

Study of Phytodiversity in Sahwa and Taranagar Area of Churu District, Rajasthan

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Abstract

Increasing population and changing lifestyle lead extensive commercial exploitation of the natural biodiversity. Therefore, documentation of biodiversity is mandatory to develop the strategies of conservation and management. Present paper reports the phytodiversity in Sahwa and Taranagar area of Churu district. The present study provides information on 188 plant species belonging to 142 genera covering 53 families of angiosperms. Out of these reported 188 plant species 13.3% are trees, 10.1% shrubs, 05.3% under shrubs, 57.5% herbs, 10.6% grasses and 03.2% climbers. It is also evident that Fabaceae and Poaceae are the largest families among Dicotyledons and Monocotyledons respectively. Fabaceae the largest family is represented by 18 genera and 26 plant species whereas Poaceae by 17 genera and 23 species. Rests of the families are represented by less plant species. The present paper has attempted to record the data regarding the availability of plant resources which have various potential uses.

Keywords: Angiosperms, Herbs, Trees, Conservation, Desert.

Introduction

Norse and Mac Manus (1980) defined the term Biological diversity and its abridged form Biodiversity was initially coined by W.G.Rosen in 1985 (Heywood and Baste 1995) for the first planning meeting of the "National Forum on Biodiversity" held in Washington DC (Singh and Singh, 2010). Biodiversity related to plants known as Phytodiversity. It refers to the number of plants species occurring in the given region, country, continent or the entire globe. It provides the basic necessities of our social, cultural, economic and biological life. Some of the benefits are directly visible to us while some others are indirect. The growing human and animal population has laid great stress on desert vegetation for fuel, top feed, fibers, fertilizer, timber and fencing.

Generally plants live together and form small or large groups in a particular area where they compete with each other for light, water and mineral nutrients. This type of aggregation among plant species is known as community. Vegetation fluctuations from year to year, season to season and month to month are studied through frequency, density and abundance (Mishra, 1968). The study of vegetation is an important aspect in phytosociological studies of an area. Vegetation and plant communities can give us the correct picture of the ecological conditions, since vegetation is a combination of various plant communities of different aspects and compositions, each being the result of combined effect of all environmental factors, connected with where they grow.

Aims of the Study

The present study is an attempt to determine the structure, composition and diversity of plant species in Sahwa and Taranagar area of churu district and also to develop awareness among local inhabitants for Biodiversity conservation.

Review of Literature

It is estimated that these exist 5-50 million species of living forms (Flora and Fauna) on the earth. These include 3, 93,450 of green plants, fungi, bacteria, lichen and viruses (Anon, 1997). India is one of the world's top twelve mega diversity nations (Apte *et al.* 2007) among these India ranked 6th (Semwal *et al.* 2007). India has almost all the climatic conditions and ecological zones found in different part of the world (Krishnakutty and Chandrasekaran, 2007). Indian Thar desert is formed from one of the biogeographical zone of India (Gena 2006). Indian sub-continent is a treasure house of wild economic plants, wild edible and medicinal ones

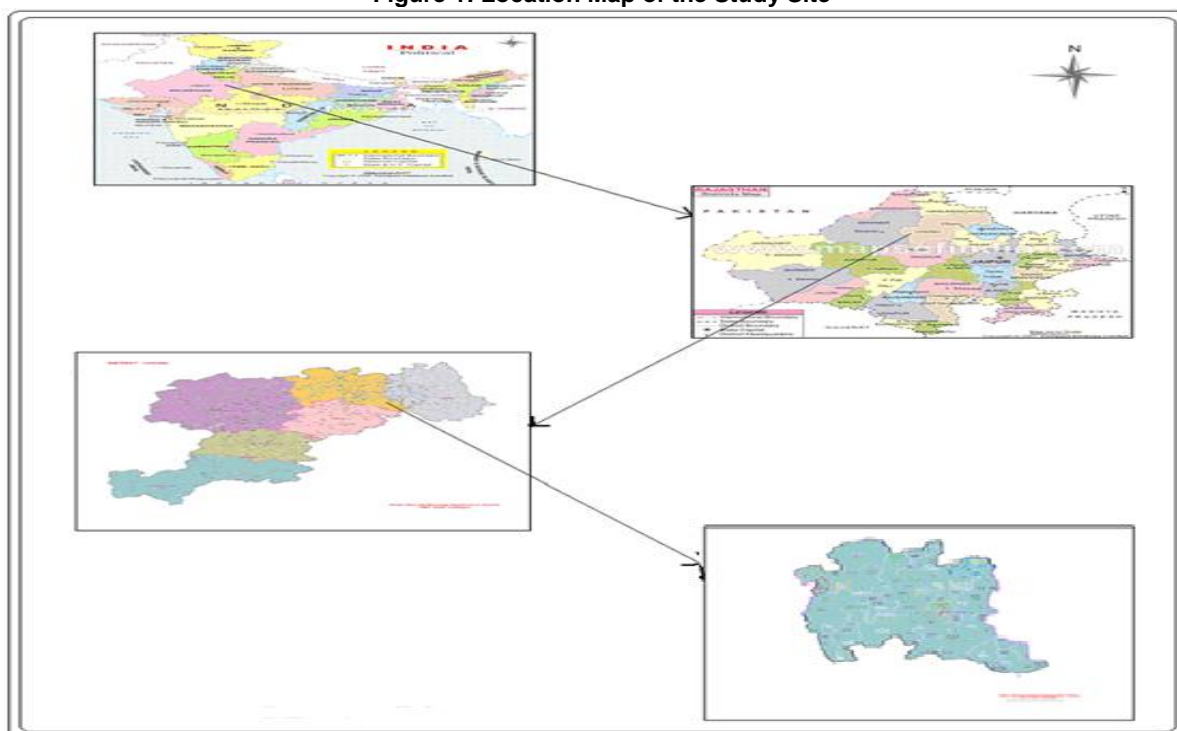
used in several Ayurvedic preparations and also the centre of domestication and diversification of several forest plant species forage, grasses, shrubs, herbs and ornamental plants. The Indian Thar Desert known as "Maru-Pradesh" means the land of death, the region known for the erosion and depletion of phytodiversity. The characteristic phytodiversity of Thar is due to variable climatic, edaphic and topographic conditions. Those have marked effect on growth and development of vegetation but still several plant species thrive well despite the inhospitable environmental conditions (Mohammed 2000; Sen 1996, 2000). The collection and study of Rajasthan desert traced from the year 1852 by Mr. and Mrs. G.L.Allen after that Hooker (1907), Sarup (1958), Bhandari (1978,1990), Flora of Churu"(Singh *et al* 1997), The phytodiversity and ecology of Churu district have been studied by Harsh (2002), Mohammed *et al* (2002). Goel and Mitra (2000) studied the method and approaches to the conservation of Phytodiversity.

Study Area

Sahwa and Taranagar are the north eastern part of Churu district and situated in 28°41'N Latitude

and 75°03'E longitude with a height of about 286 meters above mean sea level (MSL). Plant collected from these different sites of Sahwa and Taranagar (Bhaleri Site I, Changoi Site II, Sahwa Site III). The study area represents extremely harsh climatic condition and varied micro-topographic features where plants have adapted to arid hostile climatic conditions. It gives rise to various plant associations which exhibit stark seasonality. The vegetation is mainly dry, open and interspersed grasslands consisting mainly of stunted, thorny and prickly shrubs and perennial herbs which are mostly drought resistant. The ephemerals come during the rainy season, complete their life cycle before the advent of summer and bulk of area is once more transformed into open sandy plains, desolate and barren. Vegetation is mainly categorized on the basis of its habitat (Shetty and Singh, 1987). The physiographic feature of this area having sand dunes and sandy plains both stabilized and embryonic sand dunes are present in this region.

Figure 1: Location Map of the Study Site



Material and Method

The field study was carried out in Sahwa and Taranagar Tehsil of Churu District, Rajasthan during 3 years (2008-2010). The selected areas represent various topographical and ecological features such as sandy plains, sand dunes and humid area near IGNP Canal distributary and Chaudhary Kumbha Ram Arya Lift canal (Sahwa). Plant species were collected and studied by rapid and frequently used quadrat method (Braan-Blanquet, 1932), Herbarium sheet also prepared and labeled. Further identified with different floras (Maheswari, 1963, Bhandari, 1990) and also matching with the help of authentic herbarium of

Dungar College Bikaner, J.N.V.University Jodhpur and B.S.I. Jodhpur.

The various phytosociological parameters such as Frequency, Density, Abundance and Dominance for each species were analysed from collected data as per standard methods. These parameters are Frequency, Density & abundance.

Frequency

It is concerned with the degree of dispersion of individuals of a species within an area. It is measured by percentage presence of a species in a particular area.

Density

It denotes the average number of individuals of a given species in an area. The study of density is significant due to relative importance of each species.

Abundance

It is the number of individuals per unit area of their occurrence or it represents the relative distribution of species in the community were calculated.

A number of indices have been reported which are used to measure both components of species diversity, *i.e.* species richness and evenness into a single index. Indices such as Simpson's index (Simpson, 1949) and Shannon-wiener index (Shannon and Weaver, 1949) for species diversity, for Equitabilities (Lloyd and Ghelardi, 1964) has been used for assessing biodiversity of the area.

Simpson's index

Simpson proposed for the first time a widely used index varies inversely with species heterogeneity and infact measures the concentration of dominance. The index measures the probability that two individuals selected at random from a sample will belong to the same species and ranges from 0-1.

Shannon-Wiener index

This index of diversity is based on information theory. The information content is a measure of the amount of uncertainty. The index is zero if there is only one species in the sample and maximum when all species are represented by the same number of individuals. It generally falls between 1.5 -3.5 and rarely exceeds 4.5 (Margalef, 1972). Pielou (1966) suggested that this index is valid on random samples which one takes out from a large community with known species number.

Equitability

Evenness or Equitability represents the distribution of individuals among the species. It is sometimes defined as the ratio of observed diversity (Margalef, 1958).

Result and Discussion

The present study focuses on an inventory of phytodiversity of Sahwa and Taranagar area of Churu District, Rajasthan and recorded 188 plant species, belonging to 142 genera covering 53 families of Angiosperms (Table1), out of these reported 188 plant species, 13.3% are trees, 10.1% Shrubs, 05.3% Undershubs, 57.5% herbs, 10.6% grasses and 03.2% climbers (Figure-1). It is also evident that Fabaceae and Poaceae are the largest families among Dicotyledons and Monocotyledons respectively. Fabaceae the largest family is represented by 18 genera and 26 plant species whereas Poaceae by 17 genera and 23 species. Rests of the families are represented by less than 10 plant species. Among these, 27 families are represented by only single genus and 21 families by only single species (Figure-2).

The recorded data of frequency, density and abundance of each species is estimated and are presented that the plant species which exhibits highest frequency during 2008-2010 such as *Cenchrus ciliaris* at Site I and lowest frequency is *Blepharis sindica* at Site III. The plant species which

shows high density during both the years is *Amaranthus viridis* at Site II and lowest density is *citruillus colosynthis* at Site III and the plant species which shows highest abundance such as *Tragus racemosus* and *Cyperus rotundus* at Site II and the lowest is *Convolvulus microphyllus* at Site I. The value of different parameters such as diversity indices (Simpson's Index, Shannon Wiener Index), Equitabilities or Evenness of study site are presented in table 2.

Table 2: Diversity Indices of Study Sites

	Site I	Site II	Site III
Simpson Index	0.052	0.057	0.070
Shannon & Wiener Index	3.107	2.961	2.681
Equitability	0.866	0.873	0.743

The value of Simpson index ranges from 0.052 to 0.070, which shows that the distribution of individuals among the species is in evenness. According to Margalef (1972) the value of Shannon – Wiener index generally falls from 1.5 to 3.5 and rarely exceed up to 4.5. In the present study, this index was also observed higher and ranges from 2.681 to 3.107. Higher value indicates that all species represented by the same number of individuals. The value of equitability is from 0.743 to 0.886 observed at study sites.

Verma *et al.* (2003) observed and reported that the dominance index was lower while density index was higher for ground flora. In the present study higher value of species diversity but lesser value of equitability were reported. The higher value of species diversity is not a good indicator of the relative wealth of species in a community.

According to Sen (1982) the western Indian desert is divided into five major phytogeographical divisions. The study area is also divided into following divisions:

Sand Dunes Areas

It is biggest division and vegetationally demarcated by Calligonum type. Among tree and shrub species *Prosopis cineraria* and *Calligonum polygonoides* are dominant throughout, whereas *Acacia senegal*, *Calotropis procera*, *Capparis decidua*, *Dalbergia sisso*, *Leptadenia pyrotechnica*, *Salvadora persica*, *Tecomella undulata* are co-dominant.

Sandy Plains

This area is vegetationally demarcated by *Prosopis-Ziziphus-Capparis* type. The dominant shrubs and trees are *Capparis decidua*, *Leptadenia pyrotechnica*, *Prosopis cineraria*, *Ziziphus nummularia*, while *Acacia senegal*, *Calotropis procera*, *Lycium barbarum*, *Salvadora oleoides*, *S. persica* etc are the co-dominant ones. *Cenchrus prieurii*, *Cleome gynandra*, *Gisekia pharnacioides*, *Rhynchosia minima*, *Tecomella undulata*, *Tephrosia purpuria*, *Tribulus rajasthanensis*, *Ziziphus* are threatened plant species of this division (Pandey etal 1983: Bhandari 1990)

Gravel and Compact Soil Areas

This division is vegetationally named as *Capparis-Prosopis-Salvadora* type. Dominant

vegetation among shrubs and trees are *Capparis decidua*, *Prosopis cineraria*, *Salvadora oleoides* and *Ziziphus nummularia* whereas co-dominant are *Acacia nilotica*, *Acacia senegal*, *Albizia lebbek*, *Azadirachta indica*, *Balanites aegyptica*, *Calotropis procera*, *Leptadenia pyrotechnica*, *Salvadora persica* etc. Some of the threatened taxa found in this habitat are *Cenchrus prieurii*, *Heliotropium marifolium*, *Tribulus rajasthanensis*.

Saline Areas

Vegetationally this division named as Tamarix-Salvadora-Suaeda type. The dominant species are *Chenopodium album*, *Capparis decidua*, *Haloxylon recurvum*, *Salvadora persica*, *Suaeda fruticosa*, *Tamarix indica* whereas co-dominant are *Acacia senegal*, *Calotropis procera*, *Indigofera oblongifolia*, *Leptadenia pyrotechnica*, *Prosopis cineraria* etc.

The study area has a large number of perennial species such as *Aerva persica*, *Calligonum polygonoides*, *Capparis decidua*, *Crotalaria burhia*, *Leptadenia pyrotechnica*, *Prosopis cineraria*, *Salvadora persica*, *Solanum surattense*, *Tecomella undulata*, *Withania somnifera*, these plant are also used as emergency food and have lots of economic value.

Several plant species such as *Aerva persica*, *Argemone maxicana*, *Calotropis procera*, *C. gigantea*,

Capparis decidua, *Crotalaria burhia*, *Leptadenia pyrotechnica*, *Prosopis cineraria*, *Salvadora oleoides*, *S.persica* and *Tecomella undulata* are adapted and best suited for conservation and stabilization of sand dunes and also maintain the phytodiversity of study area as well as balancing the desert ecosystem. The rich phytodiversity of study area has a great potential of plants having medicinal value and some are used as fodder in addition to this, these plants provide tannins, oils, gums and resins, dyes and fibers.

The documentation and proper assessment of phytodiversity is dependent on respective areas and their habitat. High demand rate of plant products for various purposes promote either overexploitation or cultivation of specific plant species (Tiwari P., Soni I. and Patel S. (2014).) and thus economic valuation of ecosystem services neglects the value of biodiversity conservation. Unfortunately, present ecosystem are destroyed rapidly due to habitat alternation, high grazing pressure, over exploitation, pollution and introduction of exotic species also threatened the native taxa and global biological resources and this had led to the fast depletion of biodiversity in different ecosystems and adversely affected the ecological balance and socio-economic status of the people. There is a need for increased legal protection well designed management practices to conserve the phytodiversity.

Table 1: List of indigenus plant species observed at study area and its surroundings

S.No.	Plant species	Family	Habitat	Remarks
01	<i>Abutilon indicum</i> (Linn.) Sweet	Malvaceae	Shrub	Kanghi, WP
02	<i>Acacia farnesiana</i> (Linn.) Willd.	Fabaceae	Herb	Fodder
03	<i>A. nilotica</i> (Linn.) Del.	Fabaceae	Tree	Gum
04	<i>A. senegal</i> (Linn.) Willd.	Fabaceae	Small tree	Kumbat, Gum
05	<i>Achyranthes aspera</i> Linn.	Amaranthaceae	Herb	Uandokanto
06	<i>Aegle marmelos</i> (Linn.) Correa.	Rutaceae	Tree	Bilpatar, Fruit
07	<i>Aerva persica</i> (Burm.f.) Merrill	Amaranthaceae	Under shrub	Bui
08	<i>A. pseudotomentosa</i> Blatt. & Hallb.	Amaranthaceae	Under shrub	Buari
09	<i>Albizia lebbek</i> (Linn.) Willd.	Fabaceae	Tree	Sares, WP
10	<i>Aloe barbadensis</i> Mill.	Liliaceae	Herb	Gwarpatha
11	<i>A. vera</i> (Linn.) Burm	Liliaceae	Herb	Gwarpatha, LP
12	<i>Alternanthera sessilis</i> (Linn.) DC.	Amaranthaceae	Herb	Fodder
13	<i>Amaranthus spinosus</i> Linn.	Amaranthaceae	Herb	Kantio-chandelo
14	<i>A. viridis</i> Linn.	Amaranthaceae	Herb	Common weed
15	<i>Anagallis arvensis</i> Linn.	Primulaceae	Herb	Whole plant
16	<i>Argemone mexicana</i> Linn.	Papaveraceae	Herb	Satyanasi, WP
17	<i>Aristida adscensionis</i> Linn.	Poaceae	Grass	Lampro
18	<i>A. ciliaris</i>	Poaceae	Grass	Fodder
19	<i>Arnebia hispidissima</i> (Lehm.) DC.	Boraginaceae	Herb	Ram-bui, Alkanet
20	<i>Artemisia scoparia</i> Waldst& Kit.	Asteraceae	Herb	Fodder
21	<i>Asparagus racemosus</i> Willd.	Liliaceae	Climber	Satawari, Tuber
22	<i>Asphodelus tenuifolius</i> Cav.	Liliaceae	Herb	Piazi
23	<i>Azadirachta indica</i> A.Juss.	Meliaceae	Tree	Neem
24	<i>Balanites aegyptiaca</i> (Linn.) Delille.	Simaroubaceae	Tree	Hingotia, WP
25	<i>Bergia ammannioides</i> Roxb.	Elatinaceae	Herb	Jal bhangro
26	<i>Blepharis sindica</i> T.Anders.	Acanthaceae	Herb	Untkantalo, Leaf
27	<i>Boerhavia diffusa</i> Linn.	Nyctaginaceae	Prostrate herb	Saata
28	<i>Borreria articularis</i> (Linn. f.) Willd.	Rubiaceae	Herb	Agio
29	<i>Brachiaria erusiformis</i> (Sm.) Griseb.	Poaceae	Herb	Murat
30	<i>Butea monosperma</i> (Lamk.) Taub.	Fabaceae	Shrub	Khakario

31	<i>Calligonum polygonoides</i> Linn.	Polygonaceae	Shrub	Phog
32	<i>Calotropis gigantea</i> (Linn.) R.Br.	Asclepiadaceae	Shrub	Moto Aak
33	<i>C. procera</i> (Ait.) R.Br.	Asclepiadaceae	Shrub	Aakara
34	<i>Capparis decidua</i> (Forsk.) Edgew.	Capparaceae	Small tree	Kair
35	<i>Carissa congesta</i> Wight	Apocynaceae	Shrub	Weed
36	<i>Cassia angustifolia</i> Vahl.	Fabaceae	Shrub	Fuel, Fodder
37	<i>C. auriculata</i> Linn.	Fabaceae	Shrub	Anwal
38	<i>Catharanthus roseus</i> Linn.	Apocynaceae	Herb	Baramasi
39	<i>Cenchrus biflorus</i> Roxb.	Poaceae	Grass	Bhuroot
40	<i>C. ciliaris</i> Linn.	Poaceae	Grass	Dhaman
41	<i>C. setigerus</i> Vahl, Enum,	Poaceae	Grass	Weed
42	<i>Chenopodium album</i> Linn.	Chenopodiaceae	Herb	Chilero
43	<i>C. murale</i> Linn.	Chenopodiaceae	Herb	Goyalo
44	<i>Cirsium wallichii</i> DC.	Asteraceae	Herb	Weed
45	<i>Cistanche tubulosa</i> (Schrenk.) Hook.f.	Orobanchaceae	Parasite,Herb	Parasite
46	<i>Citrullus colocynthis</i> (Linn.) Schard.	Cucurbitaceae	Prostrate herb	Tumbo
47	<i>C. lanatus</i> (Thunb.) Matsumara & Nakai	Cucurbitaceae	Prostrate herb	Matiro
48	<i>C. vulgaris</i> Schrad.	Cucurbitaceae	Prostrate herb	Fruit
49	<i>Cleome gynandra</i> Linn.	Capparaceae	Herb	Safed bagro
50	<i>C. viscosa</i> Linn.	Capparaceae	Herb	Handi bagro
51	<i>Clerodendrum phlomidis</i> Linn. f.	Verbenaceae	Small tree	Arni, root
52	<i>Cocculus hirsutus</i> (Linn.) Diels.	Menispermaceae	Climber	Weed, Fodder
53	<i>Convolvulus auricomus</i> (A.Rich.) Bhandari	Convolvulaceae	Prostrate herb	Rota bel
54	<i>C. microphyllus</i> Choisy	Convolvulaceae	Herb	Santari
55	<i>Corchorus depressus</i> (Linn.) Christensen	Tiliaceae	Prostrate herb	Kurand
56	<i>C. tridens</i> Linn.	Tiliaceae	Herb	Kagnasha
57	<i>Coronopus didymus</i> (Linn.) Smith	Brassicaceae	Prostrate herb	Weed
58	<i>Crotalaria burhia</i> Buch.-Ham.	Fabaceae	Under shrub	Shinio
59	<i>C. juncea</i> Linn.	Fabaceae	Under shrub	Strong branches
60	<i>C. medicaginea</i> Lamk.	Fabaceae	Herb	Gugario
61	<i>Ctenolepis cerasiformis</i> (Stocks) Naud.	Cucurbitaceae	Climber	Ankh phutani
62	<i>Cucumis melo</i> Linn.	Cucurbitaceae	Prostrate herb	Kachari
63	<i>C. sativus</i> Linn.	Cucurbitaceae	Herb	Fruits
64	<i>Cynodon dactylon</i> (Linn.) Pers.	Poaceae	Grass	Doobghas
65	<i>Cyperus iria</i> Linn.	Cypereceae	Herb	Moth, Aromatic
66	<i>C. rotundus</i> Linn.	Cypereceae	Herb	Motho
67	<i>Dactyloctenium aegyptium</i> (Linn.) P.Beauv.	Poaceae	Grass	Makaro
68	<i>Dalbergia sissoo</i> Roxb.	Fabaceae	Tree	Sisham
69	<i>Datura metel</i> Linn.	Solanaceae	Herb	Kalo-Daturo
70	<i>D. stramonium</i> Linn.	Solanaceae	Herb	Dhaturo
71	<i>Desmostachya bipinnata</i> (Linn.) Stapf	Poaceae	Herb	Dhab
72	<i>Digera alternifolia</i> Linn.	Amaranthaceae	Herb	Lolaru
73	<i>Digitaria adscendens</i> H.B.& K.	Poaceae	Grass	Jharanio
74	<i>Echinochloa colonum</i> Linn.	Poaceae	Grass	Jirio
75	<i>Echinops echinatus</i> Roxb.	Asteraceae	Shrub	Root, Seed
76	<i>Eclipta alba</i> (Linn.) Hassk	Asteraceae	Herb	Bhangara
77	<i>Eleusine compressa</i> (Forsk.) Aschers.	Poaceae	Grass	Fodder
78	<i>Emex spinosa</i> (Linn) Campd.	Polygonaceae	Herb	Khanto-pelak
79	<i>Eragrostis ciliaris</i> (Linn.) R.Br.	Poaceae	Grass	Lutia lamp
80	<i>E. pilosa</i> (Linn.) P.Beauv.	Poaceae	Grass	Sporadic grass
81	<i>E. tenella</i> (Linn.) P.Beauv.	Poaceae	Grass	Eat Fresh & dry
82	<i>E. tremula</i> Hochst.	Poaceae	Grass	Chirio-ro khet
83	<i>Erigeron bonariensis</i> Linn.	Asteraceae	Herb	Weed

84	<i>Eruca sativa</i> (Mill.) Thell.	Brassicaceae	Herb	Tarmiro
85	<i>Eucalyptus lanceolatus</i>	Myrtaceae	Tree	Safado
86	<i>Euphorbia dracunculoides</i> Lamk.	Euphorbiaceae	Herb	Bamburi
87	<i>E. granulata</i> Forsk.	Euphorbiaceae	Herb	Dudheli
88	<i>E. hirta</i> Linn.	Euphorbiaceae	Herb	Dudhi
89	<i>Fagonia indica</i> Burm.f.	Zygophyllaceae	Herb	Dhanso
90	<i>Farsetia hamiltonii</i> Royle	Brassicaceae	Herb	Hiran chabbo
91	<i>Ficus bengalensis</i> Linn.	Moraceae	Tree	Bar
92	<i>F. religiosa</i> Linn.	Moraceae	Tree	Pipal
93	<i>Gisekia pharmacioides</i> Linn.	Molluginaceae	Herb	Morang
94	<i>Glinus lotoides</i> Linn.	Molluginaceae	Herb	Bakadu, Hata
95	<i>Gnaphalium indicum</i> Linn.	Asteraceae	Herb	Khersiya
96	<i>Haloxylon recurvum</i> (Moq.) Bunge ex Boiss.	Chenopodiaceae	Under shrub	Khar
97	<i>Hedyotis corymbosa</i> (Linn.) Lamk.	Rubiaceae	Herb	Rare weed
98	<i>Heliotropium ellipticum</i> Ledebour	Boraginaceae	Herb	Pili-bui
99	<i>H. marifolium</i> Koen.ex Retz.	Boraginaceae	Herb	Choti-santari
100	<i>Heliotropium subulatum</i> Hochst.ex DC.	Boraginaceae	Herb	Kali-bui
101	<i>Ifloga spicata</i> (Fors) Schultz-Bip.	Asteraceae	Herb	Weed, Fodder
102	<i>Indigofera cordifolia</i> Heyne ex Roth	Fabaceae	Herb	Bekario
103	<i>I. sessiliflora</i> DC. Prodr	Fabaceae	Herb	Fodder
104	<i>Jatropha curcas</i> Linn.	Euphorbiaceae	Shrub	Jamal ghotra
105	<i>J. gossypifolia</i> Linn.	Euphorbiaceae	Shrub	Biodiesel
106	<i>Lathyrus aphaca</i> Linn.	Fabaceae	Herb	Pilimatari
107	<i>Launaea procumbens</i> (Roxb.)Ramayya&Rajgopal	Asteraceae	Herb	Jangali gobhi
108	<i>Lawsonia intermis</i> Linn.	Lythraceae	Shrub	Mehandi
109	<i>Leptadenia pyrotechnica</i> (Forsk.) Decne.	Asclepiadaceae	Shrub	Khimp
110	<i>Leucas aspera</i> (Willd.) Spreng.	Lamiaceae	Herb	Weed
111	<i>Lycium barbarum</i> Linn.	Solanaceae	Herb	Morali
112	<i>Majorana hortensis</i> Moench	Lamiaceae	Herb	Marwa
113	<i>Maytenus emarginata</i> (Willd.) Ding Hou	Celastraceae	Small tree	Kankero
114	<i>Medicago sativa</i> Linn.	Fabaceae	Herb	Rijaco
115	<i>Melilotus indica</i> (Linn.) All.	Fabaceae	Herb	Marvo
116	<i>Mimosa hamata</i> Willd.	Fabaceae	Shrub	Jinjanio
117	<i>Mollugo cerviana</i> (Linn.) Ser.	Molluginaceae	Herb	Chiri dhaniyo
118	<i>M. nudicaulis</i> Lamk.	Molluginaceae	Herb	Rangatio-khar
119	<i>Momordica charantia</i> Linn.	Cucurbitaceae	Climber	Barkarelo
120	<i>Moringa oleifera</i> Lamk.	Moringaceae	Tree	Sahjana
121	<i>Ocimum basilicum</i> Linn.	Lamiaceae	Under shrub	Tulsi
122	<i>O. sanctum</i> Linn.	Lamiaceae	Under shrub	Tulsi
123	<i>Oldenlandia aspera</i> DC.	Rubiaceae	Herb	Weed
124	<i>Oligochaeta ramosa</i> (Roxb.) Wagenitz	Asteraceae	Herb	Fruit
125	<i>Opuntia elatior</i> Mill.	Cactaceae	Shrub	Thor
126	<i>Oxalis corniculata</i> Linn.	Oxalidaceae	Herb	Khatari
127	<i>Panicum turgidum</i> Forsk.	Poaceae	Herb	Muratio
128	<i>Parkinsonia aculeata</i> Linn.	Fabaceae	Small tree	Weed
129	<i>Parthenium hysterophorus</i> Linn.	Asteraceae	Herb	Weed
130	<i>Pedaliium murex</i> Linn.	Pedaliaceae	Herb	Gokhru
131	<i>Peristrophe paniculata</i> (Forsk.) Burm.f.	Acanthaceae	Herb	Kagner
132	<i>Phalaris minor</i> Retz	Poaceae	Grass	Weed
133	<i>Phragmites karka</i> (Retz) Trin. ex Stend.	Poaceae	Grass	Marshy place
134	<i>Phyla nodiflora</i> (Linn.) Greene	Verbenaceae	Creeping herb	Moist place
135	<i>Phyllanthus amarus</i> Schum. & Thonn.	Euphorbiaceae	Herb	Gugario
136	<i>P. nirui</i> Hook. f.	Euphorbiaceae	Herb	Fodder
137	<i>Physalis minima</i> Linn.	Solanaceae	Herb	Chirphoti

138	<i>Polycarpaea corymbosa</i> (Linn.) Lamk.	Caryophyllaceae	Herb	Zuthiokhad
139	<i>Polygala arvensis</i> Roxb	Polygalaceae	Herb	Weed
140	<i>P. chinensis</i> Willd	Polygalaceae	Herb	Fodder
141	<i>P. linifolia</i>	Polygalaceae	Herb	Weed
142	<i>Polypogon monspeliensis</i> (Linn.)Desf.	Poaceae	Herb	Batalio Gehun
143	<i>Portulaca oleracea</i> Linn.	Portulacaceae	Herb	Luni
144	<i>Prosopis cineraria</i> (Linn.) Druce	Fabaceae	Tree	Khejari
145	<i>P. juliflora</i> (Swartz.) DC.	Fabaceae	Small tree	Leaves fodder
146	<i>Pulicaria crista</i> (Cass.) Benth.&Hook.f.	Asteraceae	Herb	Soneli
147	<i>Ranunculus scleratus</i> Linn.	Ranunculaceae	Herb	Weed
148	<i>Rhynchosia minima</i> (Linn.) DC.	Fabaceae	Climber	Chiri-motio
149	<i>Ricinus communis</i> Linn.	Euphorbiaceae	Small tree	Arand, Fruit
150	<i>Rumex dentatus</i> Linn.	Polygonaceae	Herb	Jangali palak
151	<i>Saccharum bengalense</i> Retz.	Poaceae	Perennial grass	Moist place
152	<i>Salvadora oleoides</i> Decne	Salvadoraceae	Tree	Khari-jhal
153	<i>S. persica</i> Linn	Salvadoraceae	Tree	Pilu, Mitha jal
154	<i>Scripus</i> spp.	Cyperaceae	Perennial grass	Common on moist
155	<i>Sesamum indicum</i> Linn.	Pedaliaceae	Herb	Til
156	<i>S. mulayanum</i> Nair	Pedaliaceae	Herb	Weed
157	<i>Sisymbrium irio</i> Linn.	Brassicaceae	Herb	Asalio
158	<i>Solanum indicum</i> Linn.	Solanaceae	Under shrub	Whole plant
159	<i>S. nigrum</i> Linn.	Solanaceae	Herb	Makoi
160	<i>S. surattense</i> Burm.f.	Solanaceae	Herb	Ringani
161	<i>Sonchus brachyotus</i> DC.	Asteraceae	Herb	Weed
162	<i>S. oleraceus</i> Linn.	Asteraceae	Herb	Akadiyo
163	<i>Spergula arvensis</i> (Linn.)	Caryophyllaceae	Herb	Zutanio-Khad
164	<i>Striga euphrasioides</i> Benth.	Scrophulariaceae	Semiparasite herb	Moist place
165	<i>Suaeda fruticosa</i> (Linn.) Forsk.	Chenopodiaceae	Shrub	Lunaki
166	<i>Tamarindus indica</i> Linn.	Fabaceae	Tree	Imli, Fruit pulp
167	<i>Tamarix dioica</i> Roxb.	Tamaricaceae	Tree	Timber
168	<i>Tecomella undulata</i> (Sm.) Seem.	Bignoniaceae	Tree	Rohiro
169	<i>Tephrosia purpurea</i> (Linn.) Pers.	Fabaceae	Herb	Bansa
170	<i>Tinospora cordifolia</i> (Willd.) Miers.	Menispermaceae	Climber	Neem giloy
171	<i>Tragus racemosus</i> Hook. f.	Poaceae	Grass	Fodder
172	<i>Trianthema portulacastrum</i> Linn.	Aizoaceae	Herb	Dhedo-santo
173	<i>T. triquetra</i> Rottle.ex Willd.	Aizoaceae	Herb	Lunki
174	<i>Tribulus terrestris</i> Linn.	Zygophyllaceae	Prostrate herb	Bhankhri
175	<i>Tridax procumbens</i> Linn.	Asteraceae	Herb	Weed
176	<i>Trigonella foenum-graecum</i> Linn.	Fabaceae	Herb	Methi

177	<i>T. incisa</i> (Benth.) Ali	Fabaceae	Herb	Common weed
178	<i>Typha angustata</i> Bory &Chaub.	Typhaceae	Perennial herb	Paan
179	<i>Verbesina encelioides</i> (Cav.) Benth. & Hook.	Asteraceae	Herb	Weed
180	<i>Vernonia cinerascens</i> Schultz-Bip.	Asteraceae	Shrub	Fodder
181	<i>Vetiveria zizanioides</i> (Linn.)Nash	Poaceae	Perennial grass	Khas, essential oil
182	<i>Vigna aconitifolia</i> (Jacq.) Marechal	Fabaceae	Shrub	Seeds
183	<i>Withania somnifera</i> (Linn.) Dunal	Solanaceae	Under shrub	Asgandh
184	<i>Xanthium strumarium</i> Linn.	Asteraceae	Under shrub	Gadario, fruit
185	<i>Zaleya redimita</i> (Melville) Bhandari	Aizoaceae	Herb	Ratio gulalio santo
186	<i>Ziziphus mauritiana</i> Lamk.	Rhamnaceae	Small tree	Bordi
187	<i>Z. nummularia</i> (Burm.f.) Wt.	Rhamnaceae	Shrub	Borti
188	<i>Z. sativa</i> Gaertn	Rhamnaceae	Tree	Fodder

Figure 2: Distribution of observed plant species in study area

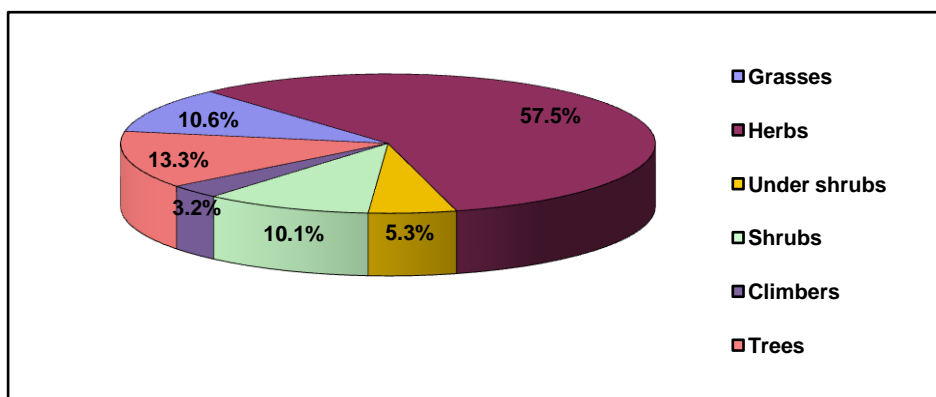


Figure 3; Dominant plant families of study area

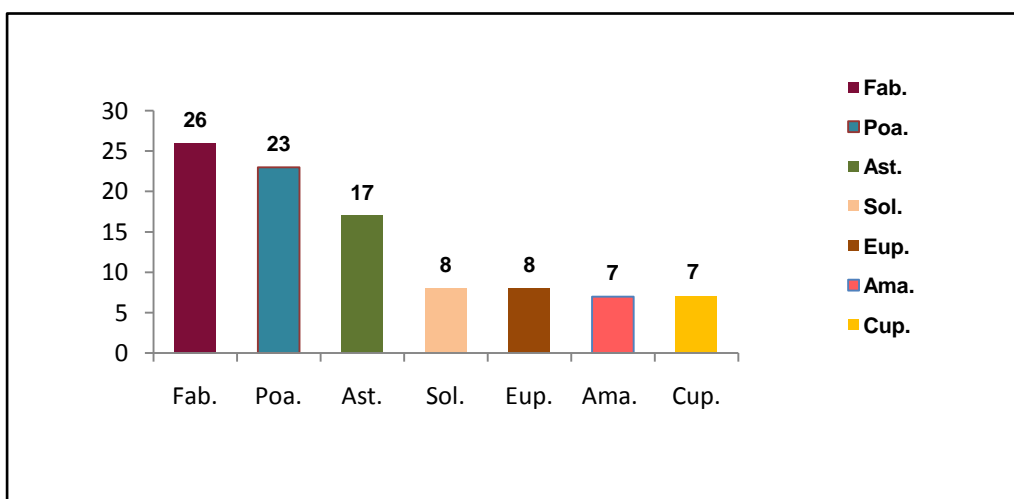
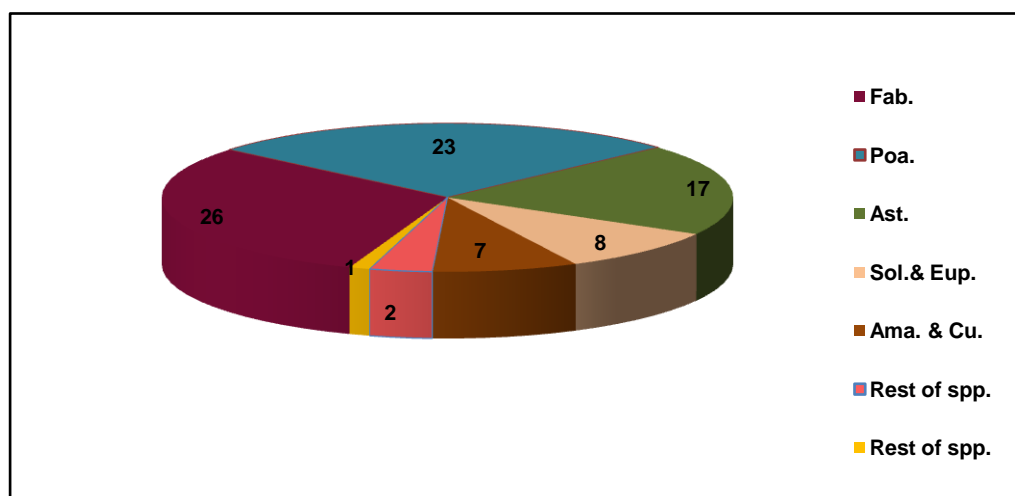


Figure 4: Family wise distribution of observed plant species in study area



A-Fabaceae, B-Poaceae, C-Asteraceae, D-Solanaceae & Euphorbiaceae, E-Amarathaceae & Cucurbitaceae, F-27 families (2-4 species), G-21 Families (single species)

Conclusion

Plants are useful to the social communities and also play an important role in the maintenance of natural ecosystem Corlett R.T. (2016). It is fundamental importance for understanding biodiversity and ecosystem functionings, as it provides us with the data to explore and describe phytodiversity through scientific analysis. The study provides the basic information about the plant species as well as plant community which are currently found in the study area. Such a list could play an important role for the local and regional authorities interested in future to conserve and sustainable use of phytodiversity for sustainable development of the area. The study will provide a hand list on plant species and habitat diversity in Churu district. Thus the present study could play a crucial role for future conservation of natural resources otherwise will have to face the consequences of disappearance of such valuable xeric bio wealth.

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