

ETHNOBOTANICAL STUDIES OF THE EASTERN PLAINS OF TAKHT-E-SULAIMAN HILLS

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Abstract

Studies have been carried out in the proposed area to assess, record and report the Ethno-botanical potential of the area. Forty five individuals were selected through snow ball sampling and interviewed in details, equally distributed in the three main sites of the area. A total of 66 ethnobotanically important species were found, belonging to 37 families, in which one was Pterodophyte family and the remaining were of angiosperm, distributed in 2 monocots and 34 dicot families. Regarding habit, 39 herbs, 11 shrubs and 16 were trees. 63.6% species were having medicinal uses including 02 as veterinary medicinal, 59.09% as fodder, 43.93% as fuel, 24.24% species as technological including timber and agricultural tools and 25.57% as edible including wild vegetables/pot herbs/salad and wild fruits and 33.33% were included in the category "Others" including miscellaneous uses. Regarding use reports the overall average use value was 2.5 for each species, 4.5 for tree species, 2.54 for shrubs and 1.69 for herbs. Mode of administration of medicinal plants was as, 21 plants were applied externally, 10 with internal usage and 11 with both internal and external application. 9 different parts of plants were reported to be used for medicinal purposes. There is a need to educate the locals for sustainable harvesting of plant resources and also to carry out detailed qualitative and quantitative studies in all the ethnic groups surrounding Thakht-e-Sulaiman hills complex, especially gathering the valuable knowledge of the inhabitants residing on hill sites of this area.

Introduction

Ethnobotany plays a key role in understanding the relationships between biological diversity, social and cultural dynamics (Husain *et al.*, 2008; Mahmood *et al.*, 2011). Ethnobotanical approaches are significant in highlighting locally important plant species, particularly for new crude drugs. Documentation of indigenous knowledge, in particular the medicinal values of plant species, provided various vital modern drugs (Cox, 2000). About 25% of drugs originate from plants and many other drugs are synthetic analogues of compounds isolated from plants. About 80% of the people of developing countries are still dependent on traditional indigenous medicines for their basic healthcare (Malik *et al.*, 2010).

Since prehistoric period, medicinal plants have been used for the cure of various diseases. These plants were in common use by the local people and were of great importance that's why a lot of people were engaged in the trade of important medicinal herbs throughout the world (Elisabetsky, 1990; Shinwari & Qaisar, 2011). People living in villages have been using indigenous plants as medicines because this knowledge transfers from generation to generation and is based on experiences. Besides, villages are far away from cities and mostly lack proper health facilities (Gul *et al.*, 2012).

Thakht-e-Sulaiman is the highest peak in the Sulaiman Ranges which form the eastern edge of Iranian plateau where the Indus River separate it from the sub-continent. Bordering the Sulaiman Range to the north are the arid highlands of the Hindu Kush, where more than 50 percent of the lands lie above 2,000 meters (Khan, 1991).

Due to poverty, low literacy rate, less communication means and non-availability of modern medicinal facilities, the people are depending on natural resources especially the plants for different purposes (Sarwat *et al.*, 2012).

The Sun facing Eastern plains mainly comes under the F.R. Dera Ismail Khan administration, which were the study area in the present study (Fig. 1).

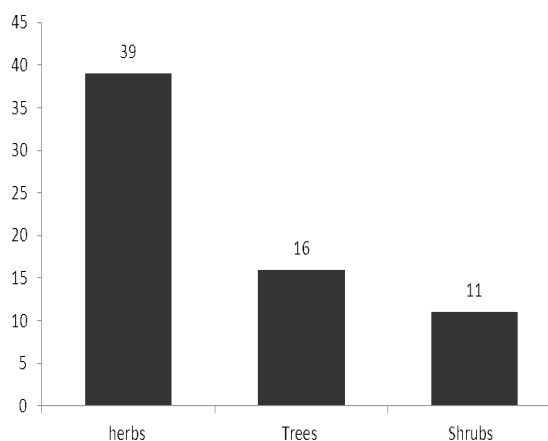


Fig. 1. Habit wise distribution of the plants in the study area.

Material and Methods

Area: F.R. Dera Ismail Khan as a whole is located between 31°-31' and 31°-34' north latitudes and 59°-55' and 70°-24' east longitudes, spread over an area of 2008 Square kilometers with a population of approximately 39000. It is bounded at the north by South Waziristan Agency (FATA), on east by Kalachi Tehsil of D.I. Khan District, on South by D.G khan District of Punjab and on the west by Zhobe District of Baluchistan. Two tribes i.e., Sheranis and Ustranas inhabit this Frontier Region (Anon., 1998). The Sherani tribe was included in this study (Anon., 1998).

The area have sparse vegetation as located in the arid zone, while going from D.I. Khan Division towards Zhob District, there is increase in elevation and change in vegetation and vegetation also become dense. As there is no meteorological office in the area, so no proper climatic data was available for this region.

Research methods: Fieldwork was conducted for a total of 6 months during spring, summer and autumn of 2010. It included interviews and the collection of plant voucher specimens. A total of 45 individuals which were selected through snow ball sampling, were interviewed in the three main sites of the area. Walks in the wood with informants were conducted, which recognized the useful plants with its local names. The age of the interviewees were 35–85 years old, with an average age of 48. Semi-structured interviews were conducted in local language with males only as female interviews were not allowed due to specific cultural restrictions. The consent from the informant was obtained before each interview. The ethical guidelines adopted by the International Society of Ethnobiology (Anon., 2006) were strictly followed.

Identification was carried out by comparing with the already identified specimens in the Herbarium of Pakistan (ISL) Quaid-i-Azam University, Islamabad. Reference floristic material was also used to confirm the identification, including the Flora of Pakistan. (Nasir & Ali, 1970-1989; Ali & Nasir 1989-1991; Ali & Qaiser, 1993-

1995, 2000-2004). Voucher specimens were deposited in the same herbarium for future studies.

Results

Timber / Technological species: A total of 16 plants were used in this category, 6 were recommended by the locals as the better and 3 as the best i.e., *Dalbergia sissoo*, *Tamarix aphylla* and *Acacia nilotica*. Durability, Multipurpose purpose usage, Utility as furniture, Paltering and color, Light weight, Free of cost and abundant availability, Easy Wood planking, Plain and beautiful wood, Self regeneration, Resistant to termite attack and Rapid growth were the criteria for the selection of timber wood species used by the locals (Fig. 2). All the 3 best timber woods are sold in the local markets, both by the collectors and market dealers. The selling rates of different timber wood species were different and were not fixed, as they depended upon the bargain agreement between the seller and buyer.

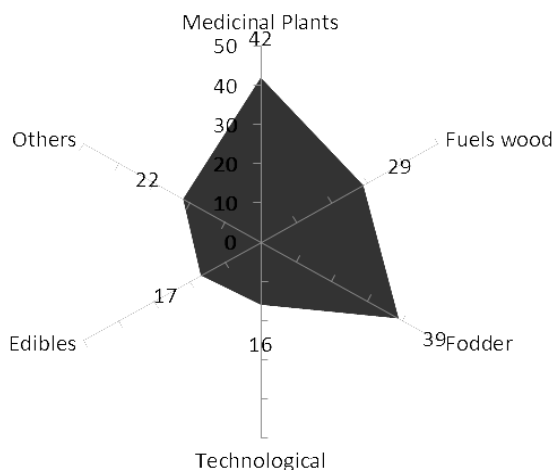
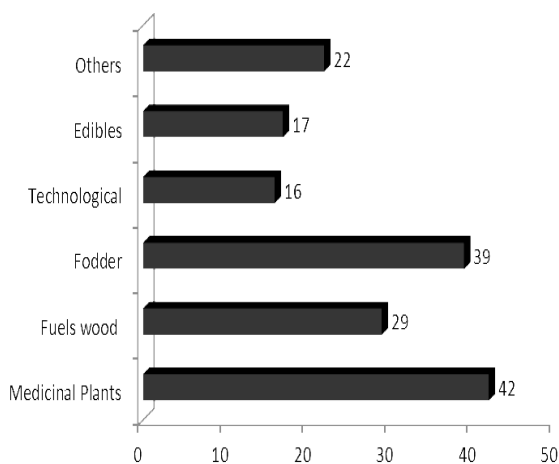


Fig. 2. Demonstrate the usage of Plant Diversity by Local Communities for different puposes.

Fodder/forage species: There were total 39 plant species were used as a fodder/forage in the area. The fodder species were stored for winter season. The quantities stored were depended upon their availability, as greater the availability, greater was the amount stored and also depends upon the number of livestock. Several markets were found where fodder was sold to the local community, both in fresh and dried from. The rate of the fodder species slightly differ in different markets.

Fuel wood species: 29 plants species were used as fuel. Nearer to homes, free of cost availability, sooner drying, burning even in green conditions, rapid recover from cutting, more heat value and no sparking were the criteria for considering best fuel wood species. It has been observed that the fuel wood consumption varied in different seasons. The wood consumption during summer was in between 10-20 Kg/day/house hold. During winter season the amount consumed was almost above doubled

i.e. 25-50 Kg/day/house hold. The fuel woods were sold in local markets, especially sold to hotels and furnaces in the Draban Tehsil of D.I. Khan District.

Medicinal plants: 42 plants were listed as medicinal by the locals that were used in traditional health care. Of them, 15 species were considered as the better and were commonly used and 4 as the best and highly medicinal with extensive use (Figs. 3 and 4). The best were: *Withania coagulans*, *Plantago ovata*, *Tamarix aphylla* and *Peganum harmala*, also reported earlier (Kuroyanagi et al., 2012). The marketable value, no side effect, easy availability, fragrance and inducing of sleep were the criteria for ranking the best medicinal plants. Only few medicinal plants were marketed. Most of the medicinal plants observed were collected and used/consumed by the locals themselves as house hold health care items. Thus the trade of medicinal plants in the area was negligible. Similar outcome were reported by Qasim et al., 2010 from Baluchistan .

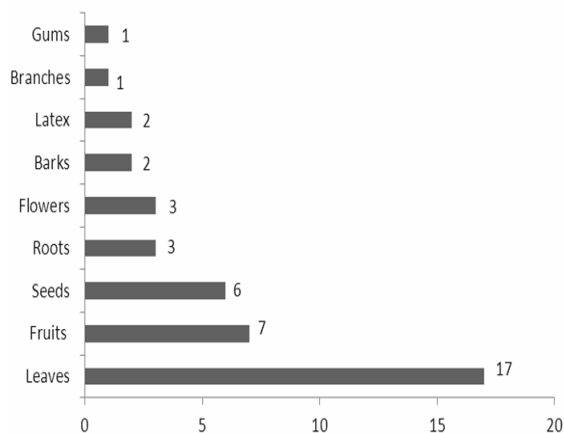


Fig. 3. Showing the part of medicinal plants used by the local inhabitant of the study area.

Discussion

About 66 plant species were found with ethno-botanical importance, distributed in total 37 families having 36 families of angiosperm and one Pteridophyte. In the 36 angiosperm families, 2 were of monocots and 34 were dicots. Mimosaceae and Malvaceae were the dominant families with five species each. The other important families of the area were Papilionaceae, Asteraceae, Chenopodiaceae having 4 species each. Euphorbiaceae, Moraceae and Zygophyllaceae were having 3 species while Asclepiadaceae, Cappariaceae, Apiaceae, Moraceae, Fagaceae, Amarantaceae, Rosaceae and Tamaricaceae were having two species each. The remaining families were represented by one species each.

In the six ethnobotanical use categories (Phillips & Gentry, 1993a, 1993b; Phillips *et al.*, 1994) the tree species has an average score of 4.5 which indicate higher importance and more anthropogenic pressure (Tables 1 and 2). Shrub average score is 2.54 and that of herbs is 1.69 (Fig. 5). These results indicate the general ethnobotanical uses phenomena that trees always have higher use values, followed by the shrubs and then herbs. (Shinwari *et al.*, 2011; Qureshi & Bhatti, 2008; Gerique, 2006; Jan *et al.*, 2008)

The general ethnobotanical studies of the specific area are the indicators of the specific culture. As the present results indicate 63.63% medicinal plants, 59.09% fodder species, 43.93% species as fuel/fire, 25.75% species for technological uses, 24.24% as edibles and 33.33% in the categories of "Other" which include miscellaneous uses. The highest number of reported medicinal species indicates pure cultured and more indigenous community (Noor & Kalsoom, 2011; Qureshi & Bhatti, 2008; Ji *et al.*, 2004; Leporatti & Lattanzi, 1994; Shinwari & Malik, 1989). The Higher number of fodder species are due to the reason that the main source of income of the local are cattle rearing. Fuel/fire wood species indicates the weather of the region and also as the vegetation is shrubby type, as for general fire at homes shrubs are mostly used. The more the number of plants with miscellaneous uses, the more away and isolated the area will be, from cities and markets. The numbers of timber wood species are the indicator of the houses structures and tree density and presence or lacking

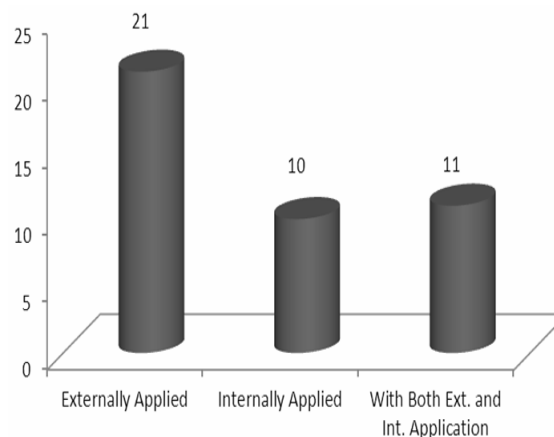


Fig. 4. The medicinal plant classification on the basis of mode of administration.

reserve forests. Low numbers of edible species are the indicators of less annual rain fall and vice versa as majority of the wild edibles are annual herbs which are depending on rainfall.

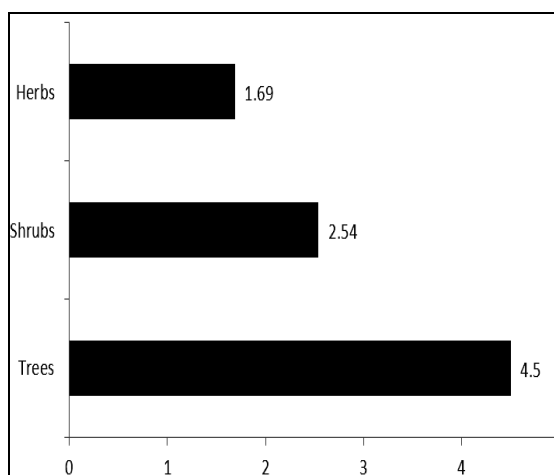


Fig. 5. The average scoring of trees, shrubs and herbs among six use categories.

Interviews with some keys informants revealed the rapid decline of certain species like *Acacia modesta*, *Acacia nilotica*, *Dalbergia sissoo* etc. As the locals are mostly depending on cattle rearing for their personal requirements and trade. So over grazing, browsing and trampling became an ecologically problem of the area which causes species not to reach its climax stage. This situation was clearly seen in many places, which results in stunting growth. Medicinal plants are collected by the inexperienced people. For instance leave of a particular plant is used for ailment of a disease, but the local people uproot the whole plant. Soil erosion by the stream water and in slope areas by the rain water was also harmful for plant growth. There is a need to educate the local people about the sustainable use of species. Martin (1995) wrote Ethno-botanical methodology for the people to under take conservation work with local communities.

Table 1. Shows the species utilization in six use categories.

Botanical name	Fodder	Fuel	Technological	Edible	Medicinal	Other	Species Score
<i>Abutilon bidentatum</i>	+	-	-	-	-	-	1
<i>Acacia modesta</i>	+	+	+	-	+	+	5
<i>Acacia nilotica</i>	+	+	+	-	+	+	5
<i>Adiantum cappillusveneris</i>	-	-	-	-	+	-	1
<i>Aerva tomentosa</i>	+	+	-	-	-	+	3
<i>Albizia lebeck</i>	+	+	+	-	+	+	5
<i>Alhagi maurorum</i>	+	-	-	-	+	-	2
<i>Andrachne aspera</i>	-	+	-	-	-	-	1
<i>Astragalus psilocentros</i>	+	-	-	-	-	-	1
<i>Amaranthus Viridus</i>	+	-	-	+	-	-	2
<i>Artemisia scoparia</i>	-	-	-	-	+	-	1
<i>Calotropis procera</i>	-	+	-	-	+	-	2
<i>Capparis decidua</i>	-	+	+	+	+	-	4
<i>Centaurea iberica</i>	+	-	-	-	-	-	1
<i>Chenopodium album</i>	+	-	-	+	+	-	3
<i>Chenopodium murale</i>	+	-	-	+	+	-	3
<i>Citrullus colocynthis</i>	-	-	-	-	+	-	1
<i>Cleome branchycarpa</i>	-	-	-	-	+	+	2
<i>Convolvulus arvensis</i>	+	-	-	-	+	-	2
<i>Cuscuta reflexa</i>	-	-	-	-	+	-	1
<i>Cynodon dactylon</i>	+	-	-	-	-	+	2
<i>Dalbergia sissoo</i>	+	+	+	-	+	+	5
<i>Desmostachya bipinnata</i>	+	-	-	-	-	+	2
<i>Dodonaea viscosa</i>	-	+	-	-	+	+	3
<i>Eucalyptus globules</i>	-	+	+	-	+	+	4
<i>Euphorbia helioscopia</i>	-	-	-	-	+	-	1
<i>Euphorbia prostrata</i>	+	-	-	-	-	-	1
<i>Fagonia cretica</i>	-	+	-	-	+	-	2
<i>Ficus carica</i>	+	+	-	+	+	-	4
<i>Fumaria indica</i>	+	-	-	-	+	-	2
<i>Heliotropium eichwaldii</i>	+	-	-	-	-	-	1
<i>Launea nudicaulis</i>	-	-	-	-	+	-	1
<i>Lens culinaris</i>	+	-	-	-	+	-	2
<i>Lippia nodiflora</i>	+	-	-	-	-	-	1

Table 1. (Cont'd.).

Botanical name	Fodder	Fuel	Technological	Edible	Medicinal	Other	Species Score
<i>Medicago polymorpha</i>	+	-	-	+	-	-	2
<i>Malva neglecta</i>	+	-	-	+	-	-	2
<i>Malva parviflora</i>	+	-	-	+	-	-	2
<i>Malvastrum corumondrianum</i>	-	-	-	-	+	-	1
<i>Melia azedarach</i>	-	+	+	-	-	-	2
<i>Mentha sylvestris</i>	-	-	-	+	+	-	2
<i>Morus alba</i>	+	+	+	+	+	+	6
<i>Morus nigra</i>	+	+	+	+	+	+	6
<i>Oxalis corniculata</i>	+	-	-	+	-	-	2
<i>Peganum hermalla</i>	-	-	-	-	+	+	2
<i>Periploca aphyllah</i>	-	+	-	-	+	+	3
<i>Pertulata quadrifida</i>	+	-	-	-	+	-	2
<i>Phoenix dactylifera</i>	-	+	+	+	+	+	5
<i>Plantago ovate</i>	+	-	-	-	+	-	2
<i>Polygnum barbatum</i>	+	-	-	-	+	-	2
<i>Prosopis spicigera</i>	-	+	+	-	-	-	2
<i>Psammogeton biternatum</i>	+	-	-	-	+	-	2
<i>Rhazya stricta</i>	-	+	+	-	-	-	2
<i>Salix alba</i>	+	+	-	-	-	+	3
<i>Salsola foetida</i>	+	+	-	-	+	+	4
<i>Salvadara oleoides</i>	-	+	+	-	+	+	4
<i>Sisymbrium irrio</i>	+	-	-	-	-	-	1
<i>Suaeda fruticosa</i>	+	+	-	-	-	-	2
<i>Tamarix aphylla</i>	-	+	+	-	+	+	4
<i>Tamarix dioca</i>	-	+	+	-	+	+	4
<i>Taraxacum officinale</i>	+	-	-	-	-	-	1
<i>Tribulus terrestris</i>	+	-	-	-	+	-	2
<i>Typha latifolia</i>	-	+	-	+	-	+	3
<i>Withania coagulans</i>	-	+	-	-	+	-	2
<i>Withania somnifera</i>	-	-	-	-	+	-	1
<i>Zizyphus mauritiana</i>	+	+	+	+	-	-	4
<i>Zizyphus sativa</i>	+	+	+	+	+	+	6
Total species (66)	Fodder Score (39)	Fuel score (29)	Technological score (17)	Edible score (16)	Medicinal score (42)	Other score (22)	Average score (2.5)

Table 1. Showing botanical names with family and local names, parts used and usage purpose.

Botanical name	Habit	Parts used	Used for
<i>Abutilon bidentatum</i> A.Rich., <i>Acacia modesta</i> Wall.	Herb Tree	The whole plant The whole plant	Fresh fodder for cattle Wood is used as timber, fuel, in making agriculture tools and furniture. Ash is used in preparing snuff. Gum is used as tonic and as restorative. Leaves are browsed by camels and goats Its flowers are used in gums inflammation. The Bark is useful in leukoria. Gum is Aphrodisiac. Branches are used as tooth brushes. Also used as fuel, timber and in furniture. Leaves are browsed by camels and goats
<i>Acacia nilotica</i> (L.) Willd. ex Del.	Tree	The whole plant	
<i>Adiantum Cappillus-veneris</i> L. <i>Aerva javanica</i> (Burm. f.) Juss. <i>Albizia lebeck</i> (L.) Benth. <i>Alhagi maurorum</i> Medic.	Herb Perennial herb Tree	Root stalk and leaves The whole plant The whole plant The whole plant	It is used as a tonic, it is used as a tonic, also as demulcent, expectorant and diuretic Young shoots are browsed by camels. The plant is used as fuel. Flowers are also used in pillows. Wood is used as timber, fuel, in furniture and also cultivated as an ornamental. Flowers are used in skin diseases, the decoction of the bark is used in diarrhoea. Used as Fodder. The exudation of the leaves and branches is used as blood purifier and as an expectorant, also used as cooling agent. The infusion extracted from its roots is thought to be useful for kidney stone. It is also browsed by camels. The plant is poisonous to all animals. Its dried wood is used as a fuel The plant is grazed by the cattle The Plant is used as vegetables. Also used as fodder The infusion of the plant is given as purgative and the smoke of plant is also used for earache Fresh leaves are used as bandages for rheumatic joints and swelling. Milky latex is also used to extract broken thorns from the skin. Milky latex is also used in veterinary medicines for swelling. The plant is also considered as poisonous and harmful. The dried plants are used as fuel Fruits are edible and are eaten by the birds and even man. Fruit is laxative. Bark is used as laxative and antihelmintic. Young shoots are used as plaster for boils, swellings. Wood is used as fuel, in making agriculture tools
<i>Andrachne aspera</i> Sprang. <i>Astragalus psilocentros</i> Fisch. <i>Anacanthus Viridus</i> Linn. <i>Artemisia scoparia</i> Waldst. and Kit. <i>Calotropis procera</i> (Ait.) R.Br., <i>Capparis decidua</i> (Forssk.) Edgewes	deciduous shrub A wild herb of dry places Herb A wild herb Common waste-land wild shrub A waste land wild small tree	The whole plant The whole plant Flowers and leaves Stem, leaves, milky-juice Fruit, bark, leaves and wood	Used as fodder for cattle It is used as pot-herb. It has laxative and purgative properties. Also used as fresh fodder especially camels and goats The fresh fruit Juice is mixed with sugar and is given in dropsy and is externally applied in discoloration of skin. The seed oil is used for snake bite. The fruits are highly purgative and given to cattle for intestinal disorder. But the fruit and seed contain some poisonous contents and careless use of which may be fatal The leaves are crushed in oil and the paste is rubbed on the arm and legs as an embrocating for fever. Leaves are aromatic and insect repellent A common weed of wheat crop. The decoction of the plant regulates menstrual cycle in females. Also used in skin disorders. The plant is also eaten by the cattle especially goats, cows and camels etc. The plant is used as plaster on painful parts of cattle to remove swelling and pain when they are boiled. It is also a blood purifier A good fresh fodder for cattle. In dried form also used as fodder. In gardens it is grown as an ornamental plant
<i>Centaurea iberica</i> Treviranus ex Sprengel, <i>Chenopodium album</i> Linn. <i>Chenopodium murale</i> Linn. <i>Citrullus colocynthis</i> (Linn.) Schrad. <i>Cleome brachycarpa</i> Vahl ex DC. <i>Convulvulus arvensis</i> Linn. <i>Cuscuta reflexa</i> Roxb. <i>Cynodon dactylon</i> (Linn.) Pers. <i>Dalbergia sissoo</i> Roxb.	An annual wild herb An annual herb of waste lands An annual herb of waste lands A wild perennial herb in arid soil A wild herb An annual climbing herb A leafless yellow parasite found on zizyphus species commonly A perennial wild prostrate herb Wild perennial tree	The whole plant The whole plant The whole plant Roots, fruits and seeds Whole plant Whole plant Whole plant The whole herb The whole plant	It is an important timber tree. Its wood is used in making furniture and other agricultural tools. Crushed leaves mixed with lemon juice are used for freckles. Branches, roots and leaves are commonly used as fuel. Leaves are browsed by camels. It is also used as fuel and cultivated as Shade tree

Table 1. (Cont'd.).

Botanical name	Habit	Parts used	Used for
<i>Desmostachya bipinnata</i> (Linn.) Stapf	A tough perennial, wild grass	Inflorescence, stems (Strau)	Young leaves are eaten by the animal. Stems are used in making brooms "Chaj" used for the winnowing of wheat
<i>Dodonaea viscosa</i> (Linn.) Jacq.	A shrubby plant of dry habitat	The whole plant	Branches are used in thatching, hedging and fencing. It is also cultivated as ornamental plant. Dried plant is used as fuel. Leaves are bitter and astringent, used in goat rheumatism, swelling and burns
<i>Eucalyptus globulus</i> Labillardiere	Tall, cultivated tree, not an indigenous species but well adopted	Leaves, stem, branches	It is cultivated in Saline areas to reduce the salinity. It is a fuel wood Species, used in making furniture. The stem and branches are used for thatching. Also used as ornamental plant. It is believed that its presence prevent malaria fever
<i>Euphorbia helioscopia</i> L.	An animal wild herb	Shoots, latex	Its latex is poisonous and causes swelling and irritation on skin. It is thought to be harmful especially for cattle when eaten with other fodder crops
<i>Euphorbia prostrata</i> Aiton.	A prostrate annual herb	The whole herb	It is used a fodder for cattle
<i>Fagonia indica</i> Hadidi in Rech. f.	An annual green spiny waste land herb	Whole herb	It is used for abdominal and gastric troubles. Twigs along with leaves are crushed and the juice is obtained which is used as cooling agent and to purify the blood. Dry plants are used as fuel in some area
<i>Ficus carica</i> L.	A cultivated as well as wild perennial tree	The whole plant	The fruits are edible and given to the children in small pox and are very effective. Its fruits also give relief in fever. Its dry wood is used as a fuel. Fruit Juice of the plant is given in common fever. It is also a blood purifier. The plant is given in diabetes. It is used as fodder for cattle
<i>Fumaria indica</i> (Hauskn.) Pugsley	A common wild herb	The whole plant	The extract of the plant is given in common fever. It is also a blood purifier. The plant is used in diabetes. It is used as fodder for cattle
<i>Heliotropium europaeum</i> var. <i>lastocarpum</i> (F.&M.) Kazmi	An annual herb	The whole plant	Used as fodder for cattle
<i>Launaea medicatis</i> (L.) Hook.f.	A wild annual, herb	Leaves	The leaves are applied to the head of children which are suffering from fever
<i>Lens culinaris</i> Medic.	Small, erect, wild herb	The whole plant	The plant is used as a fresh fodder. Its seeds are used as laxative. Medicinally used by the local Healers in constipation and other intestinal affections. Its paste is used to clean foul ulcer
<i>Lippia nodiflora</i> (Linn.) Michx.	Perennial prostrate herb	Whole plants	The plant is used as fresh fodder for cattle
<i>Medicago polymorpha</i> Linn.	An annual wild herb	Whole plant	Leaves of young shoots are used as vegetable (pot-herb) the herb is also used as fresh fodder
<i>Malva neglecta</i> Wallr.	An annual or perennial herb	The whole plant	It is used as fresh fodder for cattle. It is also used as vegetable
<i>Malva parviflora</i> Linn.	A small spreading herb	The whole herb	The leaves are used as pot-herb. The plant is also used as fresh fodder
<i>Mahoevirum cornuonchritium</i> (Linn.) Garcke	An annual wild herb	Leaves	Leaves are applied in different ways for inflammations and wounds which act as cooling agent
<i>Melia azedarach</i> Linn.	A will medium sized tree	Wood	Wood is used as fuel, in timber and is also used in making agricultural tools and furniture.
<i>Mentha sylvestris</i> Linn.	An annual herb	The whole herb	Seeds are used in bowel complaints. The plant is used externally as poultice on swellings. Also used as pot-herb
<i>Morus alba</i> Linn.	A wild or cultivated tree	Fruits, branches, wood and leaves	It is used as fuel, furniture, timber and in agricultural tools. Tall and flexible branches are used in making cages for birds and baskets. Leaves are used as fodder. The unripe fruits are used as vegetable. Both freshly ripen and dried fruit are edible and used as purgative. It is shady tree
<i>Morus nigra</i> Linn.	A wild or cultivated tree	Wood, branches, leaves and fruits	Having similar uses to that of <i>Morus alba</i> but its excess use is considered to cause constipation
<i>Oxalis corniculata</i> Linn.	A small wild herb	Whole plant	Leaves are eaten as salad. The herb is also commonly eaten by the cattle
<i>Peganum harmala</i> Linn.	Perennial wild herb	Seeds	Seeds are antiseptic and its smoke is used after child birth and at some other injuries, also used in small pox as the red spots on the body of patient disappear when the body is exposed to smoke. The smoke is considered as evil repellent
<i>Periploca aphylla</i> Dene.	A wild shrub	Whole plant	The milk is used for treating ulcer and wound. The plant is also sometimes used for ornamental purposes. Also used as fuel

Table 1. (Cont'd.).

Botanical name	Habit	Parts used	Used for
<i>Pertulata quadrifida</i> Linn.	A succulent herb	Arial parts	Used as pot herb, Salad and also taken by animals as fodder
<i>Phoenix dactylifera</i> Linn.	A tall erect perennial tree	Fruits, leaves and wood	Fruit are edible and used in cough and chest problems. Leaves are used in thatching and in making ropes. Leaves are used in making mats, baskets, caps etc. it is used as timber and fuel. It is also used as ornamental plant
<i>Plantago ovata</i> Forssk.	A small wild herb	The whole plant	Used as a fresh fodder for cattle. Its seeds are soaked in water and are used for the dysentery, intestinal inflammation and constipation. Also used as a cooling agent
<i>Polygonum barbatum</i> Linn.	Perennial, wild frats	The whole plant	Used as fodder for cattle
<i>Prosopis spicigera</i> Linn.	Wild, Perennial, shrub	The whole plant	The plant is specially used as fuel on very large scale in the area. It is also used for hedging and sheltering purposes
<i>Psammogeton bibernatum</i> Edgew.	A small glabrous annual wild herb	The whole plant	The decoction is used as blood purifier and used as a stomachic. May be used as a fodder for cattle
<i>Rhazya stricta</i> Decne.	A perennial wasteland shrub	The whole plant	The plant is used as fuel. It is also sued for hedge and sheltering
<i>Salix alba</i> Linn.	A wild perennial tree	The whole plant	The plant is used as fuel, also browsed by the cattle. Also used as ornamental plant
<i>Salsola foetidat</i> Linn.	A perennial wild shrub	The whole plant	It is used in making "Khar" which is used for washing clothes. The "Khar" which is made from leaves is very helpful in discharge of fetus. The plant is also browsed by the camels. Dried plants are used as fuel
<i>Salvadora oleoides</i> Decne.	A small medium size wild waste lands tree	Roots, branches and leaves	Roots and branches are used for making tooth brush. Root bark is vesicant. Branches are used in thatching and fencing. Also used as fuel. Commonly occur in grave yard and considered a "Nobal"
<i>Sisymbrium irio</i> Linn.	An annual wild herb	The whole herb	It is used as fodder for cattle
<i>Suaeda fruticosa</i> Forssk.	A small wild succulent shrub of saline soils	Shoots	Young shoots are browsed by camels and goats. It is very favorite fodder for camels. Dried shoots are used as fuel
<i>Tamarix aphylla</i> (L.) Karst.	A wild tree	The whole plant	Used as antiseptic. The fumes are used for healing and inflammations of wounds and also after a child's birth. The decoction of the leaves is used in tetanus. It is used in making agricultural tools, as fuel, timber and in furniture
<i>Tamarix dioica</i> Roxb. ex Roch	Wild shrub, with zerophytic characters	Leaves and woods	Dried wood is chiefly used as fuel. Leaves has the same uses as <i>Tamarix aphylla</i>
<i>Taraxacum officinale</i> Weber	Annual wild herb	The whole plant	The plant is used as a fresh fodder
<i>Tribulus terrestris</i> Linn.	A prostrate, annual, wild herb	Seeds and leaves	Seeds are used in the diseases of kidney stone as well as urinary bladder. The plant is also used as fodder for cattle
<i>Typha latifolia</i> Linn.	A wild tall perennial herb of marshy places	The whole plant	Cakes are prepared from flowers and are eaten. The roots of young plant are also eaten raw. Leaves are weaved into ropes which are used in weaving mats, for making mats and baskets. Leaves are also used for thatching. Dried leaves are also used as a best fuel. It is also used in the formation of cottages
<i>Withania coagulans</i> (Stocks) Dunal.	A wild scliately tomentose shrub of dusky ash colour	Fruits, Leaves and wood	A very common and important medicinal plant. The fresh fruits are used as emetic but when dried are used in dyspepsia and flatulent colic. The dried plant is also used as source of fuel
<i>Withania somnifera</i> (L.) Dunal	A perennial, wild herb	Whole Plant	Green leaves are used to relieve joints pain and painful swellings. Roots are used as diuretic and tonic. Juice is used in rheumatism. The plant is also known as astringent, and aphrodisiac.
<i>Zizyphus mauritiana</i> Linn.	A small sized wild bushy tree	Fruits, shoots, leaves	Fruits are edible. Leaves are browsed by camels and goats. Shoots are used for hedging, fencing and for fuel purposes
<i>Zizyphus sativa</i> Linn.	A perennial, wild tree	woods, branches, fruits and leaves	Fruits are edible and are good for digestion, also having market value. Branches are used in fencing. Leaves are browsed by camels and goats. The wood is used as fuel and in making agricultural tools

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