
Phoenix dactylifera L.	Date	Fruit	Tonic
Phyllanthus emblica L.(= *Emblica officinalis* Gaertn.)	amla	Fruit	Laxative, antioxidant
Pongamia pinnata (L.) Pierre	Pongam	Fruit/leaf/ bark	Nervine
Prunus cerasoides Buch.-Ham. ex D.Don	wild Himalayan cherry	Seed	Tonic
Prunus dulcis (Mill.) D.A.Webb	Badam	Seed	Tonic
Pterocarpus santalinus L.f	Red Sander	Wood	Antidiabetic
Punica granatum L.	Pomgrante	Fruit	Anti oxidant
Sesbania grandiflora (L.) Pers.	Agase	Leaf	Antiinflammatory
Syzygium aromaticum (L.) Merr. & L.M.Perry	Clove	flower bud	Carminative
Tamarindus indica L.	Tamarind	Fruit/seed/leaf	Antioxidant
Ziziphus jujuba Mill.	Ber	Fruit	Antioxidant

Climbers			
Aristolochia indica L.	Eswara muli	Root/leaf	Anti toxic
Asparagus cochinchinensis (Lour.) Merr.	Yellow shatavari	Root	Tonic
Asparagus racemosus Willd	Shatavari	Root	Lactogogue
Bauhinia vahlii Wight & Arn.	Visthri aachu	Leaf	Leaf plate
Corallocarpus epigaeus (Rottler) Hook.f.	Aakasa garudan	Root tuber	Anti toxic
Decalepis hamiltonii Wight & Arn.	Mahakali	Root tuber	Aromatic, cooling
Dioscorea bulbifera L.	Baniatakari	Root tuber	Tonic
Embelia ribes Burm.f.	Baibidand	Fruit	Antifertility
Entada rheedii Spreng.	Sea Bean	Seed	Liver tonic
Gloriosa superba L.	Galihari	Root tuber, seed	Antiinflammatory
Gymnema sylvestre (Retz.) R.Br. ex Sm.	Gudmar	Leaf	Antidiabetic
Hemedesmus indicus L.	Anantamul	Root	Antiinflamatory
Ichnocarpus frutiscens Br	Kali dhoodi	Stem	Antiinflammatory
Lagenaria ciceraria L.	Bottle guard	Fruit	Antioxidant
Leptadenia reticulata Wight &Arn.	Jeevanthi dhoodabel	Stem	Lactocogue
Momordicha charantia L.	Karela	Fruit	Antidiabetic
Mucuna pruriens (L.) DC.	Kounch	Seed	Parkinson
Passiflora edulis Sims	Passion fruit	Aerila part	Anti oxidant
Piper longum L. (pippali)	Long pepper,	Fruit	Pungent
Piper nigrum L.	Black pepper	Fruit	Pungent
Rubia cordifolia L.	Manjistha	Root	Colouring
Salacia chinensis L.	Ekanayakam	Root	Antidiabetic
Smilax china L.	China root	Root	Immunostimulant
Tinospora sinensis (Lour.) Merr.	Giloe, Amrutha valli	Stem	Immunostimulant
Ventilago maderaspatana Gaertn.	Pitti.	Root	Colouring
Vitis vinifera L.	Grape	Fruit	Antioxidant

Medicinal Herbs	**Common name**	**Part used**	**Properties**
Achyranthes aspera L.	Apamarga	Whole plant	Diuretic, antifertility
Acorus calamus L.	Bach	Rhizome	Nervine, digestive
Aloe vera (L.) Burm.f.	Aloe	Leaf	Anti diabetic, tonic
Andrographis paniculata (Burm.f.) Nees	Kalmeg	Aerial part	Bitter, immunostimulant
Arnebia nobilis Rech.f.	Ratan jot	Root	Colouring agent
Bacopa monnieri (L.) Wettst.	Nir brahmi	Whole plant	Nervine tonic
Boerhavia diffusa L.	Punarnava	Whole plant/root	Diuretic
Centella asiatica (L.) Urb.	Brahmi	Whole plant/leaf	Nervine tonic, anti ulcerative
Chlorophytum tuberosum (Roxb.) Baker	Safed musale	Root	Tonic
Chrysopogon zizanioides (L.) Roberty	Vetiver	Root	Aromatic, cooling.
Curculigo orchiioides Gaertn.	Kali musle	Root uber	Tonic, Aphrodisiac

Curcuma longa L.	Haldi	Rhizome	Anti oxidant, colouring
Curcuma zedoaria (Christm.) Roscoe	White turmeric	Rhizome	Anticarcingenic
Cymbopogon citratus (DC.) Stapf	Lemongrass	Leaf	Aromatic, anti microbial
Cymbopogon martini (Roxb.) W.Watson	Palmarosa	Leaf	Aromatic, antmicrobial
Cynodon dactylon (L.) Pers.	Durva	Rhizome/ whole plant	Tonic, antidiabetic
Cyperus rotundus L.	Nut grass	Rhizome	Aromatic, anti pyretic
Datura metal L.	Datura	Fruit	Hallucinogenic
Desmodium gangeticum (L.) DC.	Orilai	Root/ whole plant	Dasamoola bowl tonic
Didymocarpus pedicellata R.Br.	Shilapushpi	Root/ whole plant	Livertonic
Eclipta prostrata (L.) L.	Bringaraj	Leaf	Hair growth promotor.
Enicostema axillare (Lam.) Raynal		Whole plant	Bitter tonic
Euphorbia hirta L.	Asthma Weed.	Whole plant	Diuretic
Euryale ferox Salisb.	Fox nut	Seed	Tonic
Evolvulus alsinoides L.	Vishnugranthi	Whole plant	Anti pyretic, nervine
Foeniculum vulgare Mill	Fennel	Fruit	Aromatic, digestive
Fumaria indica (Hausskn.) Pugsley	Sahatara	Whole plant	Liver protective
Hybanthus enneaspermus (L) F. Muell	Ratanpurush	Whole plant	Aphrodisiac
Indigofera tinctoria L.	Nili	Leaf	Colouring, skin tonic.
Lallemantia royaleana Bentham	Tukmalanga	Seed	Cooling
Lepidum sativum L.	Alsi	Seed	Antioxidant
Linum usitatissimum L.	Lin seed	Seed	Antioxidant
Medicago sativa L.	Alfalfa	Leaf	Tonic
Mentha spicata L.	Pudina	Leaf	Aromatic, cooling
Merremia emarginata (Burm. f.) Hallier f.		whole plant	Nervine tonic
Mollugo cerviana (L.) Ser.	Parpatak	Whole plant	antipyretic
Nelumbo nucifera Gaertn.	Kamal	Flower/seed	Uterine tonic
Nigella sativa L.	Kalongi	Seed	Diuretic
Ocimum basilicum L.	Sweet basil	leaf/seed	Aromatic
Ocimum tenuiflorum L.	Holy basil	Leaf	Respiratory tonic,
Pedalium murex L.	Bada gokru	Fruit	Aphrodisiac, diuretic
Peganum harmala L.	Harmal	Seed	
Phyla nodiflora (L.) Greene	Jal bhuti	Fruit	Hair growth promotor
Phyllanthus amarus Schumach. & Thonn.	Bhuiamla	Whole plant	Bitter liver tonic
Phyllanthus maderaspatensis L.	Melanelli	aerial part	Liver tonic
Picrorhiza kurroa Royle ex Benth	Kutki	Rhizome	Liver tonic
Plantago major L.	Isabgol	Fruit shell	Laxative
-Plectranthus barbatus Andrews	Patanchur	Root tuber	Anti- inflammatory
Plumbago zeylanica L	Chirakmul	Root	Liver tonic
Pogostemon cablin (Blanco) Benth.	Patchouli	Aerial part	aromatic
Rauvolfia serpentina (L.) Benth. ex Kurz	Sarbaganda	Root	Cardiac tonic
Rheum australe D. Don	Revalchini	Root tuber	Antiinflammatory
Rosmarinus officinalis L.	Rosemary	Leaf	Aromatic
Ruta graveolens L.	Garden rue	Leaf/fruit	Homeopathic
Saussurea costus (Falc.) Lipsch.	Kuth	Root	Anti microbial
Senna alexandrina Mill.	Senna	Leaf/fruitshell	Laxative
Sida cordifolia L.	Bala	Root	Tonic,
Sinopodophyllum hexandrum (Royle) T.S.Ying(=*Podophyllum hexandrum*)	Ban kakri	Rhizome	Anticancer
Solanum americanum Mill.	Makoy	Leaf/fruit	Antiulcerative, calcium
Solanum surattense Burm. f.	Kateli	Whole plant/root	Dasmoola, bowl tonic
Sphaeranthus indicus L.	Mundi	Head	digestive
Sphagneticola calendulacea (L.) Pruski (=*Wedelia chinensis* (Osbeck) Merr.)	Yellow bringaraj	Leaf	Liver tonic, hair growth promotor
Swertia chirayita (Roxb.) Buch.-Ham. ex C.B.Clarke	Chirayita tikta	whole plant	Bitter, imminostimulant
Sylibium marianum (L.) Gaertn	Milk thistle	Seed/leaf	Liver protective
Tagetus erecta L.	Marigold	Flower	Anti oxidant, coluring
Tephrosia purpurea (L.) Pers	Sharpunka	Aerial part	Liver protective
Trachyspermum ammi (L.) Sprague	Ajwain	Fruit	Digestive, antimicrobial
Tribulus terrestris L.	Gokhru	Fruit/root	Aphrodisiac, diuretic
Trigonella foenum graceum Linn.	Methi	Seed/leaf	Antidiabetic, tonic
Valeriana jatamansi Jones	jatamansi	Rhizome	Aromatic
Viola odorata L.	Banfasa	Leaf/flower	Antioxidant
Withania coagulans (Stocks) Dunal	Panirdhoodi	Fruit	Antidiabetic

Withania somnifera (L.) Dunal	Ashwaganda	Root	Antidepressant, tonic

Shrubs	Common name	Part Used	Properties
Camellia sinensis (L.) Kuntze	Tea	Leaf	Anti oxidant
Clerodendrum phlomoides Hort. ex DC.	Agnimanda	Root /stem	Antiinflammatory
Embelia tsjerium kottam (Roem. & Schult.) A. DC.	Baibidang	Fruit	Antifertility
Glycyrrhiza glabra L.	Liquorice	Rhizome	Anti ulcerative
Hibiscus rosa-sinensis L.	Shoe flower	Leaf/flower	Colouring agent
Hippophae rhamnoides L.	Sea buck thorn	Fruit	Anti oxidant
Justicia adhatoda L.	Vasaka	leaf/root	Expectorent
Lawsonia inermis L.	Henna	Leaf	Colouring agent
Premna serratifolia L.	Agnimandha	Root /stem	Antiinflammatory
Randia dumetorum Lam.	Madanphala	Fruit	
Ricinus communis L.	Castor	Leaf/seed	Antimicrobial
Rotheca serrata (L.) Steane & Mabb.	Bharangi	Root	Anti-inflammatory, antipyretic
Vitex negundo L.	Nirgundi	Leaf	antiinflammatory
Woodfordia fruticosa Kurz.	Dahi phool	Flower	Tonic
Zanthoxylum nitidum (Roxb.) DC.	Kukumada	Seed/leaf	Spice, carminative
Zanthoxylum acanthopodium DC.	Japanese pepper	seed/leaf	Spice
Zinziberaceae plant (Table 6)			
Alpinia galanga (L.) Willd.	Kolinjan	Rhizome	Cough cold
Curcuma longa L.	Haldi	Rhizome	Anti -oxidant
Elettaria cardamomum (L.) Maton	Cardamomum	Fruit	Aromatic
Hedychium spicatum Buch. & Ham.	Kapur kachri	Rhizome	Respiratory tonic
Kaempferia galanga L.	Kachhuram	Rhizome	Expectorent
Zingiber officinale Roscoe	Ginger	Rhizome	Pungent, digestive, bitter

Herbs available in Plains

Sida sp, Boerhavia diffusa, Tephrosia purpurea, Tribulus terrestris are frequently available in the plains. *Eclipta prostrata, Sphaeranthus indicus, Solanum xanthocarpum, Bacopa monnieri Phyla nodiflora, Alternanthera sessilis* are present in the paddy growing areas. Rainfed field areas one can find *Cassia auriculata*, *Plumbago zeylanica* is available in the shade areas near Tamarind trees. The climbers such as *Tinopspora cordifolia, Gymnema sylvestre, Aristolochia indica* are growing in hedges of Agriculture fields. Near coastal areas *Tinospora cordifolia, Leptadenia reticulata, Solanum trilobatum, Aristolochia indica, Coccinea indica* are growing more. *Cynodon dactylon, Cyperus rotundus a*re common monocot plants. , *Enicostema axillare, Evolvulus alsinoides, Hybanthus enneaspermu.* In the floors of scrub jungle *Curculigo orchioides* is growing *Salacia chinensis, Solanum virginianum, Trapa natans, Tylophora indica, Coccinea grandis* and *Datura metal* are growing near coast. *Medicago sativa* is cultivated in rainfed fields. *Mollugo cerviana, Nelumbo nucifera, Nigella sativa,*

Plants available in the Hill stations above 1000 f*eet al*titude

Centella asiatica, Solanum nigrum are growing from sea level to 2000m, *Symplocos racemosa, Berberis aristata, Mappia foetida, Cyathula prostrata, Cinnamomum verum, cinnamomum tamala, Eucalyptus globulus, Rosemarinus officinalis, Menta pepprita.* Ferns also prefer higher altitudes. *Decalepis hamiltonii* is an endemic climber, closely related to *Hemidesmus indicus,* often cultivated in Andhra Pradesh and Karnataka for its tubers which are used in pickle, cooldrink and in medicine.

Plants found in the dry deciduous forests.

Tree like *Albizia lebbeck, Azadirachta indica, Albizia amara, Syzygium cuminii, Adansonia digitata , Gmelina arborea . Pterocarpus marsupium , Santalum album, Sapindus emarginatus , Phyllanthus emblica L., Terminalia arjuna,T. bellirica , T. chebula, Wrightia tinctoria , Ficus benghalensis, Ficus racemosa, Ficus religiosa, Garcinia gummigutta, Holarrhena pubescens, Mappia foetida, Premna serratifolia, Sapindus emarginatus, Strychnos nux- vomica, Strychnos potatorum, Semicarpus anacardium* are frequently growing in the dry deciduous forests Boswellia serata, Canarium strictum, *Commiphora mukul, Gardenia gummifera, Shorea robusts, Vateria indica are resin yielding plants. Firmiana simplex, Acacia nilotica are gum yielding trees. Ichnocarpus frutiscens, Corallocarpus epigaeus, Asparagus racemosus, Hemedesmus indicus, Gloriosa superba* etc. are wild climbers. *Lagerstroemia speciosa* is often planted in the parks and avenues. *Tamarindus indica* is also a regular avenue tree and it also grows near foot hills and villages, boundaries of agriculture lands. *Aphanamixis polystachya* tree is also planted in the park, roadsides in Bengaluru. *Embelia ribes, Helictrus isora, Vitex negundo, Woodfordia fruticosa* are shrubs. *Woodfordia(*daye phool*)* is more common in the north Indian forest. *Piper betel, Piper longum, Piper nigrum, Plantago ovata* are cultivated plants. *Glycyrrhiza glabra* is native of Mediterranian region cultivated in some places, *Hibiscus rosa sinensis, Justicia adhatoda* are often cultivated in the south. In the north Indian forests *Justicia adhatoda* is distributed under wild condition. *Rauvolfia serpentina, Uraria laopodioides* are important wild herbs.

Plants available in The Himalayan region

Pinus tree is the vastly distributed tree in The Himlalayan areas. between 750-1500m *Prunus* sp, *Pyrus* sp, *Juglans regia* (Wal nut), *Cedrus deodar*(Devdar), *Berberis aristata, Punica granatum, Polygonum alatum, Inula racemosa, Saussurea costus, Pycrorrhiza kurroa, Taxus wallichiana, Abies pindrow, A. spectabilis, Hypericum perforatum* are frequently used medicinal herbs. They are altitude specific. Plants like *Juniperus macropoda, Jurinea macrocephala, Skimmia lauriola* are used as dhoop for aromatic fragrance. *Aesculus indica, Aquiaria agallocha, Betua utilis, Crocus sativus, Lycopodium clavatum, Podophyllum hexandrum, Rubia cordiflia, Smilax china, Swertia chirayita, Aconitum heterophyllum, Arnebia nobilis, Bergenia ciliata, Hedychium spicatum, Iris germanica, Lallemantia royaleana, Nardostachys grandiflora, Onosma echioides, Polypodium*

vulgare, Rhododendron anthopogon, sysymbrium irio, Viola canescens, Zanthoxylum armatum. These are the minor forest products, local residents processed it and supplying to the consumers.

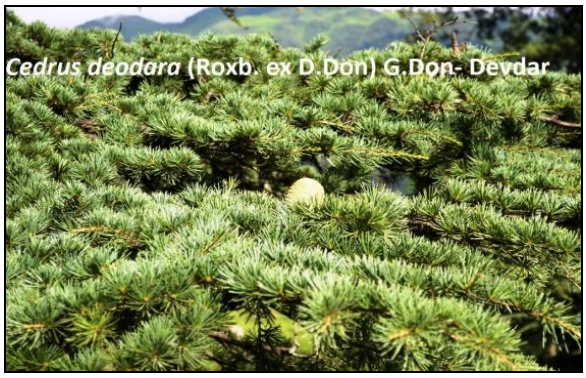
Plants found in the cold Himalayan desert
Peganum harmala, Hippophae rhamnoides, Physochalina praelta, Ephedra gerardiana, Hyoscyamus niger etc. are found in the Leh Ladakh area of Himchala Pradesh and Jammu &Kashmir.

Plants found in The Indian Desert.
Prosopis spicigera, Withania somnifera, W. coagulens, Convolvulus pluricaulis, Pluchea lanceolata, Tecomella undulata, Salvadora persica, Clerodendrum phlomoides, Commiphora mukul, Leptadenia reticulata, Lawsonia inermis, Ziziphus mauritiana etc. are found in the desert areas of Rajasthan. These are contributing largely to the economy of the local people and also to the nation. Rajasthan henna is considered superior. Methi seeds, senna leaves are produced large scale here.

Plants found in the coastal area.
Morinda citrifolia, Salacia chinensis, Salvadora persica, Asparagus racemosus, Tribulus terrestris, Leptadenia reticulata, Cassia auriculata, Azadirachta indica, Premna corymbosa, Vitex negundo , Phyllanthus maderspatensis, mangrove species are found in the coastal areas. *Operculina turpethum* is often growing along canals.

Western Ghats (Kerala, Tamilnadu, Karnataka & Maharashtra) Spice crops such as *Myristica fragrans, Sysygium aromaticum, Piper nigrum, Piper roxburghiana, Cinnamomum tamala, C. verum, Elettaria cardamomum* etc. are cultivated. Nowadays the seeds of *Swietenia mahagoni* are consumed by diabetic patients. It is coming from the Southern states.

Discussion
Out of 1000 species of medicinal plants about 200 species are used commercial scale. Often they are used by the local people. Availability of the herbs is insufficient, which is the reason for not using the plants for commercial use. Herbs like *Withania somnifera* (Ashwaganda), *Centella asiatica* (Brahmi), *Gloriosa superba* (Kalihari), *Phyllanthus amarus* (Bhumiamla), *Ocimum tenuiflorum* (Tulasi), *Aloe vera*, *Senna alexandrina* (Senna), *Andrographis paniculata*(Kalmeg)are often cultivated. Most of these crops except Withania, Ocimum remaining are grown under buy back schemes. Some other potential crops are *Tinospora cordifolia* (Geloy), *Mucuna pruriens*(Kounch), *Gymnema sylvestre* (Gudnmar), Vetiveria zizanioides(vetiver), *Alpinia galangal*(Kolinjan), *Plumbago zeylanica* (Chitrak), *Chlorophytum borevilianum* (Safed musali). The aromatic crops like Cymbopogon martini (Palmarosa), C. flexuosa(Lemeon grass), Rosemarinus officinalis (Rosemary), *Pogostemon cabli*(patchouli) are often cultivated. Vegetable crops like *Moringa oleifera* (Drumstick), *Zingiber officinalis* (Adrak), *Decalepis hamiltoni* (Anantamul) is also often cultivated, which is used in mediine as well making pickle. In the high altitude Himalayas *Saussurea costus*, (Kuth), *Inula racemose* (Pushkarmul), *Pycrorhiza kurruoa*(Kutki) are cultivated. *Indigofera tinctoria* (Nili) is cultivated some area near Pondicherry, Tamilnadu. *Curcuma longa* is consumed as spice, medicine in large scale. There is also demand for organic Turmeric, Ginger Moringa etc. There is no organized medicinal plant cultivation activity; consequently there is an abrupt price variation in the market. The demand and supply ratio is quiet inconsistent. Farmers not willing to cultivate the herbs second time. Only some entrepreneurs take all risks and successfully doing the medicinal herb cultivation. One has to seek medicinal gardens to get some medicinal plants, but it is very difficult to maintain medicinal garden. Wild sources are frequently disappearing due to drought or human developmental expansion activities or grazing. When a particular herb is not available for use, the medicine producers look for substitutes.



Conclusion

The study reflects current status Indian medicinal plants. Medicinal herb cultivation is restricted to some areas. Market demand and price are varying. Quality issues such as assay, pesticide residue and heavy metal contents makes the herb unsuitable for consumption. The demand for nutraceutical plants such as Ashwaganda, Centella, Moringa, Curcuma, Tribulus and Asparagus are increasing and are cultivated in the Madya Pradesh, Rajasthan and Karnataka. Centella became a regular green in Chennai. Aloe vera gel consumption also increased, similarly aromatic plants such as Tulasi, *Cymbopogon flexuosus*, *C. martini*, *Pogostomon patchouli*, *Chrysopogon zizanoides*, *Rosmarnus officinalis*, *jasminum grandiflorum*, *J. sampac*, *Polyanthus tuberosus*, *Rosa* sp etc are produced in a large scale. Certified organic cultivation is new initiative in India during this decade. National biodiversity authority (NBA) is streamlining commercial utilization of medicinal plants. National medicinal plant board and State medicinal plant boards encouraging the cultivation of medicinal plants and establishing the medicinal gardens.

Acknowledgement

Author is thankful to the Director Dr. Amit Agarwal and Dr. Deepak M, Head R&D for their support and encouragement.

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