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EXPLORATION, CONSERVATION AND CULTIVATION OF MEDICINAL PLANTS IN BALRAMPUR, GONDA AND SHRAVASTI, DISTRICTS OF UTTAR PRADESH

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ABSTRACT

Paper deals with the distribution of medicinal plants in Balrampur, Gonda and Shravasti districts of Uttar Pradesh. The study areas are falling under Upper Gangetic plains bordering with Nepal in Himalayas, Shiddharthnagar and Basti districts in the east, Baharaich in the west and Barabanki and Faizabad districts in south separated by the river Ghaghra. Methods of conservation and cultivation aspects in the areas have also been emphasized in the present communication. A high grade commercial medicinal plant in the area is *Helminthostachys zeylanica* being traded in the name of Kamraj. However, plants of *Aegle marmelos* (Bilva) *Mallotus phillippinensis* (Kampillak) and *Vetiveria zizanioides* (Ushir) are available in plenty in different forest areas of Shravasti district and needs to be commercialized through Forest Department. Plants of *Bacopa monnieri* (Brahmi) and *Desmodium gangeticum* (Shalparni) etc. needs to be cultivated. Paper is supported by use of available medicinal plants and Global Positioning locations also.

KEYWORDS: Conservation, exploration, medicinal plants, GPS data.

INTRODUCTION

Uttar Pradesh the largest state of India in respect to population, is located in the northern part of India bordering with state of Bihar, in the east, Uttaranchal and Delhi in the North and Madhya Pradesh in the West and South. It covers an area of mostly plains of Upper Gangatic plains and Bundelkhand just adjascent to Madhya Pradesh with a forest cover of tropics only.

It occupies a land area of 2716425 Km^2 and comprises of 75 districts. The areas covered under extensive exploration in Uttar Pradesh are Shravasti, Gonda and Balrampur falling into Tarai belt distinguished with the prominent river Ghaghra and its sister rivers Kuwano and Rapti. The three forest divisions are surrounded by Basti and Shiddharth Nagar Forest divisions in the east, Faizabad Baharaich in the west and Faizabad and Barabanki in the South. The northern part as a whole is surrounded by Nepal. Major areas are occupied by non tribal people except few tribal areas with Tharu tribes and several groups covers the migrants named the Nepalis.

As per the State of Forest Report 2003, published by the Forest Survey of India, Uttar Pradesh has a forest cover of 21.833 km^2, which is 5.8% of the total geographical area of the state. These forests receive moderate rainfall and support a reasonable floral and faunal biodiversity. Flora of Upper Gangetic Plains by Duthie (1960) and ethnobotanical studies have been undertaken in past (see Kanjilal, 1933; Duthie, 1960; Anwar and and Ghani, 1973; Aminuddin and Singh. 1982; Singh and Maheshwari, 1985,1992; 1995; Singh and Maheshwari, 1989; Jain, 1991, 2003; Asolkar et al. 1992; Singh and Prakash, 1996; Sundriyal et al., 1996; Singh, 1997; Pande, et al., 1998; Pandey et al, 1999; Singh and Singh 2001; Pande,2002; Kumar et al. 2003a,b, 2005, 2006; Mutthu, 2006, Khare, 2007; Babu et al., 2010; Gabriel, et al.,2010; Altundag and Ozturk, 2011; Tatyik, 2013: Hayta et al., 2014; Anonymous and several others). Mitra (1989) has described therapeutic terms used in ethnobotany whereas Rao (1989) has described the techniques used in ethnobotany. Report on various aspects of ethnobotany to the Government of India was prepared and submitted by Pushpangadan (1997).

Exploration of ethno medicinal plants in Balrampur, Gonda and Shravasti forest areas has been made by during 2015-16 and the paper represents the commercially viable medicinal plants in the explored areas. However, commercial exploration of medicinal plants with GPS location with pharmaceutical potential for conservation and cultivation of important medicinal plants has been described for the first time in the concerned Forest divisions falling under sub hill areas of Uttar Pradesh.

METHODOLOGY

Extensive exploration of the different forest areas falling under Balrampur, Gonda and Shravasti the three forest divisions of Uttar Pradesh has been made. Records of the collections have been observed with Global Positioning System (GPS) at different places

with their distribution has been recorded at different spots. The Herbarium vouchers were made by drying poisoning and mounting on Herbarium sheets as per methodology described by Jain and Rao (1967) and deposited in the Herbarium of Regional Ayurveda Research Institute (Acronym JHS). Authenticity of Herbarium was made after consulting the Herbarium of the Institute already matched confirmed Herbarium sheets kept in the Herbarium of Botanical Survey of India, Allahabad. During field observation, suitability of medicinal plants with high demand and commercial values as well as methods for conservation and cultivation has been studied by bringing the sufficient germplasm in the Garden of Regional Research Ayurveda Institute Jhansi. Attempts have also been made to know the potential of highly used medicinal plants in the area and the attempts made for commercialization as well as conservational aspects.

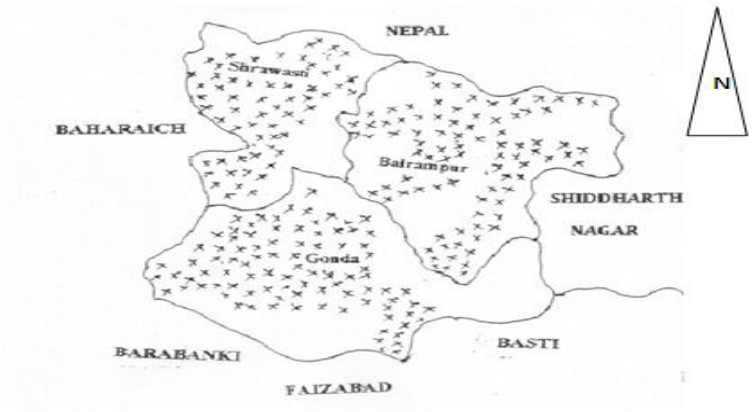
OBSERVATIONS

Extensive exploration of medicinal plants has been made in different season with an emphasis on pressure of exploitation and status as per GPS records for most of the forest areas in the study areas of Balrampur, Gonda and Shravasti districts of the state of Uttar Pradesh (Map-1). Medicinal plants are widely used by few traditional healers as well as collectors for trade of only *Helminthostachys zeylanica*. Cultivation of some of the medicinal plants is also in practice like *Andrographis paniculata, Aloe barbadensis, Asparagus racemosus, Bauhinia variegate, Emblica officinale, Chlorophytum tuberosum, Ocimum tenuiflorum* etc.

Exploration

Exploration of medicinal plants needs the identifying areas for maximum occurrence of commercially viable species of medicinal plants, potential of such species in a particular area for commercial utility, less occurring medicinal plants species whose conservation is the need of time, utilization of medicinally important species under local health practices or other ways of use like food, ornamental or timber etc. and the land suitable for undertaking medicinal plants cultivation. During various explorations in the state of Uttar Pradesh all such types of status has been recorded. During course of exploration it was observed that local traditional healers are undertaking treatment of weakness jaundice, fever etc. by the use of locally available herbs like *Acacia nilotica, A. catechu, Achyranthus aspera, Adiantum lunulatum, Adina cordifolia, Aegle marmelos, Amorphophalus campanulatus, Andrographis paniculata, Argyreia nervosa, Aristolochia indica, Alangium salvifolium, Callicarpa*

macrophylla, Carisa carandas, Centella asiatica, Cissampelos pareira, Coccinia indica, Curcuma longa, Curculigo orchioides, Cuscuta reflexa, Datura stramonium, Desmodium gangeticum, Eclipta prostrata, Helminthostachys zeylanica, Hemidesmus indicus, Holarrena antidysenterica, Mallotus philippensis Oroxylum indicum, Phyllanthus amaras,Plumbago zeylanica, Putranjiva roxberghii, Schliechera oleosa, Semicarpus anacardium, Sida acuta, S. cordifolia, S. rhombifolia, Smilax glabra Solanum nigrum,S viarum, Trichosanthes dioica, Vetiveria zizanioides etc. Commercial exploitation of *Holarrhena antidysenterica, Mallotus philippensis, Helminthostachys zeylanica etc.* is at highest level. People are collecting plants in unplanned and non scientific manner. *Aegle marmelos* and *Mallotus phillippensis* is abundantly occurring in Shravasti and Gonda forest divisions and needs commercialization. Distribution of medicinal plants in different forest areas as per GPS markings is described in table-1. Paper is represented by photographs of some important medicinal plants available in the study areas (Figure- 1).



Map - Showing areas under study in Balrampur, Gonda and Shrawasti districts of Uttar Pradesh.

CONSERVATION

Conservation of medicinal plants in sub Himalayan Region of Uttar Pradesh to which the study areas belong, needs for enriching the locally available medicinal plants in their vicinity which has the commercial value as it is fact due to shortage of plant for the root of *Desmodium gangeticum* the whole plant is traded in market with three different plants in different markets in the name of Shalparni.

Conservation experience in India

Experimental experience in Arunachal, Assam, Sikkim, Manipur, Nagaland, Meghalaya Mizoram of North East India and Chhattisgarh and Uttarakhand has adapted conservation

aspects for selected medicinal plants in different suitable localities however, Madhya Pradesh and Uttar Pradesh is concentrating towards *Mentha piperita* and *Chlorophytum borivilianu*, and occasionally *Aloe barbadensis* cultivation. Karnataka and Kerala are concentrating towards cultivation of medicinal plants with dual used like *Cinnamomum zeylanica*, *Eletaria cardamomum* and *Santalam album*.

Network of conserving about 30 species of medicinal plants have been initiated by National Medicinal Plants Board out of which *Aegle marmelos, Bacopa monnieri, Emblica officinalis* is being cultivated in Uttar Pradesh. However, large number of medicinal plants growing in Uttar Pradesh is in great demand by the pharmaceuticals. In present situation plants of *Boerhaavia diffusa, Fumaria indica, Ocimum tenuiflorum, Solanum virginianum, Tinospora cordifolia, Uraria picta* is in great demand. Experience of including other species in the states are gradually increasing.

Revitalization of local health tradition in different explored areas is very poorly available which also needs to be conserved by facilitating the traditional healers.

Criteria for selection of conservation area

- Forest cover stratification/ vegetation types and altitudinal zones
- Area known for high diversity of medicinal plants (Hot spots)
- Areas with high proportion of endemic species
- Easily manageable sites with an area of 200-500 hectares
- Easily accessible area
- Through cultivation with other agricultural crops and vegetables.

Historically / traditionally known area for high potency of medicinal plants.

Conservation of medicinal plants was made generally cultivating in waste land and road sides only. In the study areas very limited part is left for cultivation of medicinal plants as most of the areas are occupied by timber tree like *Shorea robusta* and *Tectona grandis*. Most of the conservation areas are confined to the teak forests and road sides only.

Insitu conservation

In situ conservation helps in conserving intra specific medicinal plants

There are three different models for In situ conservation:

- Medicinal plants conservation area (MPCA) model

- Medicinal plants development (MPDA) model
- Non timber forest produce area (NTFP) model

In the study areas only *Bacopa monnieri, Helminthostachys zeylanica, Phyllanthus amaras* and *Solanum nigrum,* can be conserved as there is major exploitation of this plant collected in the name of trade name Brahmi, Kamaraj, Bhumiamwla and Makoy. *Aegle marmelos* (Bael) and *Mallotus philippensis* (Kampillak) needs to be commercialized from the areas of occurrence.

Plants conservation areas should be demarcated with identified gate with a small nursery at the entry point of the area with raised planting materials of the plants identified for conservation of the species in the identified area.

Systemic collection of the medicinal plants in the areas is the measure to enhance the quantity of new plants. It is dependent upon the parts to be collected. In case of root collection as drug there is need of leaving more than 50% of entire root in case of tree and shrubs whereas same percentage of herbs are required to be uprooted to keep the potential of plant in the area as balanced for forthcoming year. In case of leaf collection too the practice must be for protection of plants in the area for further propagation and making balance in the vicinity. In case of flower fruit and seed collection drug part must be left in the required proportion intact with the mother plant for maturation and germination of the seeds on maturity in the natural field.

Conservation through Cultivation

Conservation through cultivation of medicinal plants is a trial and error practice methods for cultivation which needs acclimatization. As per various level trial made in different climatic zones cultivation of *Asparagus racemosus, Bacopa monneiri, Cinnamomum tamala, C. zeylanica, Holarrhena antidysenterica, Oroxylum indicum, Rauvolfia serpentina, Saraca asoca, Smilax* species etc. where seeds are used as propagules, the seeds are germinated in nursery beds and seedlings are transplanted in the field. *Abelmoschus moschatus* (Lata Kasturika), *Andrographis paniculata* (Kalmegh) *Ocimum tenuiflorum* (Tulasi) and *Rauvolfia serpentina* (Sarpagandha) etc. needs to be cultivated mixed with crop/vegetable plants. Vegetative propagation through root and stem cuttings is another practice where cultivation is made by taking vegetative parts as propagule like rhizome in case of *Acorus calamus, Costus speciosus, Curcuma* species, tubers for *Smilax glabra* (Chobchini) and other species

Amorphophalus campanulatus (Arsaghna) stem cuttings for *Rauvolfia serpentina, Tinospora cordifolia,* etc. This practice needs high grade caring of young propagules before plantation to the field. Indirectly, cultivation of medicinal plants with vegetable and crop plants improves the plant health and saves the crop from various types of plant diseases. Cultivated areas of crop plants needs to be protected by using the boundary through cultivation of medicinal plants like *Adhatoda zeylanica* (Adusa/Vasaka), *Solanum virginianum* (Kantakari). These conservational and mixed cropping will be helpful in enhancing the crop produce by protecting the crops from various infectants.

Table-1. Medicinal plants explored in Balrampur, Gonda and Shravasti forest divisions of Uttar Pradesh

S. No.	Botanical name	Sanskrit name	Local name	Uses	GPS location
1	*Abrus precatorius* L.	Gunja	Ghumchi	Seeds- tonic	
2	*Abutilon indicum* L.	Atibala	Kanghi	Bark -diuretic Seeds - aphrodisiac	N $27^0$46.053 E 082^0 00.522
3	*Acacia catechu* (L.f.)	Khadir	Khair	Bark- throat sour	N 27^0 47.923 E 081^0 53.251
4	*Acacia farnesiana* (L.)	Arimada	Gond Babool	Bark- astringent	N 27^0 47.019 E 081^0 43.531
5	*Achyranthes aspera* L.	Apamarga	Latjira	Root -jaundice	N 27^0 46.048 E 081^0 00.551
					N $27^0$40.709 E081^0 46.718
6	*Adhatoda zeylanica* L.	Vasa	Adusa	Leaf- cough, arthritis	N 27^0 40.707 E 081^0 46.114
7	*Adiantum capillus-veneris* L.	Hanspadi	Bhingu	Whole plant- cough	N 27^0 46.665 E 081^0 55.628
					N 27^0 46.565 E 081^0 55.609
8	*Adina cordifolia* (Roxb.)	Haridru	Haldu	Bark- antiseptic	N 27^0 45.765 E 081.59.821
9	*Aegle marmelos* (L.) Corr.	Bilva	Bail	Leaf- diabetes, fruit- diarrhoea	N 27^0 46.565 E 081^0 55.593
					N$27^0$40.709 E 081^0 46.718
10	*Aerva lanata* (L.) A. L. Juss. ex Schultes.		Chaya	Whole plant- anthelmintic	N 27^0 46.488 E 081^0 55.275
11	*Agave americana* L.			Root- antipyretic	
12	*Ageratum conyzoides* L.			Leaf- cough, wound healing	N$27^0$40.709 E 081^0 46.718
13	*Ailanthus excelsa* Roxb.	Mahanimba	Maharukha	Bark- Dyspepsia	
14	*Alangium salvifolium* (L.f.) Wangerin.	Ankola		Root- purgative fever.	N$27^0$40.709 E 081^0 46.718

15	*Albizia lebbeck* (L.) Benth.	Sirish	Siris	Bark -cough tonic, Seeds -piles.	N 27^0 30.644 E 082^0 82.423
16	*Alstonia scholaris* (L.) R. Br.	Saptaparna	Chhitauni	Bark -fever, malaria	N 27^0 51.848 E 081^0 42.436
17	*Alternanthera sessilis* (L.) R. Br.		Matsiyakashi	Plant - cholagogue	N 27^0 44.349 E 081^0 59.024
18	*Ampelopteris prolifera* (Retz.) Copel.			Frond -cuts and wound	N 27^0 46.853 E $082^0$00.522
19	*Andrographis paniculata* Wall.	Kalamegh		Whole plant- fever, jaundice	N 27^0 46.053 E 082^0 00.522
20	*Anogeissus latifolia* (Roxb. ex DC.) Wall. Ex Guill. &Perr.	Dhava	Dhau	Bark astringent	N 27^0 47.943 E 081^0 53.254
21	*Argemone mexicana* L.	Swarnakshiri	Satayanasi Bhadabhaad	Root- chronic skin disease	N 27^0 44.187 E 081^0 45.599
22	*Aristolochia indica* L.	Ishwari	Ishwari	Root- tonic	N 27^0 46.053 E 082^0 00.522
23	*Artocarpus heterophyllus* Lam.	Panas	Kathal	Fruit- tonic, leaf skin disease	N 27^0 46.048 E 081^0 00.549
24	*Artocarpus lakoocha* Roxb. .	Lakuch	Barhal	Seed- purgative, bark sore.	N 27^0 47.510 E 081^0 40.523 N $27^0$40.709 E 081^0 46.718
25	*Arundo donax* L.	Nala	Narkat	Root- diuretic, hypoglycemic	N $27^0$51.848 E $081^0$49.859
26	*Asparagus racemosus* Willd.	Shatawari		Root- aphrodisiac tonic	N $27^0$10.273 E $082^0$15.206
27	*Azadirachta indica* A.Juss.	Nimba	Neem	Leaf -fever, diabetes, bark skin	N 27^0 41.943 E 081^0 53.254
28	*Bacopa monnieri* (L.) Pennel	Nirabrahmi	Brahmi	Plant- nervine tonic, asthma	N 27^0 49.320 E 081^0 43.152
29	*Bambusa arundinacea* (Retz.) Willd.	Vamsa	Bans	Exudate- cough tonic	N 27^0 48.092 E 081^0 54.130
30	*Basella rubra* L.	Potaki, Putika	Poi	Leaf- diuretic, gonorrhea	N 27^0 53.791 E 081^0 45.257
31	*Bauhinia purpurea* L	Kovidar	Kanchanar	Bark- throat disorder, root- carminative flower- laxative	N 27^0 31.160 E 081^0 59.8766
32	*Bauhinia racemosa* Lam.			Leaf- malaria, bark- astringent, diarrhea, dysentery	N 27^0 48.092 E 081^0 54.130
33	*Bauhinia vahlii*, W. & A	Maljan		Seeds- tonic aphrodisiac	N 27^0 46.077 E 082^0 00.413

34	*Bidens pilosa* L.			Plant- cough cuts	N 27^0 51.848 E 081^0 49.436
35	*Blumea lacera* L.	Kukurandar		Plant- bitter leaf antihelmintic.	N$27^0$40.709 E-081^0 46.718
36	*Boerhavia diffusa* L.	Punarnava	Gadahpunna	Root- asthma, jaundice	N 27040.709 E 081046.718
37	*Bombax ceiba* L.	Salmili	Semal	Bark- tonic aphrodisiac	N $27^0$40.709 E 081^0 46.718
					N 27^0 30.994 E 081^0 55.486
38	*Bougainvillea glabra* Choisy			Leaf - antiinflamatory	N 081046.718 E 27040.709
39	*Brassica campestris* L.	Sarsapa	Sarsoo	Seed oil- muscular rheumatism	N 081046.718 E 27040.709
40	*Bridelia montana* (Roxb.) Willd.		Khaji	Root and bark- astringent	N $27^0$40.709 E 081^0 46.718
					N 27^0 51.848 E 081^0 49.436
					N 27^0 48.345 E 081^0 45.230
41	*Butea monosperma* (Lam.)	Palash	Dhak	Bark- urinary disorder, seed- anthelmintic	N 27^0 47.510 E 081^0 40.523
42	*Caesalpinia bonduce* (L.) Roxb.	Lata karanj		Seed- fever, malaria, jaundice	N $27^0$40.709 E 081^0 46.718
43	*Cajanus cajan* (L) Millsp	Adhaki	Arahar	Leaf- jaundice, seeds boil	N 27^0 46.584 E 081^0 55.729
44	*Calamus rotang* L.	Vetra		Leaf- blood disorders	N 27040.709 E 081046.718
45	*Callicorpa maorophylla* Vahl	Priyangu		Leaf- rheumatism	N $27^0$40.709 E 081^0 46.718
					N 27^0 46.884 E 081^0 55.143
46	*Calotropis gigantea* R.Br.	Alarka	Akwan	Root- dysentery	N 27^0 07.154 E $082^0$16.457
47	*Calotropis procera* (Aiton) W.T. Aiton	Arka	Akawan Madar (L.) r	Root- bark dysentery	N $27^0$06.537 E $082^0$17.362
48	*Canna orientalis* Roscoe		Sarbajaya	Root- diaphoretic, diuretic	N $27^0$31.152 E $081^0$59.903
49	*Cannabis sativa* L.	Bhanga Ganjika	Ganja/ Bhang	Leaf- dysentery	N $27^0$40.709 E 081^0 46.718
50	*Carissa carandas* L.	Karmard	Karaunda	Unripe fruit- astringent, root-	N 27^0 46.053 E 082^0 00.522
					N 27^0 09.200

				anthelmintic	E 082^0 15.133
51	*Carissa opaca* Stapf ex Haines	Karmardika	Karauna	Root- anthelmintic	N 27^0 46.053 E 082^0 00.522
52	*Caryota urens* L		Mari	Nut- cooling	N 27^0 09.200 E 082^0 15.133
53	*Cascabela thevetia* (L.) Lippold	Peetakarvira	Pili kanair		N 27^0 30.616 E 082^0 02.423
54	*Cassia fistula* L.	SuvarnakaAragvadha	Amaltus	Rootbark seed- laxative, seeds emetic.	N 27^0 45.765 E 81. 59. 758
55	*Catharanthus roseus* (L.) G.Don	Sadanpushpi	Sadavahar	Flower- cancer, leaf diabetes	N27^{0}40.709 E 081^0.46.718
					N27^{0}40.709 E 081^0.46.718
56	*Cayratia trifolia* L.	Atamlaparni		Leaf , root- fever, ulcer	N 27^0 53.712 E 081^0 49.253
57	*Ceiba pentandra* (L.) Gaertn.)	Swet Salmili	Semal	Gum- tonic, astringent laxative	27^0 06.553 E 082^0 17.420
58	*Centella asiatica* (L.) Urb.	Mandukaparni	Mandukaparni	Plant- nerve tonic, skin disease	N 27^0 46.122 E 082^0 0.016
59	*Chenopodium album* L.	Vastuka	Bathuwa	Plant- laxative, anthelmintic	N 27^{0}40.709 E 081^0 46.718
					27^0 06.553 E 082^0 17.420
60	*Chrysopogon zizanioides* (L.) Roberty	Ushir	Khas	Root- rheumatism, stomachic, stimulant	N 27^{0}40.709 E 081^0 46.718
61	*Cinnamomum tamala* (Buch.-Ham.) T.Nees & C.H.Eberm.	Tamalaka	Tejapat	Leaf- stimulant carminative aromatic, gonorrhea, rheumatism,	N 27^0 10.279 E 082^0 23.012
62	*Cissampelos pareira* L	Ambasta, Patha		Root- bitter tonic, fever	N 27^{0}40.709 E 081^0 46.718
63	*Clerodendrum infortunatum* L.	Bhandir		Leaf, root- skin disease, wormifuge, malaria	N 27^{0}40.709 E 081^0 46.718
64	*Coccinia indica* Wight & Arn.	Bimbi, Kundrue	Kundan	Leaf root- diabetes, plant gonorrhea	N 27^0 47.923 E 081^0 53.251
					N 27^0 31.018 E 081^0 55.619

65	*Coix lacryma-jobi* L.	Gavedhuka	Gavedithuca	Seed -tonic, diuretic, root- menstruation disorder	N 27^0 44.173 E 081^0 45.498
66	*Cordia dichotoma* G. Forst.	Shleshmatak	Lasoada	Leaf-cough, fruit diuretic	N $27^0$40.709 E 081^0 46.718
					N 27^0 46.614 E 081^0 55.696
67	*Crotalaria retusa* L.		Ghunghuniya	Whole plant - scabies	N $27^0$40.709 E $081^0$46.718
68	*Crotalaria juncea* L.	Sana	Sanai	Leaf, seed- blood purification	N $27^0$40.709 E 081^0 46.718
					N $27^0$10.184 E $082^0$23.012
69	*Croton bonplandianum* Baill,		Vanatulsi	Anthelmintic	N 27^0 53.775 E 081^0 49.859
70	*Curculigo orchioides* Gaertn.	Talamulika	Kali-musali	Root- Piles jaundice, asthma	N 27^0 46.053 E082^0 00.522
71	*Cuscuta reflexa* Roxb.	Akashvalli	Amarbel	Plant- purgative, seeds- carminative anthelmintic	N 27^0 53.791 E 081^0 45.257
72	*Cyclosorus subpubescens* (Blume) Ching			Frond- skin disease	N 27^0 47.850 E 081^0 53.650
73	*Dalbergia sissoo* Roxb.	Shirshapa	Shisam	Leaf- stimulant, gonorrhea, root- astringent, wood leprosy	N 27^0 31.160 E 081^0 59.876
74	*Datura innoxia* Mill.		Safed Datura	Leaf- rheumatism, seeds- cough	N 27^0 48.275 E 081^0 45.197
75	*Dendrocalamus strictus* (Roxb.) Nees		Bans	Silicious matter- tonic astringent, peels- wound healing	N 27^0 40.707 E 081^0 46.114
76	*Desmodium gangeticum* (L.) DC.	Shalparni		Root- tonic, diarrhea diuretic	N $27^0$46.053 E $082^0$00.522
77	*Desmostachya bipinnata* (L.) Stapf	Kusha	Kush	Culms- diuretic, stimulant	N $27^0$10.184 E $082^0$23.012
					N 27^0 46.122 E $082^0$00.016
78	*Dillenia pentagyna* Roxb		Agai	Bark- astringent, fruit- digestive, cooling	N $27^0$40.709 E 081^0 46.718
79	*Dioscorea bulbifera* L.	Varahi		Tubers- dysentery, ulcer, syphilis	N 27^0 46.884 E 081^0 55.143
					N 27^0 53.791 E 081^0 45.257

80	*Diospyros melanoxylon* Roxb.	Tinduk	Tendu	Root- rheumatism swelling	N 27^0 45.765 320 E 81.59.758
81	*Dysphania ambrosioides* (L.) Mosyakin & Clemants			Leaf- vegetable for flavor	N 27^0 10.279 E 082^0 23.114
82	*Eclipta prostrata* (L.) L.	Bhringaraj		Plant- digestion, root purgative, hair tonic	N 27^0 44.335 E 081^0 59.029
83	*Eichhornia crassipes* (Mart.) Solms		Kumbhi	Flower- skin disease, edible,	N 27^0 31.004 E 081^0 55.523
84	*Elephantopus scaber* L.	Gojihwa		Plan-t cardiac tonic, root- dysuria	N 27^0 46.077 E082^0 00.413
85	*Emilia sonchifolia* (L.) DC.		Hirankhuri	Plant- decoction bowel complaint	N 27^0 46.053 E 082^0 00.522
86	*Eucalyptus globulus* Labill.		Yukalaptus	Leaf oil- antiseptic, respiration, skin disease, diarrhea,	N 27^0 30.994 E 081^0 55.486
87	*Euphorbia hirta* L.	Brihat Dugdhika	Duddhi	Plant- cough, asthma, worm, skin disease	N 27^0 46.053 E 082^0 00.522
88	*Evolvulus alsinoides* L.	Neel Shankhapushpi		Whole plant- nerve tonic	N $27^0$10.184 E $082^0$23.012
89	*Ficus benghalensis* L.	Vata	Bargad	Juice- rheumatism, bark- tonic, diarrhoea, diabetes	N 27^0 47.850 E 081^0 53.650
90	*Ficus hispida* L.f.	Kakudumbara		Fruit, seed, bark- emetic, purgative,	N $27^0$08.149 E $083^0$14.163
91	*Ficus racemosa* L.	Udambara	Gular	Bark- astringent, root dysentery, diabetes	N 27^0 46.883 E 081^0 55.235
92	*Ficus rumphii* L.		Pahar	Juice- worm, asthma	N 27^0 48.039 E 081^0 53.337
93	*Flemingia chappar* Buch. Ham. ex Benth.			Root- epilepsy, hysteria	N 270 46.584 E 081055.729
94	*Flemingia semialata* Roxb.		Shalparni	Root- epilepsy, hysteria	N 27^0 46.794 E 081^0 54.954
95	*Flemingia stricta* Roxb.			Root- tonic, ulcer, insomnia	N 27^0 46.077 E082^0 00.413
96	*Flemingia strobilifera* (L.) W. T. Aiton			Root- epilepsy, hysteria	N $27^0$40.709 E 081^0 46.718

97	*Gmelina arborea* L.	Gambhari	Bhelor	Root- tonic amongst dasmool	N 27^0 46.122 E082^0 00.016
98	*Gossypium herbaceum* L.	Karpasa	Kapas	Root- galactagogue, enhances lactation	N 27^0 44.335 E 081^0 59.029
99	*Heliotropium indicum* L.	Hasti sunda	Hathisunda	Leaf- boil, ulcer, wounds	N 27^0 44.335 E 081^0 59.029
100	*Hemidesmus indicus* (L.) R.Br.	Anantmoola	Sariva	Root- diuretic tonic	N 27^0 44.349 E 081^0 59.024
101	*Hibiscus rosa-sinensis* L.	Japa	Gudahal	Leaf- antifungal, flower emoluscent, root- cough	N $27^0$40.709 E 081^0 46.718
					N 27^0 10.279 E 082^0 23.012
102	*Holarrhena pubescens* Wall. ex G.Don	Kutaj	Kutaj Maida	Bark- dysentery, antihelmintic, seed- tonic	N 27^0 46.053 E 082^0 00.522
103	*Hydrocotyle javanica* Thunb.			Brain tonic, worm infestation	N 27^0 48.092 E 081^0 54.130
104	*Hygrophilla auriculata* Schumach.	Kokilakha	Talmakhana	Seeds- gonorrhoea	N $27^0$31.152 E $081^0$59.903
105	*Hyptis suaveolens* (L.) Poit		Van Tulasi	Leaf- fever,	N 27^0 31.004 E 081^0 55.523
106	*Jatropha gossypifolia* L.			Leaf, bark- skin diseases boil	N $27^0$40.709 E 081^0 46.718
					N 27^0 46.884 E 081^0 55.143
107	*Justicia gendarussa* Burm.f.		Nila Nirgundi	Leaf- rheumatism	N 27^0 10.279 E 082^0 23.012
108	*Lablab purpureus* (L.) Sweet	Shimbi	Sem	Seed- stomachic	N 27^0 10.279 E 082^0 23.012
109	*Lagerstroemia parviflora* Roxb.		Lamdia	Leaf- diabetes, bark heart disease	N 27^0 47.850 E 081^0 53.650
110	*Lannea coromandelica* (Houtt.) Merr.	Jingini	Jighna	Bark- astringent toothache	N 27^0 47.864 E 081^0 53.253
111	*Lantana camara* L.			Root- antispasmodic, antipyretic	N 27^0 46.053 E 082^0 00.522
112	*Lawsonia innermis* L	Madyantika	Mehadi Hina	Leaf- diabetes, astringent, sore throat	N 27^0 10.279 E 082^0 23.012
113	*Lens culenaris* Medic.	Masoor		Seed- laxative constipation	N 27^0 10.279 E 082^0 23.012
114	*Leucaena leucocephala*		Su babool	Leaf- anti	N 27^0 43.431

	(Lam.) de Wit			oxidant, antibacterial	E 081^0 45.860
115	*Limonia acidissima* Griff.	Kapittha	Kaitu	Fruit- stomach astringent, stimulant, leaf- carminative	N 27^0 46.048 E 081^0 00.511
116	*Linum usitatissimum* L.	Atasi	Tisi	Seed- demulcent, leaf - gonorrhea	N 27^0 47.077 E 082^0 0.413
					N 27^{0}10.279 E 082^{0}23.012
117	*Lygodium flexuosum* (L.) Sw.		Kalijhanta, Balkhes	Frond skin diseases, expectorant	N 27^0 47.077 E 082^0 0.413
118	*Madhuca longifolia* var.*latifolia* (Roxb.) A.Chev	Madhuka	Mahuwa	Flower- laxative stimulant anthelmintic	N 27^0 46.053 E 082^0 00.522
119	*Mallotus nudiflorus* (L.) Kulju &Welzen		Gutel	Plant- swelling, root- decoction in rheumatism	N 27^{0}10.279 E 082^0 23.016
120	*Mallotus philippinensis* Muell.	Kampillak Rechanaka	Sindur	Seed- anthelmintic	N 27^{0}40.709 E 081^0 46.718
121	*Melia azedarach* L.	Mahanimba	Bakain	Leaf- skin and diabetes	N 27^0 45.813 E 082^0 00.136
					N 27^0 46.565 E 081^0 55.593
122	*Millettia pinnata* (L.) Panigrahi	Karanj	Karsi	Bark, root- poultic	N 27^0 46.488 E 081^0 55.250
123	*Mirabilis jalapa* L.			Leaf- diuretic, purgative	N 27^0 10.279 E 082^0 23.114
124	*Mitragyna parvifolia* (Roxb.)	Kadam bhed		Bark, root- fever colic	N 27^0 44.389 E 081^0 59.038
125	*Momordica dioica* Roxb.	Karkotaki	Jangli Karela	Root- piles, sedative, urinary disease	N 27^0 48.367 E 081^0 45.241
126	*Moringa oleifera* Lam.	Shigru	Sahajan	Root- stimulant in paralysis, epilepsy, fruit,seed- liver disease, jaundice, leaf appetizer,	N 27^0 48.367 E 081^0 45.241
127	*Morus alba* L.	Tuda	Sahatoot	Fruit- refrigerant in fever, dyspepsia	N 27^0 48.367 E 081^0 45.241
128	*Murraya koenigii* (L.) Spreng.	Kaidarya	Mithi-neem	Plant- tonic, stomachache	N 27^0 46.053 E 082^0 00.522
129	*Neolamarckia cadamba* (Roxb.) Boss.	Kadamba	Kadamb	Bark- tonic, febriguge,	N 27^0 30.644 E 082^0 82.423

				astringent	
130	*Nerium indicum* Mill.	Karveera	Kaner	Root- skin disease, leprosy	N $27^0$10.279 E $082^0$23.012
131	*Nicotiana tabacum* L.	Tambaku	Surti	Leaf- sedative, narcotic, antiseptic rheumatic	N $27^0$10.279 E $082^0$23.012
132	*Nyctanthus arbortristis* L.	Shephalika	Harsinghar	Leaf- chronic fever, malaria rheumatism,	N 27^0 51.848 E 081^0 42.436
133	*Ocimum canum* Sims.	Arjaka	Jangli Tulsi	Leaf- skin disease cough, cold	N 27^0 48.314 E 081^0 45.201
134	*Ocimum tenuiflorum* L.	Tulasi	Tulsi	Leaf- expectorant, bronchitis, gastric, hepatic, seed genito-urinary disorder	N $27^0$10.279 E $082^0$23.012
135	*Opuntia dillenii* (Ker-Gawl.)Haw.		Nagaphani	Fruit- refrigerant, gonorrhea, cough, phylloclade ophthalmic disease	N 27^0 43.315 E 081^0 45.902
136	*Opuntia ficus-indica* (L.) Mill.		Nagphani	Fruit- refrigerant, gonorrhea, cough	N 27^0 43.315 E 081^0 45.902
137	*Oxalis corniculata* L.	Changeri		Leaf- cooling, digestive	N 27^0 46.049 E 081^0 00.501
138	*Parkinsonia aculeata* L.			Leaf- hepatoprotective, seed antibacterial, antimicrobial.	N 27^0 43.315 E 081^0 45.902
139	*Peristrophe bicalyculata* (Retz) Nees	Kakjangha	Atrilal	Plant- rheumatism, antibacterial	N $27^0$40.709 E 081^0 46.718
140	*Phoenix sylvestris* Roxb.	Khajuri	Khajur	Root- nervous disease, fruit tonic, restorative, seed- ague	N 27^0 31.160 E 081^0 59.87 N $27^0$10.279 E $082^0$23.012
141	*Phyla nodiflora* (L.) Greene	Jalpippali	Vashira	Plant- skin disease, eczema	N $27^0$40.709 E 081^0 46.718
142	*Pithecellobium dulce* (Roxb.) Benth.		Jangal Jalebi	Bark- febrifuge, anema	N $27^0$40.709 E 081^0 46.718
143	*Plumbago zeylanica* L.	Chitraka		Root- appetizer,	N $27^0$40.709

				diarrhea, piles	E 081^0 46.718
144	*Polygonum plebeium* R.Br.		Raniphool	Root- bowel, plant pneumonia, expectorant	N 27040.709 E081046.718
145	*Prosopis julifera* (Sw.) DC.		Vilayati Babool	Bark- rheumatism, pod astringent	N 27^{0}40.709 E 081^0 46.718 N 27^0 51.848 E 081^0 42.436
146	*Putranjiva roxburghii* Wall.	Putrajivak	Putranjeeva	Fruits leaf cough cold	N 27^0 51.848 E 081^0 42.436
147	*Ranunculus arvensis* L.		Chambul	Plant- intermittent fever	N 27^{0}40.709 E 081^0 46.718
148	*Ricinus communis* L.	Erand	Renda	Seeds purgative	N 27^0 48.397 E 081^{0}45.257
149	*Rumex* nepalensis Spreng.		Chutrika	Fresh plant juice- urinary complaints	N 27^{0}49.320 E 081^0 43.152
150	*Rungia pectinata* (L.) Nees		Pindi, Parpata	Leaf- cooling, small pox	N 27^0 44.349 E 081^0 59.024
151	*Saccharum munja* Roxb.	Munja	Mooj, Sarpat	Stem- aphrodisiac, blood trouble, burning sensation	N 27^0 47.510 E 081^0 40.523
152	*Saccharum spontaneum* L.	Kash	Kans	Plant- laxative aphrodisiac.	N 27^0 30.994 E 081^0 55.486
153	*Saraca asoca* (Roxb.) Willd.	Ashok, Hemapushpa	Ashok	Bark- uterine tonic menstrual disorder	N 27^0 51.848 E 081^0 42.436
154	*Schleichera oleosa* (Lour.) Merr.	Lakhaa vriksh Koshamra Kusum	Kusum	Seed oil- massage in rheumatism, skin eruption	N 27^0 45.756 320 E 81 59.860
155	*Scoparia dulcis* L	Gudapatri	Mithi Patri	Leaf- diabetes, cough	N 081^{0}46.718 E 27^{0}40.709
156	*Semecarpus anacardium* L.	Bhallataka	Bhilva	Fruit- toxic, rheumatism,tumour	N 27^0 46.077 E 082^0 00.413 N27^{0}40.709 E-081^0 46.718 N 27^0 45.765 E 81.59.821
157	*Senna alata* (L.) Roxb.	Dadmardan		Leaf- ringworm leaf, flower- cough asthma	N 27^0 30.616 E 082^0 02.423

158	*Senna occidentalis* (L.) Link,	Kasamarda	Kasaundi	Seeds, leaf- skin diseases	N 27^0 53.775 E 081^0 49.253
159	*Senna tora* (L.) Roxb.	Chakramarda	Chakaramard	Leaf- laxative, ring worm, eczema	N 27^0 53.775 E 081^0 49.859
160	*Shorea robusta* Roth	Sala,	Sal	Fruit- diarrhea, Essential oil antiseptic, fracture, skin diseases	N 27^0 46.587 E 081^0 55.084
161	*Sida acuta* Burm.f.		Bariara	Root- astringent, cooling, tonic	N27040.709 E 081046.718
					N $27^0$40.709 E 081^0 46.718
					N 27^0 37.095 E 081^0 47.862
162	*Sida cordifolia* L.	Bala	Kungya	Root- barkwith Til oil facial paralysis, plant juice spermatorrhoea	N $27^0$40.709 E 081^0 46.718
163	*Sida rhombifolia* L.	Mahabala	Swet Barela Barujar	Leaf- swelling, stem demulcent, root rheumatism,	N$27^0$40.709 E081^0 46.718
					N 27040.709 E 081046.718
164	*Smilax zeylanica* L.		Jangli Ausbak, Ramdatoon	Root- tonic, rheumatism, dysentery, veneral diseases	N $27^0$40.709 E 081^0 46.718
					N $27^0$40.709 E 081^0 46.718
165	*Solanum viarum* Dunal			Plant- diabetes	N 27^0 45.813 E 082^0 00.136
166	*Solanum virginianum* L.	Kantakari	Bhatakataiya	Root- expectorant, plant cough, sore throat	N $27^0$40.709 E $081^0$46.718
167	*Spilanthes paniculata* Wall. ex DC.			Flower- toothache, seed- saliva enhancer, plant rheumatism	N 27^0 45.813 E 082^0 00.136
					N 27^0 48.117 E 081^0 84.645
168	*Spondias pinnata* L.f. Kurz.	Amrataka	Amra	Fruit- digestive, bark- dysentery, rheumatism	N 27^0 45.813 E 082^0 00.136
169	*Streblus asper* Lour.	Shakhotaka	Singhore	Bark- fever, dysentery juice	N 27^0 44.335 E 081^0 59.029

				antiseptic, astringent	
170	*Syzygium cumini* (L.) Skeels	Jambu	Jamun Jamun	Bark- astringent, fruit liver diseases, seed diabetes	N 27^0 46.794 E 081^0 54.954
					N 081046.718 E $27^0$40.709
					N $27^0$40.709 E 081^0 46.718
171	*Syzygium heynianum* (Duthie) Wall.ex Gambel	Nadi jambu	Kathajamun	Plant- stimulant, rheumatism	N 27^0 44.349 E 081^0 59.024
172	*Tabernaemontana divaricata* R.Br. ex Roem. & Schult.			Root- bitter anodyne, toothache, juice eye,	N 27^0 10.279 E 082^0 23.114
173	*Tamarindus indica* L.	Amlika	Imali	Leaf- sprain, fruit digestive, carminative	N 27^0 43.315 E 081^0 45.902
174	*Tamilnadia uliginosa* (Retz.) Tirve	Pindar	Pandalu	Fruit pulp- dysentery, anthelmintic	N 27^0 46.665 E $080^0$55.628
175	*Tectona grandis* L.f.	Saka	Sagawn	Bark- astringent, Nut oil hair growth	N 27^0 53.775 E 081^0 49.859
176	*Terminalia arjuna* (Roxb.) W&A	Arjuna	Arjun	Bark- cardiac tonic	N 27^0 46.794 E 081^0 54.954
177	*Terminalia bellirica* (Gaertn.) Roxb.	Bibhitak	Bahera	Fruit- bitter astringent tonic, kernel narcotic	N 27^0 46.884 E 081^0 55.143
178	*Terminalia tomentosa* W.&A. .	Asana	Deli arjun	Bark- astringent, cardiac tonic	N 27^0 48.341 E 081^0 45.217
					N 27^0 45.750 E 081 59.897
179	*Tinospora cordifolia* (Willd.) Miers	Guduchi	Guruch Guduchi	Stem- bitter, jaundice, hypertension, diabetes	N 27^0 53.791 E 081^0 45.257
180	*Tribulus terrestris* L.	Gokshur	Gurkhul Kanta	Fruit- diuretic, tonic	N 27^0 46.053 E 082^0 00.522
181	*Triumfetta rhomboidea* Jacq.	Jhinjhirita	Chikti	Plant- demulcent, astringent, gonorrhoea	N 27^0 46.057 E 082^0 00.186
182	*Tylophora indica* (Burm f.)		Antamoola	Leaf- asthma	N 27^0 46.972 E 081^0 43.445
183	*Urena lobata* L.	Vanabhenda	Bachata	Root- diuretic tonic, rheumatism	N 27^0 46.665 E 081^0 55.628
					N$27^0$40.709 E081^0 46.71

184	*Vachellia nilotica* (L.) P.J.H.Hurter & Mabb.	Kikar, Babool	Babool	Gum- diarrhea, dysentery, diabetes	N $27^0$46.077 E 080^0 00.413 N $27^0$40.709 E 081^0 46.718
185	*Vanda roxburghii* R. Br.	Vrikshadani	Rasna, Vanda	Root- rheumatism	N $27^0$40.709 E 081^0 46.718
186	*Vernonia cinerea* Less.	Sahadevi		Plant - diaphoretic, juice piles, seed anthelmintic	N 27^0 10 184 E082^0 23.012
187	*Vicia hirsuta* (L.) Gray		Ankari		N 27^0 10 184 E082^0 23.012
188	*Vitex negundo* L.	Renuka, Nirgundi	Nirgundi, Meuri	Leaf- rheumatism, tonic, headache, root- expectorant	N 27^0 53.791 E 081^0 45.257
189	*Wrightia tinctoria* (L.) R. Br.	Swet Kutaj		Bark- dysentery	N $27^0$40.709 E 081^0 46.718
190	*Xanthium strumarium* L.	Artagal	Karauni	Plant- diaphoretic, sedative,malaria	N 27^0 10 184 E082^0 23.012
191	*Ziziphus jujuba* Mill.	Kola, Ber	Bair	Fruit- mucilaginous, pectoral, styptic, blood purifier root fever	N 27^0 44.335 E 081^0 59.029

Through cultivation plants are collected from one climatic area and transported to another like introduction of any required plant in the areas where it is not recorded in the Natural field. This practice is named Ex- situ propagation. This practice needs thorough testing at different level i.e. level of cultivation, quality of growth, quality of drug and percentage of active principles viz. alkaloid, flavonoids, terpinoids etc.

Figure-1 Photographs of selected medicinal plants from study areas.

Map 1 Showing study areas in Gonda, Shrawasti and Balrampur districts of Uttar Pradesh

DISCUSSION

The paper deals with the conservational issues after exploration of medicinal plants in the Balrampur, Gonda and Shravasti forest divisions of Uttar Pradesh. The increasing demand of medicinal plants by the pharmaceuticals and gradually decreasing positioning of medicinal plants in field due to transforming forest land into agricultural land and repeated use of weedicides is regularly decreasing the distribution of medicinal plants from natural field however, many of the medicinal plants are protective to the crops by supplying plant health alkaloids to the plants for protecting them from various kind of diseases. During various explorations it was observed that there is repeated decrease in the number and quantity of therapeutically important medicinal plants in the natural field. Though the Flora of Upper Gangetic Plains by Duthie (1960) and ethnobotanical studies have been undertaken in past (Kanjilal, 1933; Duthie, 1960; Aminuddin and Singh. 1982; Singh and Maheshwari, 1985,1992; 1995; Singh and Maheshwari, 1989; Jain, 1991, 2003; Asolkar et al. 1992; Singh and Prakash, 1996; Sundriyal et al., 1996; Singh, 1997; Pande, et al., 1998; Pandey et al, 1999; Singh and Singh 2001; Pande,2002; Kumar et al. 2003a,b, 2005, 2006; Mutthu, 2006, Khare, 2007; Babu et al., 2010; Gabriel, et al.,2010; Altundag and Ozturk, 2011; Tatyik, 2013: Anonymous and several others). Mitra (1989) has described therapeutic terms used in ethnobotany whereas Rao (1989) has described various techniques used in ethnobotany. Report on various aspects of ethnobotany to the Government of India was prepared and submitted by Pushpangadan (1997). Anwar and and Ghani, 1973; has undertaken ethnobotanical studies in Bangladesh. In Turkey, similar studies were also conducted (see Altundag and Ozturk 2011; Hayta et al., 2014). In addition to exploration of ethnomedicinal plants from various part of the Country some alkaloid analysis has also been carried out by Aminuddin, 1982; Goenec et al., 2012, 2014; Reda, 2015 and others. However, the potential of medicinal plants in various areas of the study has not been explored and the present paper deals with the distribution of various medicinal plants at Global Positioning System as well as quantitative assessment for pharmaceutical utility and conservational purposes. Thus it is concluded that the medicinal plants growing in field needs to be cultivated in association with crop plants to save from use of chemical fertilizers and pesticides etc. After completion of its life cycle such plants act as organic manure supplemented with plant health natural products available in them.

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