International Journal of Herbal Medicine
Available online at www.florajournal.com

E-ISSN: 2321-2187
P-ISSN: 2394-0514
IJHM 2017; 5(4): 09-15
Received: 03-05-2017
Accepted: 04-06-2017

Snobar Shafi
Department of Botany and Microbiology, HNB Garhwal University (A Central University) Srinagar, Uttarakhand India

JP Mehta
Department of Botany and Microbiology, HNB Garhwal University (A Central University) Srinagar, Uttarakhand India

Sharesth Kumari
Department of Botany and Microbiology, HNB Garhwal University (A Central University) Srinagar, Uttarakhand India

Pooja Dhiman
Department of Botany and Microbiology, HNB Garhwal University (A Central University) Srinagar, Uttarakhand India

Correspondence
Snobar Shafi
Department of Botany and Microbiology, HNB Garhwal University (A Central University) Srinagar, Uttarakhand India

Indigenous uses of plants under Pinus dominated ecosystem at Pauri Garhwal, India

Snobar Shafi, JP Mehta, Sharesth Kumari and Pooja Dhiman

Abstract
A panorama of the diversity emerged in this study, which is intangible asset suggests a very high scope of the utilisation of this natural and uncultivated biodiversity for supporting livelihoods of the region. A survey was conducted in the forest ecosystem of Pauri-Garhwal Uttarakhand with an objective to identify the prevalent economically important forest products medicinal, fodder, fibres, fuel wood, dye and various other plants used by local inhabitants. Due to the exorbitant use of the resources of forest area and modernisation, the traditional knowledge of plants is receding day by day. An attempt has been made to suggest possible conservation strategy of these resources. It is emphasised that there is to prioritise the important plants of multipurpose use. Such efforts would bring high proceeds to the local community. The present study concludes that study area comprises a huge diversity of economically important plant used by the local villagers.

Keywords: Diversity, utilisation, traditional knowledge, conservation strategy, multipurpose use

1. Introduction
Forests are an essential part of development and survival of communities residing along the forest areas. The great Himalaya is globally recognized for its vast resources of biodiversity [1]. Understanding the indigenous knowledge of mountain people in relation to biodiversity resources management is one of the key issues for sustainable development [2]. It is a well-known fact, that worldwide thousand of plant species are endangered and facing extinction with the current trend of their exploitation and destruction [3]. This is compounded by the fact that trade networks are often complex with serious impacts on species populations requiring innovative assessment, monitoring, and conservation method [4]. Plant harvest and use occur across a wide spectrum of biogeographic, ecological, economic, social, and historical circumstances across continents and vegetation types. There is a strong association between forests and application of traditional knowledge in the harvesting and maintenance of forest products [5]. Traditionally throughout the globe, many forest margin communities are depriving benefits of these plant products. Forest gatherer communities who rely on forest products for their livelihood are often poorly organized [6]. The study employs an approach to identify some of the confluences between use and conservation in the fragile ecosystem.
Pinus roxburghii Sarg. is one of the fast growing conifers in the Himalayan region is often blamed at social and even scientific platforms for ecosystem degradation but it also serves various ethnic and communities of Himalaya. In Uttarakhand information regarding the use of plants has been documented by various workers [7-13]. A similar attempt has been made to explore indigenous uses of forest plant products common among different communities of the tribal people of Pauri Garhwal.

2. Material and Methods
2.1 Study area
The intact region of Uttrakhand Himalaya is tranquil of two divisions called Garhwal and Kumaon Himalaya (Fig. 1). Geographically, the Garhwal Himalaya in Uttarakhand India lies between the latitudes 29°26’ to 31°28’N and longitudes 77°49’ to 80°60’E with a total area of 3000 km^2 exhibiting submontane to alpine climates with distinct characteristics of the specific vegetation types. Garhwal Himalaya is bounded by tonnes of rivers and forms confluences of rivers around many locations. The uncountable vegetation encompassing Garhwal Himalaya is due to geographical variation and altitudinal range. The site was typical mountainous chosen at Mandakhal, mainly lies in the hilly tract of the district Pauri Garhwal Himalaya, Uttarakhand and lies between the longitude of 78.87 E and latitude of 30.17 N with an altitudinal range of 1800-2000 masl. Three villages were selected in the periphery of forests namely Baukhal, Nishnee including Mandakhal and surveyed for two consecutive years (2014-2016).

The area enjoys sub-temperate to a temperate climate with cool winter and pleasurable summer. The present work was undertaken and assessed in Pine dominated forest ecosystem.

2.2 Methods

For the study of diversity of indigenous uses of plants, data were drawn from a household random survey of villagers residing around forest margins often known as 'Pahadis' (the hill people) and is also a combination of comparative literature. After thoroughly exploration tree, shrub and herb species were listed from the forest and were analysed for different utilisation. In addition to the base data of diversity, prevalent species were quantitatively analysed for density by quadrat method. Identification of plant samples was done by using the available literature with the help of relevant flora of the North West Himalayas [14, 15] and GUH herbarium. The information was compiled, documented and analysed for diversity and utilisation pattern. The queries were frequently made to increase the reliability of the data.

3. Results

Diversity of Plants

The total plant species identified were 120 plants belonging 102 genera and 42 families. The representing families were Asteraceae (15 spp.) followed by Poaceae (13 spp.), Lamiaceae (11 spp.) and Rosaceae (9 spp.) (Fig. 2) and most of the products were derived from herbs (59%), followed by shrubs (15%), grasses (9%), trees (6%), sedges (5%) and contributed by legumes (4%) (Table 1 and Fig. 3). Results revealed a higher percentage of medicinal plants (90 spp, 75%) followed by fodder plant species (50spp, 39.7%). Apart from medicinal and fodder value, many of the plants were noticed wild edible (40 spp, 33.3%), used for thatching and sheltering (6 spp, 5%), some provide fuel wood, fibre, dye, as well as bee forage (Table 2 and Fig. 4). With reference to the plant, part uses, leaves (27%) were commonly used for medicines and as fodder also followed by stem and fruit, followed by whole plant uses (25.30%) to root, stem, flower, fruit and seed. (Fig. 5). Density was higher for bee forage species (*Plantago depressa*) 480/ha followed by some representative medicinal species (*Micromeria biflora)* 460/ha, followed by fodder species (*Indigofera heterantha*) 420/ha (Fig. 6). Total density was higher for medicinal plants (2440/ha) followed by wild edibles 1100/ha (Fig. 7). It was evident from the observation that *Pinus roxburghii* favours frequent burning for regeneration of herbaceous vegetation**.** It was assessed that these products are used to meet substantial needs of livelihood and forests are sort of income for future generations.

3.2 Utilisation pattern

On the basis of their uses, the forest products can be classified into 8 categories as medicinal, fodder, wild edible, thatching and sheltering, fuel wood, fibre, dye, and bee forage and are utilised in different forms. Different mixtures are used for medicinal purposes including important ones are: *Ajuga* spp, *Asparagus adscends, Berberis* spp, *Bergenia ciliata, Conyza canadensis, Cynoglossum* spp*, Cyperus* spp, *Desmodium* spp, *Echinops cornigerus, Himalrandria tetrasperma*, *Hypericum oblongifolium, Indigofera heterantha, Micromeria biflora, Plantago depressa, Rosa brunonii* and *Urtica dioca* etc. Some 50 fodder plant species were recorded including trees, shrubs and herbs and mostly livestock fed on wild plants either in wet or dried form commonly include Poaceae members (*Apluda mutica, Chrysopogon* spp, *Sporobolus fertilis), Anaphalis busua*, *Rhynchosia rothii* and *Asparagus adscends* etc. Some plant species were found edible as a whole or either some part like fruits leaves etc, in use found were *Begonia picta, Oxalis corniculata* and *Urtica dioca*. Only 1.5% plants (*Arisaema tortuosum* and *Themeda anathera*) were considered poisonous to humans and livestock. Local people use the stem, leaves of *Artmesia* spp*, Cotoneaster rotundifolia* and *Myrsini africana* for thatching, sheltering and fencings purposes as well as for making agricultural implements. Almost all woody species was found in use for fuel wood species, common in use were *Myrica esculenta, Pinus roxburghii,* and *Pyrus pashia.* Few of the plants also yield dye which is common among local communities common in use was found *Rubia manjith.* Plants such as *Plantago depressa, Pyracantha crenulata* and *Rosa brunonii* are an important source of bee forage and few plants such as *Dabregeasia salicifolia* and *Daphne papyraceae* are an important source of fibre.

4. Discussion

It was found that the tribal communities of the area are linked to these plants for acquiring basic livelihood requirements. Tribal Population of Uttarakhand like Jaunsuri, Tharu and Bhotiya tribes have a well-known account of plant uses with religious beliefs and plant conservation was conceded through these beliefs. The paper furnishes importance of plants to humans which are in use from time immemorial. It has been noticed herbaceous plants were most popularised among these products. The degree of threat to natural populations of medicinal plants has increased because more than 90% of the plant raw materials for herbal industries are drawn from the natural habitats [16]. In particular, the impacts of land-use and climatic changes on plant biodiversity will have extensive ramifications on other taxa and human society given that plants are fundamental structural and nutrient-sequestering components of most ecosystems [17]. The present study will be helpful in depicting the traditional correlation of plant resources with humans of the area and provides experimental approaches for rangeland management for livestock farming. Similar views were also pointed out that rangeland blessed with a high number of palatable species has great potential for livestock farming [18]. The plants under multiple uses have to be given priority because these and are under immense biotic pressure [19]. The issue about the conflict of use was also raised in the late 1990's, evaluating integrated management of NTFPs and timber as a means to promote compatibility [20]. Where a plant resource is particularly valuable, logging operations may become involved in its exploitation, competing with, or excluding, local collectors [21]. The available evidence suggests that fires are practised deliberately to maintain grasses for cattle, and also facilitate the collection of fodder and several non-wood forest products [22]. Grazing is the most economical way of utilising rangeland vegetation and information concerning the effects of grazing and burning on forage grasses is needed for the successful long-term use of the grazinglands. Due to a frequent wild forest fire in Garhwal Himalaya, climatic changes are apparent and loss of important species can occur in future. The attention to assessing the impacts of environmental changes was also paid on biodiversity for effective prioritisation of conservation efforts [23].

Some plants are of multiple uses like *Artmesia capellaris* Thunb., *Artmesia nilagirica* (C.B.Clarke) Pamp.*, Asparagus adscendens* Buch. Ham. exRoxb. *Bidens pilosa* L. *Begonia picta* Smith, Exot. *Cotoneaster rotundifolia* Wallich ex Lindley. *Dabregeasia salicifolia* (D.Don) Rendle*, Daphne papyraceae*

Wallich ex Steudel, *Desmodium microphyllum* (Thunb.) DC., *Duchesnea indica* (Andrews) Focke.*Geranium walliachianum* D.Don ex Sweet. *Hypericum oblongifolium* Choisy. *Indigofer a heterantha* Wallich ex Brandis. *Myrica esculenta* Buch Ha m. ex D Don, *Myrsini africana* L. *Pinus roxburghii* Sargent, *P rimula floribunda* Wallich *Pyrus pashia* Buch.-Ham ex D.Don. *Quercus leucotrichophora* A. Camus. and *Solanum nigrum* L, need to be managed efficiently. Besides of this other plants also are of despicable uses. Some conservation strategies have to be there so that loss can be mitigated.

4.1 Conservation strategies

Forest department involved actively in conservation policy should recommend policies to both government and non-government organisations to mitigate the loss of biodiversity. In addition to use by local people, it is a debate of conflict that researchers are procuring either whole plant or different plant parts, but somehow restrictions should be imposed on excessive extraction. Despite this, research centres should be thoroughly involved in the efficient use and possibly overcomes for stability. There should be policies and great enthusiasm among people thereby reducing the pressure of overgrazing and other biotic interference, efforts should be for management of grasslands in terms of fodder species. Local communities in Garhwal Himalaya have a long history in modifying the environment by fire for own benefits, for negotiating catastrophe effects due to fire, wild fire/ accidental fire method should be brought into repeated prescribed treatment to ensure the stability of broad leaf evergreen forests.

Table 1: Plants with Botanical name, common name, family, life form, importance and Part used

S. No.	Botanical Name	Local name/ English name	Family	Life form	Importance	Part used
1	*Achyranthes aspera* L.	Latjiri	Amaranthaceae	H	M, Fo	R, L
2	*Achyranthes bidentata* Blume.	Chicheere	Amaranthaceae	H	M, Fo	R, L
3	*Agrostis pilosula* Trin.	Bentgrass	Poaceae	G	Fo	WP
4	*Ajuga bracteosa* Wallich ex Benth.	Neelkanthi,	Lamiaceae	H	M, E	L
5	*Ajuga latifolia* Host.	Bugleweed	Lamiaceae	H	M	L
6	*Anagilla arvensis* L.	Jonkmari	Primulaceae	H	M, Fo, E	WP
7	*Anaphalis busua* Buch-Ham. DC.	Bugla	Asteraceae	H	Fo, E	L
8	*Androsace lanuginose* Wallich.	WoollyRock Jasmine	Primulaceae	H	Fo	L
9	*Apluda mutica* L.	Tachula	Poaceae	G	Fo	WP
10	*Argemone mexicana* L.	Pili Kateli	Papaveraceae	H	M	R, Sd
11	*Agrimonia pilosa* Ledeb.	Lesukuria	Rosaceae	H	M	WP
12	*Arisaema tortuosum* Wallich.	Bag-Mungri	Araceae	H	M	WP
13	*Artmesia capellaris* Thunb.	Marwa	Asteraceae	H	M, Th & Sh	S, L
14	*Artmesia nilagirica* (C.B.Clarke) Pamp.	Kunja	Asteraceae	H	M, Th & Sh	S, L
15	*Asparagus adscendens* Buch.-Ham. ex Roxb.	Jhirni	Asparagaceae	Sh	M, Fo, E	R, S, Fr
16	*Berberis aristata* DC.	Kingore	Saxifragaceae	Sh	M, Fw, E, F	R, S
17	*Berberis asiatica* Roxb. ex DC.	Kilmora	Saxifragaceae	Sh	M, E, F, D	R, S, Fr
18	*Bergenia ciliata* (Haworth) Stemb.	Silpara	Saxifragaceae	H	M, E	R, L
19	*Bidens pilosa* L.	Kumur	Asteraceae	H	M, E, Fo	WP
20	*Begonia picta* Smith, Exot.	Patharchatta	Begoniaceae	H	M, E	WP
21	*Bupleurum falcatum* L.	Jangli-jeera	Apiaceae	H	M, E	R; Fr
22	*Campanula pallida* Wallich.	Purple Bell- flower	Campanulaceae	H	M	L
23	*Campylotropis speciosa* Royle ex Schindler.		Fabaceae	Sh	Fo	S
24	*Carex cruciata* Wahlenb.	Cruciate sedge	Cyperaceae	S	Fo	S
25	*Chrysopogon aciculatus* Retz.	Surwala	Poaceae	G	Fo	WP
26	*Chrysopogon gryllus* L.	Scented grass	Poaceae	G	Fo	WP
27	*Clinopodium vulgare* L.	Wild basil	Lamiaceae	H	M, E	WP
28	*Commelina benghalensis* L.	Kanjura	Commelinaceae	H	M	WP
29	*Conyza Canadensis* L.	Horseweed	Asteraceae	H	M	L
30	*Cotoneaster rotundifolia* Wallich ex Lindley.	Rainshi	Rosaceae	Sh	M, Fw, Sh, E	S, Fr
31	*Crotolaria albida* Heyne ex Roth.	Chunchuni	Fabaceae	H	M, Fo	R, Sd
32	*Cynodon dactylon* (L) Pers.	Dubla	Poaceae	G	M, Fo	R
33	*Cynoglossum glochidiatum* Wallich ex Benth.	Lichkura	Boraginaceae	H	M	R
34	*Cynoglossum zeylanicum* (Vahl ex Hornem.)	Andhahuli	Boraginaceae	H	M	L
35	*Cyperus cyperoides* L.	Tall Sedge	Cyperaceae	S	M, Fo	WP
36	*Cyperus distans* L.f.	Slender cyperus	Cyperaceae	S	M, E	WP
37	*Cyperus niveus* Retzius.	Murya-ghas	Cyperaceae	S	Fo	WP
38	*Cyperus rotundus* L.	Motha	Cyperaceae	S	Fo	WP
39	*Dabregeasia salicifolia* (D.Don) Rendle	Syanru	Urticaceae	T	M, Fo, Fw, F, E	WP
40	*Daphne papyraceae* Wallich ex Steudel.	Satpura	Thymelaeaceae	Sh	M, Fw, F	S, L
41	*Desmodium microphyllum* (Thunb.) DC.	Sunsuni	Fabaceae	L	M, Fo	WP
42	*Desmodium multiflorum* DC.	Many- Flowered Desmodium	Fabaceae	L	M, Fo	WP
43	*Desmodium neomexicanum* A. Gray	New Mexico ticktrefoil	Fabaceae	L	M	WP
44	*Dicliptera chinesis* Nees in Wallich	Kulartore	Acanthaceae	H	M, Fo,	WP
45	*Digitaria ciliaris* (Retz.) Koeler.	Summer grass	Poaceae	G	Fo	WP
46	*Duchesnea indica* (Andrews) Focke.	Bhiun-kaphal	Rosaceae	H	M, Fo, E	L, Fr
47	*Echinops cornigerus* DC.	Kantela	Asteraceae	H	M, E,	R
48	*Eleusine indica* (L.) Gaertner.	Jharnpriya-kodu	Poaceae	G	Fo	WP
49	*Elshotzia stachyodes* (Link) Raizada and Saxena.		Lamiaceae	H	Fo	WP
50	*Engelhardia spicata* Leschenault ex Blume	Mahwa	Juglandaceae	T	M, Fw	S
51	*Erigeron annus* (L.) Pers.	Daisy fleabane	Asteraceae	H	Fo	WP

52	*Eupatorium adenophorum* Sprengel.	Kharna	Asteraceae	Sh	M	L
53	*Ficus racemosa* L.	Gular	Moraceae	T	Fo, E	S, L Fr
54	*Flemingia fruticulosa* Wallich ex Benth.	Churan	Fabaceae	Sh	M, E	R, L
55	*Galinsoga parviflora* Cav.	Marchya	Asteraceae	H	M, Fo	WP
56	*Galium aparine* L.	Khuskusa	Rubiaceae	H	M, Fo	L
57	*Galium elegans* Wallich.	Kutub	Rubiaceae	H	M, Fo	WP
58	*Gentiana argentia* Royle ex D.Don.	Silvery Gentian	Gentianaceae	H	M	WP
59	*Geranium walliachianum* D.Don ex Sweet.	Ratanjot	Geraniaceae	H	M, D	R
60	*Girardiania diversifolia* (Link) Friis.	Bhainsya-kandali	Urticaceae	H	M, Th	S
61	*Glochidion velutinum* Wight.	Chamri	Phyllanthaceae	T	Fw	S
62	*Gonatanthus pumilus* (D.Don) Engler & Krause	Ban-pindalu	Araceae	H	M	R
63	*Himalrandria tetrasperma* (Roxb.) Yamazaki.	Kamoli	Rubiaceae	Sh	M, Fw	S, L, Fl
64	*Hypericum oblongifolium* Choisy.	Chitroi	Hypericaceae	Sh	M, Fo, D	S, L
65	*Hypoxis aurea* Lour.	Golkya	Hypoxidaceae	H	M	R, L
66	*Imperata cylindrica* (L.) P. Beauv	Sauraun	Poaceae	H	M, Fo	R
67	*Indigofera heterantha* Wallich ex Brandis.	Sakina	Fabaceae	L	M, Fo, E, Fw, Th	L, Fl
68	*Inula cappa* (Buch.-Ham. ex D.Don)	Athhu	Asteraceae	Sh	M	R
69	*Kyllinga brevifolia* Rottboell.	Shortleaf spikesedge	Cyperaceae	S	Fo	WP
70	*Lamium album* L.	Tilka/Henbit	Lamiaceae	H	M	WP
71	*Lepdodermis lanceolata* Wailich.	Padera	Rubiaceae	Sh	M, Fo	S, Fl
72	*Leucus lanata* Benth.	Bis-kapara	Lamiaceae	H	M, E	WP
73	*Micromeria biflora* (Buch.-Ham. ex D.Don) Benth.	Gorakhopan	Lamiaceae	H	M, Fo	L
74	*Mosla dianthera* (Buch.-Ham. ex Roxb.) Maxim.	Beefsteak	Lamiaceae	H	Fo	L
75	*Myrica esculenta* Buch -Ham. ex D Don	Kaphal	Myricaceae	T	Fw, E, D	S, Fr
76	*Myrsini africana* L.	Chupra	Myrsinaceae	Sh	M, Fw, Th	S, Fr, Fl
77	*Oplismenus undulatifolius* (Ard.) P. Beauv.	Wavyleaf basket grass	Poaceae	H	Fo	WP
78	*Origanum vulgare* L.	Bantulsi	Lamiaceae	H	M, E	WP
79	*Oxalis articulata* Savign.	Khatura	Oxalidaceae	H	M, E	L
80	*Oxalis corniculata* L.	Bhilmora	Oxalidaceae	H	M, E	L
81	*Persicaria capitata* (Buch.-Ham. ex D.Don) H. Gross.	Kaflya	Polygonaceae	H	M	L
82	*Pimpinella diversifolia* DC.	Teroi	Apiaceae	H	M	WP
83	*Pinus roxburghii* Sargent.	Chir	Pinaceae	T	M, Fw, E, R	S, Fr
84	*Plantago depressa* Willd.	Luhurya	Plantaginaceae	H	M, B	S, L, Fl
85	*Poa annua* L.	Ghas	Poaceae	G	Fo	WP
86	*Pogonatherum crinitum* (Thunb.) Kunth.	Bamboo grass	Poaceae	G	M, Fo	WP
87	*Potentila gerardiana* Lindley ex Lehmann.	Bajradanti	Rosaceae	H	M	R
88	*Pouzolzia zeylanica* (L.) J. Bennett & Brown,	Graceful Pozolz's Bush	Urticaceae	H	M, E	L
89	*Primula floribunda* Wallich	Yellow Primose	Primulaceae	H	M, Fo	WP
90	*Pyracantha crenulata* (D.Don) M. Roemer.	Ghingaru	Rosaceae	Sh	E, B	Fl, Fr
91	*Pyrus pashia* Buch.-Ham ex D.Don.	Melu	Rosaceae	T	M, Fo, Fw, E	L, Fl Fr,
92	*Quercus leucotrichophora* A. Camus.	Banj	Fagaceae	T	M, Fo, Fw	S, L, Fr
93	*Reinwardtia indica* Dumortier.	Phinuli	Linaceae	Sh	E, B	Fl
94	*Rhynchosia rothii* Benth. ex Aitchinson.	Silky Snoutbean	Fabaceae	L	Fo	L
95	*Rosa brunonii* Lindley.	Kunja	Rosaceae	Sh	M, B	L, Fl
96	*Roscoea purpurea* J.E Smith	Kakoli	Zingiberaceae	H	M,	L
97	*Rubia manjith* Roxb. ex Fleming.	Majethi	Rubiaceae	H	M, D	R, S
98	*Rubus ellipticus* Smith	Hinssar	Rosaceae	Sh	E, B	R, Fl Fr,
99	*Rubus niveus* Wallich ex G.Don	Anchu	Rosaceae	Sh	M, E	R, Fr
100	*Rumex dentatus* L.	Jangli-palak	Polygonaceae	H	M, Fo, E	L
101	*Salvia lanata* Roxb.	Ghanyajhar	Lamiaceae	H	M	L, Fl
102	*Scutellaria lineanis* Benth.	Narrow leaf skullcap	Lamiaceae	H	M	Fl
103	*Senecio nudicaulis* Buch.-Ham ex D.Don.	Neelkanthi	Asteraceae	H	M	R, L
104	*Solanum incanum* L.	Banbhatuja	Solanaceae	H	M	L
105	*Solanum nigrum* L.	Makoi	Solanaceae	H	M, Fo, E	WP
106	*Solanum surratense* Burm. f.	Bhuiakhanderi	Solanaceae	H	M	L, Fl
107	*Sonchus asper* L.	Pili-dudhi	Asteraceae	H	M	WP
108	*Sonchus oleraceous* L.	Dudiya	Asteraceae	H	M, E	WP
109	*Sporobolus fertilis* (Steudel) Clayton.	Parramatta grass	Poaceae	G	Fo	L
110	*Stellaria media* (L.) Villars.	Badyalu	Caryophyllaceae	H	M, Fo, E	L
111	*Tagetus minuta* L.	Chinchilla	Asteraceae	H	E	L
112	*Taraxacum officinale* Weber.	Kanphuliya	Asteraceae	H	M, E	R,S,L
113	*Thalictrum javanicum* Blume.	Kirmoli	Ranunculaceae	H	M	R
114	*Themeda anathera* (Nees ex Steudel) Hackel.	Ghatira	Poaceae	G	Fo	L
115	*Triumfetta annua* L.	Orange Burr-bush	Malvaceae	H	E	S
116	*Urena lobata* L.	Chatkura	Malvaceae	Sh	M, F	R, S, Fl
117	*Urtica dioca* L.	Kandali	Urticaceae	H	M, E, F	S, L
118	*Verbascum Thapsus* L.	Kakri Tamakhu	Scrophulariaceae	H	M	WP
119	*Viola canescens* Wallich.	Vanfsa	Violaceae	H	M, E	WP
120	*Viola pilosa* Blume.	Vanfsa	Violaceae	H	M, E	WP

Abbreviations: H=Herb, G=Grass, Sh=Shrub, S=Sedge, T =Tree, L=Legume, M=Medicinal plants, Fo=Fodder, E=Edible, Th and Sh=Thatching and Sheltering, Fw=Fuel wood, F=Fibre, D=Dye, R=Resin, B=Bee forage, WP=Whole plant, R=Roots, S=Stem, L=Leaves, Fl=Flower, Fr=Fruits, Sd=Seeds

Table 2: Purpose of use and representative species

Purpose	No. of species used	Part used	Representative species
Bee forage	5	Flower	*Plantago depressa*
Dyes	5	Roots and Stem	*Rubia manjith*
Edible	40	Leaves	*Duchesnea indica, Oxalis corniculata, Rubus ellipticus, Rubus niveus*
Fibre	6	Bark	*Daphne papyraceae*
Fodder	50	Stem and leaves	*Quercus leucotrichophora, Indigofera heterantha*
Fuel wood	13	Stem	*Pinus roxburghii*
Medicinal	90	Leaves	*Ajuga* spp, *Asparagus adscends, Berberis* spp, *Bergenia ciliata, Cynoglossum spp, Cyperus* spp, *Desmodium* spp, *Echinops cornigerus, Himalrandria tetrasperma, Hypericum oblongifolium, Indigofera heterantha, Micromeria biflora, Plantago depressa, Rosa brunonii*
Thatching and Sheltering	6	Twigs	*Artmesia Capellaris, Indigofera heterantha*

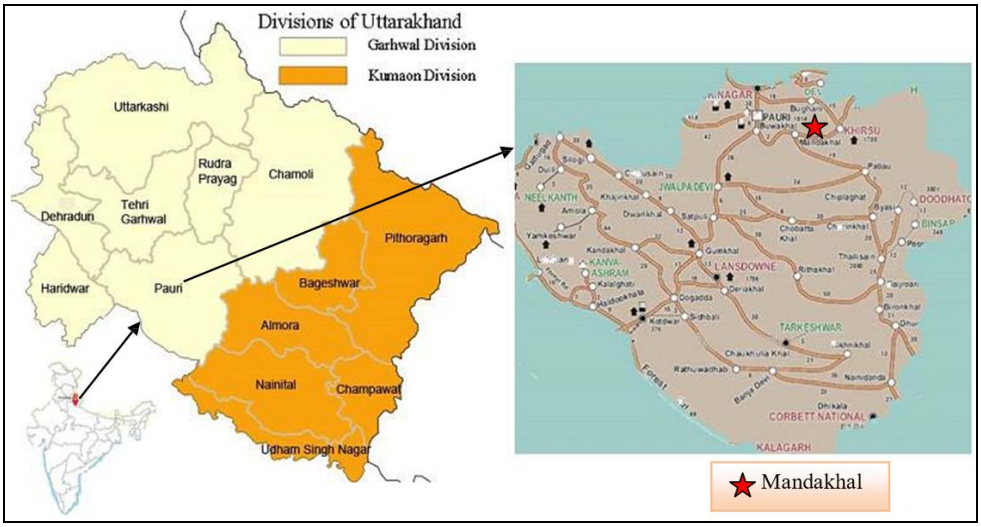

Fig 1: Map Showing Study Site

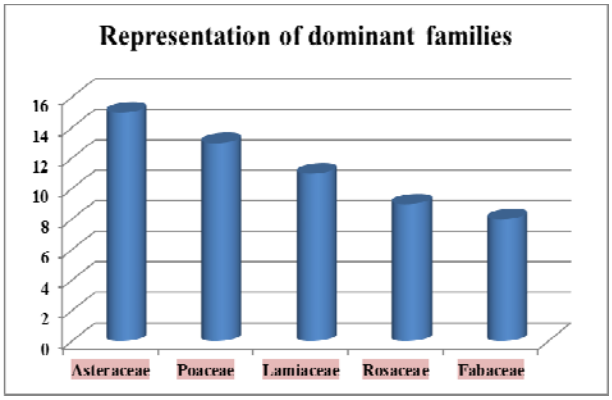

Fig 2: Dominant families

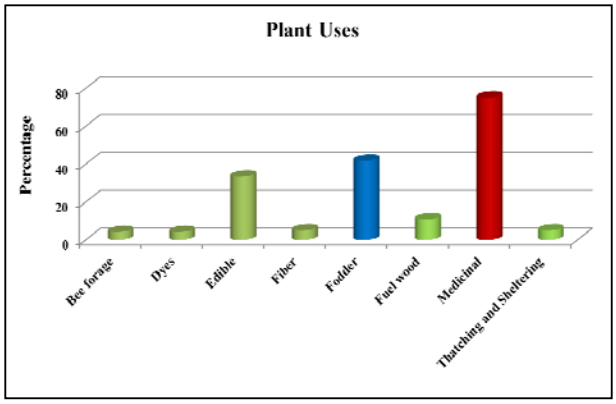

Fig 4: Percentage of different uses of Plants

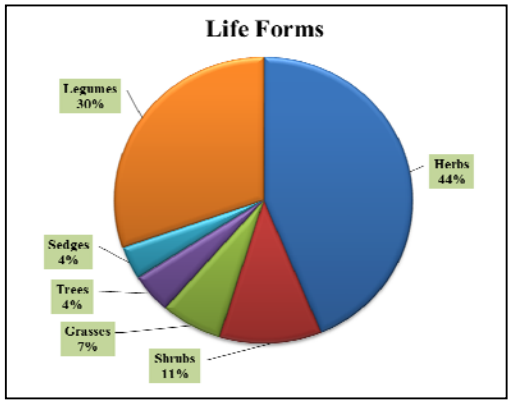

Fig 3: Plant Life Forms

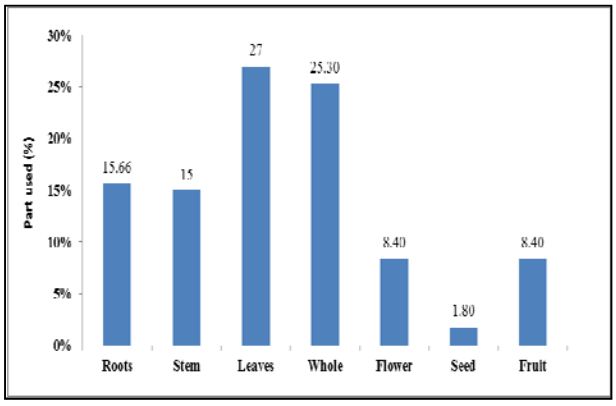

Fig 5: Parts of plants used

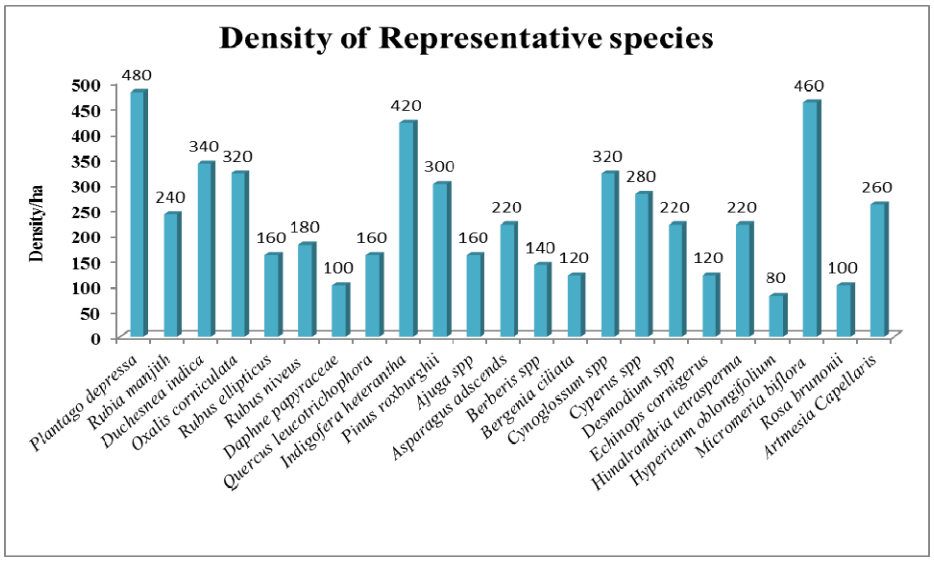

Fig 6: Density of Representative species commonly used

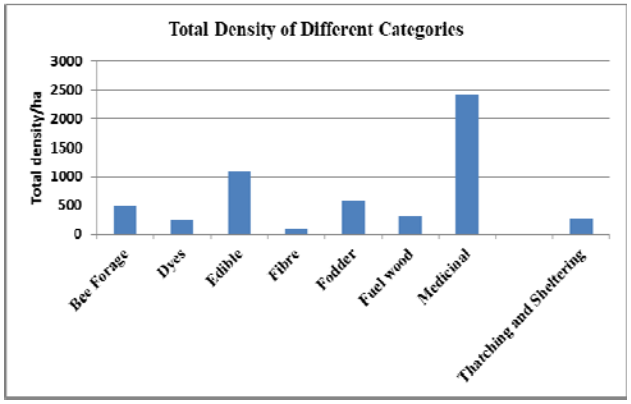

Fig 7: Total density of Different categories of plant uses

5. Conclusion: The present study highlights the status of uses of plants and presents baseline data on the use of plant resources by communities. This information will allow better long-term planning for future forest composition and may provide direction for experimental plantings of new populations or species in anticipation of the future climate. It is concluded that the investigated area is facing with a multitude of problems and over-exploitation of medicinal, fodder, and fuelwood species has resulted in degradation of the forage productivity. Resources are diminishing gradually and should be conserved by sustainable techniques. Several indirect impacts also are quite evident like impacts by a forest fire which in turn changes the microclimate at that particular temperature. There is an urgent need to aware local people about the conservation status of the local indigenous vegetation on scientific lines and to document traditional knowledge and uses of native flora. In addition to the compilation, various conservation strategies need to be implemented for future conservation.

6. Acknowledgments
The authors would like to acknowledge Department of Botany and Microbiology HNB Garhwal University for concert help and support. We are gratefully acknowledging the villagers for their cordial cooperation during data collection.

7. References

1. Singh Pushker, Yadava AK. Plant biodiversity distribution pattern under pure and mixed chir-pine (*Pinus roxburghii* Sarg.) forests of central Himalaya, India. New York Science Journal. 2013; 6(9).
2. Chavda NH, Mehta SK. Study of Species Diversity of Trees and Shrubs in Bhandaria Forest Area. International Journal of Pure and Applied Bioscience. 2015; 3(2):356-361.
3. Bapat VA, Dixit GB, Yadav SR. Plant biodiversity conservation and role of botanists. Current Science. 2012; 102(10).
4. Chamberlain JamesL, Cunningham AnthonyB, Nasi Robert. Diversity in Forest Management: Non-Timber Forest Products and Bush Meat:Renewable. Resource Journal. 2004; 22(1).
5. Dattagupta Shovan, Gupta Abhik, Ghose Manoranjan. Diversity of non-timber forest products in Cachar District, Assam. India Journal of Forestry Research. 2014; 25(2):463-470.
6. Johnson SudhakarT, Agarwal KR, Agarwal Amit. Non-timber forest products as a source of livelihood option for forest dwellers: role of society, herbal industries and government agencies. Current Science. 2013; (104):4.
7. Maikhuri RK, Nautiyal S, Rao KS, Saxena KG. Role of medicinal plants in the traditional health care system: a case study from Nanda Devi Biosphere Reserve. Current Science. 1998; 75:152-157.
8. Kala CP. Indigenous uses, population density and conservation of threatened medicinal plants in protected areas of the Indian Himalayas. Conservation Biology. 2005; 19:368-378.
9. Bisht VK, Negi JS, Bhandari AK, Sundriyal RC. Amomum subulatum Roxb: Traditional, phytochemical and biological activities- An overview. African Journal of Agricultural Research. 2011; 6(24):5386-5390.
10. Sharma Jyotsana, Gaur RD, Painuli RM. Conservation status and diversity of some important plants in the Shiwalik Himalaya of Uttarakhand, India. International Journal of Medicinal and Aromatic Plants. 2011; 1:75-82.
11. Kandari LS, Phondani PC, Payal K, Rao KS, Maikhuri RK. Ethnobotanical study towards conservation of medicinal and aromatic plants in Upper Catchments of Dhauli Ganga in the Central Himalaya. Journal of Mountain Science. 2012; 9:286-296.
12. Bisht VK, Rana CS, Negi JS, Bhandari AK, Purohit V,

Kuniyal CP *et al*. Lamiaceous ethno-medicobotanicals in Uttarakhand Himalaya, India. Journal Medicinal Plants Research. 2012; (6):4281-4291.
13. Bisht VK, Kandari LS, Negi JS, Bhandari AK, Sundriyal RC. Traditional use of medicinalp lants in district Chamoli, Uttarakhand. India Journal of Medicinal Plants Research. 2013; (7):918-929.
14. Naithani BD. Flora of Chamoli. Botanical Survey of India, Dehradun, India. 1985; 1(2).
15. Gaur RD. Flora of District Garhwal Northwest Himalaya (with Ethnobotanical notes) Transmedia, Srinagar Garhwal, 1990.
16. Sanwal Chandra Shekher, Sushma, Kumar Nilay. An Introduction of Medicinal and Aromatic Plants in Chir Pine (Pinus Roxburghii) Forest of India: A Sustainable Technique 2nd International Conference on Environmental Science and Technology IPCBEE, IACSIT Press, Singapore 2011, 6.
17. Giam Xingli, Bradshaw JA Corey, Tan TW Hugh, Sodhi S Navjot. Future habitat loss and the conservation of plant biodiversity. Biological Conservation. 2010; 143:1594-1602.
18. Ahmed Ejaz, Arshad Muhammad, Saboor Abdul, Qureshi Rahmatullah, Mustafa Ghazala, Sadiq Shumaila *et al*. Ethnobotanical appraisal and medicinal use of plants in Patriata, New Murree, evidence from Pakistan. Journal of Ethnobiology and Ethnomedicine. 2013; 9:13.
19. Amjad Shoaib Muhammad, Arshad Muhammad, Qureshi Rahmatullah. Ethnobotanical inventory and folk uses of indigenous plants from Pir Nasoora National Park, Azad Jammu and Kashmir. Asian Pacific Journal of Tropical Biomedicine Elsevier. 2015; 5(3):234-241.
20. Laird S. (The management of forests for timber and non-timber forest products in central Africa. In: Sunderland, T.C.H., Clark, L.E., Vantomme, P. (Eds.), The Non-Wood Forest Products of Central Africa: Current Research Issues and Prospects for Conservation and Development. Food and Agriculture Organisation (FAO) Rome, 1999, 51-60.
21. Rist Lucy, Shanley Patricia, Sunderland Terry, Sheil Douglas, Ndoye Ousseynou, Liswanti Nining *et al*. The impacts of selective logging on non-timber forest products of livelihood importance. Forest Ecology and Management, 2011, xxx.
22. Kumar Munesh, Sheikh MehrajA, Bhat Jahangeer, Bussmann Rainer W. Effect of fire on soil nutrients and under storey vegetation in Chir pine forest in Garhwal Himalaya, India. Acta Ecologica Sinica. 2013; 33:59-63.
23. Lee TM, Jetz W. Future battlegrounds for conservation under global change. Proceedings of the Royal Society B: Biological Sciences. 2008; 275:1261-1270.