Ethnobotanical Studies on Plant Resources of Sheikh Maltoon, District Mardan, Pakistan

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Abstract This paper reports an ethnobotanical study conducted in the year 2008 in the Sheikh Maltoon Towan and adjoining area, District Mardan. The most significant plants are cited in this paper, along with their local names, the parts of them used, popular uses. Among overall plants, 73 were medicinal plant species, 56 honeybee species, 50 fodder and forage species, 30 fuel wood species, 20 vegetable/pot-herb species, 19 multi-purpose species, fruit yielding and ornamental species 16 species each, 15 thatching/roofing species, 11 fencing/hedges plants and 8 agricultural tools making species. The study indicated that the investigated area is under heavy biotic interference and overgrazing pressure. Resultantly, valuable economic and medicinal plants of the area are decreasing. Sustainable utilization, proper management and conservation of the flora of the area is highly recommended. The area was investigated for the first time and information about the traditional remedies with special reference to their medicinal uses were collected and documented before they are lost.

Keywords Ethnobotany, Medicinal plants, Folk medicine, Sheikh Maltoon, Mardan

Background
Traditional knowledge of plants used by human being is based on thousands of years practice. By “check and fault”, people learnt how to distinguish and use plants, including those with a magic-religious purpose. Among the oldest signals to plant use were the pollen remains of medicinal plants originate on an archaeological dig at Shanidar (Iraq). These were about 60,000 years old, from the Neanderthal period (Lietava, 1992). Knowledge of plant use was common in primitive civilizations. Until the middle of the 19th century, plants were the main therapeutic agents used by humans, and even today their role in medicine is still significant. The term ethnobotany was coined in 1895 by the North American botanist John Harshberger to describe studies of “plants used by primitive and aboriginal people” (Balick and Cox, 1996). By the end of the 19th century ethnobotany had started to develop as a science, providing a new appliance for pharmaceutical study. Studies on ethnobotany have been conducted in the other countries of the world (Gupta et al., 1997; Singh et al., 1997); Vedavathy & Mrudula (1997); Siwakoti and Siwakoti (1998); Ghimireet et al. (1999); Khan (2000); Mustafa et al. (2000), Siddiqui et al. (2000), Camejo-Rodrigues (2003) and Coopoosamy & Naidoo (2012). In Pakistan such studies have also been carried out on the ethnobotany of various parts of Khyber Pakhtoon Khawa (Hussain et al., 1995); Hussain & Sher (1998); Sher et al. (2003; 2004); Hussain et al. (2004; 2005), Ibrar et al. (2007). Ethnobotanical studies have also been carried out by Tariq et al., 1995; Shinwari & Khan (1997; 1998), Durrani et al. (2003), Gilani et al. (2003) Khan et al. (2011a) in various parts of the country, however no work on the ethnobotany of present area has been presented. Medicinal plants used by the restricted people ethnobotanically are of huge significance that is the cause a lot of people are busy in the deal of important medicinal herbs, shrubs and tree species in and outside the country. Therefore, the present study reports the traditional utilization of some plants of the area, which might be helpful for the future workers, ecologist, pharmacologists, taxanomists, wild life and water shed managers.
Results and Discussion
The following ethnobotanical information was collected on 92 plant species belonging to 78 genera and 38 families in the investigated area (Table 1). The reported vegetation comprised 70 species of herbs, 11 trees, 10 shrubs and one parasite species. The people of the area depend on agriculture, fuel & timber wood selling, livestock and other natural resources of the area for earning their daily commodities.

Plants used as medicine
There were 73 (79.3%) plant species that are being used as medicine. Some of the plants are used individually, while others in mixture. Many plant species have single or multiple medicinal uses. Among such plants *Allium sativum*, *Avena sativa*, *Cassia fistula*, *Citrus aurantifolia*, *Coriandrum sativum*, *Daucus carota*, *Eruca sativa*, *Fagonia cretica*, *Ficus carica*, *Fumaria indica*, *Luffa cylindrical*, *Malva neglecta*, *Mentha arvensis*, *Papaver somniferum*, *Prunus persica*, *Punica granatum*, *Rosa indica*, *Withania somnifera* and *Ziziphus jujuba* are commonly used against the various ailments (Table 1). Seventy one percent of the local plants are used as medicine. Present findings agree with those of Hussain et al. (1995), Siwakoti & Siwakoti (1998), Hussain et al. (2004; 2005), and Ibrar et al. (2007) Khan et al. (2011) with respect to medicinal uses.

Plants used as fodder and forage
Livestock is a very important component of the village life. Some 51 (55.4%) plant species are used as fodder. The most commonly used plants are *Boerhaavia procumbens*, *Chenopodium album*, *Cucurbita maxima*, *Cucurbita pepo*, *Daucus carota*, *Eruca sativa*, *Fagonia cretica*, *Hordeum vulgare*, *Luffa cylindrical*, *Saccharum spontaneum*, *Sonchus asper*, *Spinacea oleracea*, *Tribulus terrestris*, *Zea mays*, *Ziziphus jujuba*, *Cenchrus ciliaris*, *Cynodon dactylon*, *Cyperus rotundus*, *Cyperus scarlosus*, *Oxalis corniculata* and *Sorghum halepense*. Free grazing is the common practice in the area (Figure 2). Before the commencement of winter, the grasses are harvested, dried and put into a stake. The harvesting is done collectively and then during the bare and cold months of winter, these are fed to the domestic animals. Durrani et al. (2003); Gilani et al. (2003), Hussain et al. (2005), and Ibrar et al. (2007) also reported the same from other parts of Pakistan.

Fuel wood species
30 (32.6%) of the total recorded plant species were used as fuel wood. Fuel consumption per home in the studied area is often considered more than the consumption on feeding and other requirements because of severe winters. Khan (2000) and Awan (2000) observed that the fuel wood is collected before the commencement of winter. The most common plant species used as fuel are *Abelmoschus esculentus*, *Eruca sativa*, *Eucalyptus camaldulensis*, *Hordeum vulgare*, *Melia azedarach*, *Prunus persica*, *Punica granatum*, *Saccharum spontaneum*, *Zea mays*, *Ziziphus jujuba*, *Sorghum halepense*, *Citrus aurantifolia*, *Rosa indica*, *Alhagi maurorum*, *Calotropis procera*, *Cannabis sativa*, *Chrozophora oblique*, *Datura metel*, *Datura stramonium*, *Dodonaea viscosa*, *Heliotropium europaeum*, *Ricinus communis* and *Xanthium strumarium*. Most of the economically important plants are decreasing due to cutting. All these species, which have high fuel value, are severely damaged. These include *Tamarix*, *Cassia*, *Morus*, *Melia* and *Ficus* which are decreasing in the area.

Vegetable, potherb and spices
20 species are being used as vegetables and potherbs comprising about 21.7% of the total reported plants. The cultivated and wild species are *Abelmoschus esculentus*, *Allium sativum*, *Avena sativa*, *Chenopodium album*, *Chenopodium murale*, *Cucurbita maxima*, *Cucurbita pepo*, *Daucus carota*, *Eruca sativa*, *Luffa cylindrica*, *Mentha arvensis* and *Momordica charantia*. Women and young girls collect the wild vegetables from their nearby area and generally used for their own need only. Hussain et al. (1995), Hussain and Sher (1998), Sher et al. (2004), Hussain et al. (2005), and Ibrar et al. (2007). Durrani et al. (2003); Gilani et al. (2003) also reported many wild vegetable plants which are in use of local people.

Plants yielding edible fruits
There are 16 plant species (16.3%), yielding edible
Livestock grazing is an important practice in the area. Plants used in fencing and hedging, livestock sheltering and roofing. Our findings agree with Sher et al. (2005), Sher et al. (2004), and Ibrar et al. (2007). Punica serve as cash crops in the area. Badshah et al. (1996), Gilani et al. (2003), Hussain et al. (1995; Sher et al., 2003; 2004; Hussain et al., 2004; 2005; Gilani et al., 2003; Ibrar et al., 2007). Punica are important plant species for honey bees. Honey obtained from Saccharum and Zizyphus spp., is considered to be the best quality, which is extensively used in the preparation of traditional medicines and sold at higher rates.

Plants used in making agricultural appliances/tools
In many parts of the valley even today, agriculture is carried out in primitive traditional way by using traditional wooden/iron tools. The study recorded that 8 species (8.7%) were used for making agricultural tools including ploughs, sticks, sickle handles, axe handles, pulls, knife handles and other agricultural appliances. Cassia fistula, Eucalyptus camaldulensis, Ficus religiosa, Melia azedarach, Morus alba, Morus nigra, Tamarix indica and Ziziphus jujuba are important in this respect.

Honeybee species
Honeybees visit 56 species (60.9%). The area is famous for wild honeybee species. Abemloschus esculentus, Alhagi maurorum, Allium sativum, Avena sativa, Calotropis procera, Cannabis sativa, Carthamus oxycahna, Cassia fistula, Chenopodium album, Chenopodium murale, Chrozophora oblique, Citrullus lanatus, Citrus aurantifolia, Convolvulus arvensis, Coriandrum sativum, Cucurbita maxima, Cucurbita pepo, Eruca sativa, Ficus carica, Luffa cylindrical, Mentha arvensis, Mentha longifolia, Momordica charantia, Morus alba, Morus nigra, Oxalis corniculata, Papaver somniferum, Prunus persica, Punica granatum, Ricinus communis, Rosa indica, Saccharum spontaneum, Solanum surattense, Sonchus asper, Spinacea oleracea, Tribulus terrestris, Withania somnifera, Zea mays and Ziziphus jujuba are important plant species for honey bees. Honey obtained from Saccharum and Zizyphus spp., is considered to be the best quality, which is extensively used in the preparation of traditional medicines and sold at higher rates.

Multi-purpose plant species
The inhabitants of the valley depend on plants for their needs. Some 19 (20.7%) plant species are multi-purpose species (Table 1). They include Abemloschus esculentus, Cassia fistula, Citrus aurantifolia, Cucurbita maxima, Cucurbita pepo, Eruca sativa, Eucalyptus camaldulensis, Ficus carica, Ficus religiosa, Luffa cylindrical, Melia azedarach, Rosa indica, Zea mays and Ziziphus jujuba are wild and cultivated. Some of them are economically important, but in terms of density and frequency, the wild fruit plants are decreasing continuously due to biotic pressure (Hussain et al., 1995; Sher et al., 2003; 2004; Hussain et al., 2004; 2005; Gilani et al., 2003; Ibrar et al., 2007). Punica serve as cash crops in the area. Some of the same plants for similar purposes.

Ornamental plant species
16 plant species (17.4%) were classified as ornamental plants. Among them Cassia fistula, Citrullus lanatus, Citrus aurantifolia, Cynodon dactylon, Dodonaea viscosa, Eucalyptus camaldulensis, Ficus carica, Ficus religiosa, Melia azedarach, Mentha arvensis, Papaver somniferum, Prunus persica, Punica granatum and Rosa indica. Ornamental plants are commercially not exploited but it can become a good source of income generation. Rosa had the potential for commercialization.

Plants used in fencing and hedging
Livestock grazing is an important practice in the area therefore the people protects their crop fields by planting thorny, bushy or spiny plants around their crop fields. There were 11 plants used for the purpose of fencing and hedging in the area. It comprised 12% of the total plants reported. Some important plants used for this purpose were Calotropis procera, Cassia fistula, Eucalyptus camaldulensis, Ficus religiosa, Melia azedarach, Morus alba, Morus nigra, Saccharum spontaneum, Sorghum halepense, Tamarix indica and Ziziphus jujuba.
Morus alba, Morus nigra, Prunus persica, Punica granatum, Saccharum spontaneum, Tamarix indica, Zea mays and Ziziphus jujuba.

The area is under heavy biotic pressure in the form of deforestation and overgrazing, which has been considerably reduced regeneration of woody plants. Human population explosion, uprooting of medicinal plants by the local people and other casual factors are responsible for habitat loss, soil erosion and proper functioning of ecosystems. There is dire need to conserve the biodiversity of the area in order to provide the resources and resource alternatives for our own survival in future. Some of the recorded plants such as Pomegranate are very important as cash crops in the area. Similarly Zizyphus wood is liked as fuel wood. They are sold outside the area @ Rs. 250-270/maund. Similarly, habitat deterioration has also lead to the reduction in regeneration of many woody and shrubby plants. The plants are used by local residents for many diseases like cold, cough, Stomachache, diarrhea, gonorrhea, dysentery and skin diseases, kidney spain, typhoid, for hair, joints pain, swelling of body, purification of blood, constipation, intestinal worms, pimples and many other ailments. The area has enormous potential for its natural resources. The ethnobotanical knowledge in the area is gradually being approved on from generation to generation. For proper restoration of vegetation for sustainable use ecological efforts are needed with the participation of local community.

Conclusions
The various diversity and consensus indices show considerable vitality of local plant use. The high number of plants and uses reported, as well as the number and originality of common plant names, support this idea. Nevertheless, since informants were selected from among people known for their wide knowledge of plants and their uses, and their mean age was more than 80, we may conclude that folk phytotherapy is “aging”, in the sense that knowledge of medicinal plants persists mainly in elderly rural people with little schooling. The transmission of this type of knowledge from generation to generation is now threatened in this region and tends towards disappearance. Sheikh Maltoon Town is just like the “Natural Park” has good ethnobotanical potential for medicinal plants. It is a suitable place for further ethnobotanical and ethnopharmacological studies. We are aware that this study was not exhaustive, but only a first contribution to the ethnobotany of this region, focusing on medicinal plants.

Methodology
Study area
The district lies from 34°12'0"N 72°2'24"E. The elevation of the valley is 1000 to 2056 m above sea level. It is bounded on the north by Burner district and Malakand protected area, on the east by Swabi and Burner districts, on the South by Nowshera district and on the west byCharsadda district and Malakand protected area. The total area of the district is 1632 kilometers. Mardan district may broadly be divided into two parts, North-Eastern hilly area and south western plain (Khan et al., 2011b). Sheikh Maltoon Town is one of the famous town of Mardan due to expensive area most of the area is open from 1985 which showed the look of natural park (Figure 1).

Informed consent
Prior to the study, signed consent forms from each interviewee were obtained. These individuals constituted traditional healers, patients as well as other traders (herbalists).

Sampling and interview of healers
A survey was conducted during 2008 to document the traditional uses of plants. Due to the low education level or lack of understanding of the English language of most individuals, the structured questionnaires were discussed on an individual basis and explained by an interpreter. The results were then transcribed by the interpreter as many could not write. The plants were classified according to their economic value through interviewing and filling questionnaires from drug dealers, shopkeepers, fuel wood seller, local hakims, and farmers but priority was given to local elderly people and Hakims who were the real users and had a lot of information about the plants and their traditional uses. A total of more 400 individuals were interviewed. As there are predominantly two markets in the research area, the interviewees were divided equally between these two markets.
Identification of plants

Many of the traditional healers/herbalists provided the local names of the plants being used. Scientific names were validated on our return to the laboratory. Plant specimen were collected, dried and preserved properly. They were identified through available literature (Nasir and Ali, 1971-1995; Ali and Qaisar, 1995-2006). Literature survey and general observations adds some more information. The voucher specimens were submitted to Herbarium, Department of Botany, Federal Government College Mardan, Pakistan.

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Table 1: Ethnobotanical profile of plant species of Sheikh Maltoon and adjoining area, District Mardan, Pakistan

| S. No. | Species                    | Family       | Local Name | Habit | Part used | A | B | C | D | E | F | G | H | I | J | K |
|--------|---------------------------|--------------|------------|-------|-----------|---|---|---|---|---|---|---|---|---|---|---|---|
| 1      | *Abelmoschus esculentus* L. | Malvaceae    | Binday     | Fruit | +         | + | + | + | + | - | - | - | - | - | + | + |
| 2      | *Achyranthis aspera* L.    | Amaranthaceae| Ghishkay   | Whole plant | + | + | - | - | - | - | - | - | - | - | - | - |
| 3      | *Ajuga bractiosa* Wall. Benth. | Lamiaclaeae | Khwaga beta | Whole plant | + | + | - | - | - | - | - | - | - | + | - | - |
| 4      | *Ajuga parviflora* Benth. | Lamiaclaeae | Tarkha beta | Whole plant | + | + | - | - | - | - | - | - | - | - | - | - |
| 5      | *Alhagi maurorum* Medic.   | Papilionaceae| Askha beta  | Whole plant | - | - | + | - | - | - | + | - | - | - | - | + |
| 6      | *Allium sativum* L.        | Liliaceae    | Ooga       | Bulb   | + | - | - | + | - | - | - | - | - | - | - | + |
| 7      | *Amaranthus viridis* L.    | Amaranthaceae| Soba      | Whole plant | + | + | - | - | - | - | - | - | - | - | - | - |
| 8      | *Avena sativa* L.          | Poaceae      | Jamdar     | Whole plant | + | - | - | + | - | - | - | - | - | - | - | + |
| 9      | *Boerhaavia procumbens* Banks ex Roxb. | Nyctaginaceae | Wosha | Whole plant | + | + | - | - | - | - | - | - | - | - | - | - |
| 10     | *Bromus japonicus* Thumb ex Murr | Poaceae     | Wosha     | Whole plant | - | + | - | - | - | - | - | - | - | - | - | - |
| 11     | *Calotropis procera* (Wight.) Ali | Asclepiadaceae | Spalmy | Whole plant | - | - | + | - | - | - | + | - | - | - | + | + |
| 12     | *Cannabis sativa* L.       | Cannabinaceae| Bang       | Leaves, Fruit | - | - | + | - | - | + | - | - | - | - | + | - |
| 13     | *Capsella bursa-pastoris* Medic. | Brassicaceae | Bambaisa   | Fruit, seed | - | + | - | + | - | - | - | - | - | - | - | - |
| 14     | *Carthamus oxyanthum* M. Bieb. | Asteraceae  | Kareeza    | Root, seed, flower | + | - | - | - | - | - | - | - | - | - | - | + |
| 15     | *Cassia fistula* L.        | Caesalpinaceae| Lamdes     | Fruit   | + | + | + | - | + | + | + | + | + | + | + |
| 16     | *Cassia occidentalis* L.   | Caesalpinaceae| H         | Whole plant | + | - | - | - | - | - | - | - | - | - | - | - |
| 17     | *Cenchrus ciliaris* L.     | Poaceae      | Kurishka   | Leaves  | - | + | - | - | - | - | - | - | - | - | - | - |
| 18     | *Centaurea calcitrapa* L.  | Asteraceae   | Guli       | Whole plant | + | + | - | - | - | - | - | - | - | - | - | - |
| 19     | *Chenopodium album* L.     | Chenopodiaceae| Sarme     | Leaves  | + | + | - | + | - | - | - | - | - | - | - | + |

Note: A: Medicinal; B: Fodder and forage; C: Fuel; D: Vegetable; E: Edible fruits; F: Thatching, sheltering; G: Ornamental plant; H: Fencing and hedging; I: Agricultural appliances; J: Honeybee species; K: Multi-purpose
Continuing table 1

| S. No. | Species                      | Family                  | Local Name | Habit | Part used | A | B | C | D | E | F | G | H | I  | J  | K |
|-------|------------------------------|-------------------------|------------|-------|-----------|---|---|---|---|---|---|---|---|----|----|---|
| 20    | *Chenopodium murale* L.      | Chenopodiaceae          | Soba       | H     | Leaves    | + | + | - | + | - | - | - | - | -  | +  | - |
| 21    | *Chrozophora oblique* (Vahl) A. Juss. | Euphorbiaceae | Beta       | H     | Leaves    | - | - | + | - | - | - | - | - | +  | +  | - |
| 22    | *Citrus lanatus* (Thunb.) Mats | Rutaceae                | Hindwana   | H     | Fruit     | + | - | - | - | + | - | - | - | -  | +  | - |
| 23    | *Citrus aurantifolia* Christmann | Rutaceae                | Namboo     | S     | Fruit     | + | - | - | + | - | - | - | - | -  | +  | + |
| 24    | *Convolvulus arvensis* L.    | Convolvulaceae          | Prewatay   | H     | Fruit, leaves | + | + | - | + | - | - | - | - | -  | +  | - |
| 25    | *Coriandrum sativum* L.      | Apiaceae                | Dania      | H     | Whole plant | + | - | - | + | - | - | - | - | -  | +  | - |
| 26    | *Cucumis prophetarum* L.     | Cucurbitaceae           | Kalkunday  | H     | Leaves, stem | + | - | - | - | - | - | - | - | -  | -  | - |
| 27    | *Cucurbita maxima* Duchesne. | Cucurbitaceae           | Kadu       | H     | Fruit     | + | - | - | - | + | - | - | - | -  | +  | + |
| 28    | *Cucurbita pepo* L.          | Cucurbitaceae           | Peta       | H     | Fruit     | + | - | - | - | + | - | - | - | -  | +  | + |
| 29    | *Cuscuta reflexa* Roxb.      | Cuscutaceae             | Zailay     | H     | Whole plant | + | - | - | - | - | - | - | - | -  | -  | - |
| 30    | *Cymbopogon distans* (Nees ex Steud.)Watson | Poaceae                | Sargara    | H     | Leave     | - | + | - | - | - | - | - | - | -  | -  | - |
| 31    | *Cynodon dactylon* L. Pers.  | Poaceae                 | Kabal      | H     | Leaves    | - | + | - | - | - | - | - | - | -  | -  | - |
| 32    | *Cyperus rotundus* L.        | Cyperaceae              | Dela       | H     | Leaves    | - | + | - | - | - | - | - | - | -  | -  | - |
| 33    | *Cyperus scarlosus* R.Br.    | Cyperaceae              | Dela       | H     | Leaves    | - | + | - | - | - | - | - | - | -  | -  | - |
| 34    | *Datura metel* L.            | Solanaceae              | Barbaka    | S     | Leaves, fruit | - | - | + | - | - | - | - | - | -  | +  | - |
| 35    | *Datura stramonium* L.       | Solanaceae              | Baltura    | H     | Root      | - | - | + | - | - | - | - | - | -  | -  | + |
| 36    | *Daucus carota* L.           | Apiaceae                | Gazara     | H     | Leaves    | + | + | - | - | - | - | - | - | -  | -  | - |
| 37    | *Descurainia sophia* (L.) Webb. | Brassicaceae           | Skha bootay| H     | Flowers, leaves, seeds | + | - | - | - | - | - | - | - | -  | -  | - |
| 38    | *Dodonaea viscosa* (L.) Jacq. | Sapindaceae             | Ghwaraske  | S     | Wood, bark | - | + | - | - | - | - | - | - | -  | -  | - |

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| S. No. | Species                         | Family          | Local Name | Habit | Part used      | A | B | C | D | E | F | G | H | I | J | K |
|-------|--------------------------------|-----------------|------------|-------|----------------|---|---|---|---|---|---|---|---|---|---|---|
| 39    | *Eruca sativa* Mill             | Brassicaceae    | Tarmeera   | H     | Leaves, seeds  | + | + | + | - | - | - | - | - | - | + | + |
| 40    | *Eucalyptus camaldulensis* Dehn. | Myrtaceae       | Lachi      | T     | Wood, bark     | + | + | + | - | - | + | + | + | - | - | + |
| 41    | *Euphorbia helioscopia* Mewski  | Euphorbiaceae   | Piryanodooolai | H | Leaves      | + | - | - | - | - | - | - | - | + | + |
| 42    | *Euphorbia hirta* L.            | Euphorbiaceae   | Her Beta   | H     | Whole plant   | - | + | + | - | - | - | - | - | + | + |
| 43    | *Euphorbia prostrata* L.        | Euphorbiaceae   | Warmagha   | H     | Leaves        | + | + | - | - | - | - | - | - | - | - |
| 44    | *Fagonia cretica* Burm.         | Zygophyllaceae  | Azghakey   | H     | Whole plant   | + | - | - | - | - | - | - | - | + | - |
| 45    | *Ficus carica* Hausskn. Ex. Boiss. | Moraceae      | Inzar      | T     | Fruit, leaves | + | + | + | - | + | + | - | - | + | + |
| 46    | *Ficus religiosa* L.            | Moraceae        | Peepal     | T     | Leaves, stem  | + | + | + | - | + | + | + | + | + | - |
| 47    | *Fumaria indica* (Hausskn) Pugsley | Fumariaceae    | Papra      | H     | Whole plant   | + | - | - | - | - | - | - | - | + | - |
| 48    | *Gallium aparine* L.            | Rubiaceae       | Sumira     | H     | Whole plant   | + | + | - | - | - | - | - | - | - | - |
| 49    | *Heliotropium europaeum* L.     | Boraginaceae    | Sherawina  | H     | Whole plant   | + | - | + | - | - | - | - | - | - | - |
| 50    | *Hordeum vulgare* L.            | Poaceae         | Warbashe   | H     | Whole plant   | + | + | + | - | + | - | - | - | - | - |
| 51    | *Launea procumbens* Roxb.       | Asteraceae      | Paiwar     | H     | Whole plant   | + | - | - | - | - | - | - | - | - | + |
| 52    | *Luffa cylindrica* (L.) Roem.   | Cucurbitaceae   | Torai      | H     | Fruit         | + | + | - | - | - | - | - | - | + | + |
| 53    | *Malva neglecta* Wallr.         | Malvaceae       | Panerak    | H     | Leaves        | + | + | - | - | - | - | - | - | - | - |
| 54    | *Malvastrum coromandelianum* (L.) Garcke | Malvaceae | Papita    | H     | Whole plant   | + | - | - | - | - | - | - | - | - | - |
| 55    | *Melia azedarach* L.            | Meliaceae       | Shundai    | T     | Leaves, fruits| + | + | + | - | - | + | - | - | - | - |
| 56    | *Mentha arvensis* L.            | Lamiaceae       | Podina     | H     | Leaves, stem  | + | - | - | - | - | - | - | - | - | - |
| 57    | *Mentha longifolia* L.          | Lamiaceae       | Elane      | H     | Leaves, stem  | + | - | - | - | - | - | - | - | - | - |

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| S. No. | Species                                      | Family               | Local Name | Habit | Part used            | A  | B  | C  | D  | E  | F  | G  | H  | I  | J  | K  |
|-------|----------------------------------------------|----------------------|------------|-------|----------------------|----|----|----|----|----|----|----|----|----|----|----|
| 58    | *Mirabilis jalapa* L.                       | Nyctaginaceae       | Gulabasi   | H     | Leaves, tuber         | +  | -  | -  | -  | -  | -  | -  | -  | -  | +  | -  |
| 59    | *Momordica charantia* L.                    | Cucurbitaceae       | Karela     | H     | Whole plant           | +  | -  | -  | +  | -  | -  | -  | -  | -  | -  | +  |
| 60    | *Morus alba* L.                             | Moraceae             | Spin tooth | T     | Fruit                | +  | +  | -  | -  | +  | -  | +  | +  | +  | +  | -  |
| 61    | *Morus nigra* L.                            | Moraceae             | Tor tooth  | T     | Fruits               | +  | +  | -  | +  | +  | -  | +  | +  | +  | +  | -  |
| 62    | *Ocimum basilicum* L.                       | Lamiaceae            | Kashmalu   | H     | Fruits               | +  | -  | -  | -  | -  | +  | -  | -  | -  | -  | +  |
| 63    | *Onopordum acanthium* L.                    | Asteraceae           | Katwai     | H     | Leaves, fruit         | +  | -  | -  | -  | -  | -  | -  | -  | -  | +  | -  |
| 64    | *Oxalis corniculata* L.                     | Oxalidaceae          | Treewake   | H     | Seed & fruit          | -  | +  | -  | -  | -  | -  | -  | -  | -  | -  | +  |
| 65    | *Papaver rhoes L.*                          | Papaveraceae         | Sor gul    | H     | Leaves, seeds         | +  | +  | -  | -  | -  | -  | -  | -  | -  | -  | -  |
| 66    | *Papaver somniferum* L.                     | Papaveraceae         | Doda       | H     | Fruit, seeds          | +  | +  | -  | -  | -  | -  | +  | -  | -  | -  | -  |
| 67    | *Parthenium hysterophorus* L.               | Asteraceae           | Saha boti  | H     | Whole plant           | -  | -  | +  | +  | -  | -  | -  | -  | -  | -  | -  |
| 68    | *Peganum harmala* L.                        | Zygophyllaceae       | Spelane    | H     | Whole plant           | +  | -  | -  | -  | -  | -  | -  | -  | -  | -  | -  |
| 69    | *Portulaca olearacea* L.                    | Portulacaceae        | Warkharay  | H     | Fruit                | +  | +  | -  | -  | +  | -  | -  | -  | -  | -  | -  |
| 70    | *Prunus persica* (L.) Batsch                | Rosaceae             | Shaltalu   | T     | Flowers fruit         | +  | +  | -  | +  | -  | +  | -  | -  | +  | +  | -  |
| 71    | *Punica granatum* L.                        | Punicaceae           | Anar       | T     | Fruit Gumm           | +  | +  | -  | +  | +  | -  | +  | -  | -  | -  | +  |
| 72    | *Riccinis communis* L.                      | Euphorbiaceae        | Arand      | S     | Seed & fruit          | +  | -  | -  | -  | -  | -  | -  | -  | -  | -  | +  |
| 73    | *Rosa indica* L.                            | Rosaceae             | Gulabasi   | S     | Flowers fruit         | +  | -  | -  | -  | -  | +  | -  | -  | -  | -  | +  |
| 74    | *Rumex dentatus* L.                         | Polygonaceae         | Shulkhay   | H     | Leaves               | +  | -  | -  | +  | -  | -  | -  | -  | -  | -  | -  |
| 75    | *Sacharum spontaneum* L.                    | Poaceae              | Kana       | S     | Whole plant           | +  | +  | -  | -  | +  | -  | -  | +  | +  | +  | -  |
| 76    | *Silybum marianum* (L.) Gaertn.             | Asteraceae           | Sabu       | H     | Leaves               | +  | -  | -  | -  | -  | -  | -  | -  | -  | -  | +  |
| 77    | *Solanum nigrum* L.                         | Solanaceae           | Maku       | H     | Whole plant           | +  | -  | -  | -  | -  | -  | -  | +  | -  | -  | +  |

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Continuing table 1

| S. No. | Species                      | Family      | Local Name | Habit | Part used | A  | B  | C  | D  | E  | F  | G  | H  | I  | J  | K  |
|--------|------------------------------|-------------|------------|-------|-----------|----|----|----|----|----|----|----|----|----|----|
| 78     | *Solanum surattense* Burm.f | Solanaceae  | Zira mana  | H     | Fruit     | +  | -  | -  | -  | -  | -  | -  | -  | +  | -  |
| 79     | *Sonchus arvensis* L.       | Asteraceae  | Boti       | H     | Whole plant| +  | +  | -  | -  | -  | -  | -  | -  | -  | -  |
| 80     | *Sonchus asper* (L.) Hill   | Asteraceae  | Shoda pai  | H     | Leaves    | +  | +  | -  | -  | -  | -  | -  | -  | -  | +  |
| 81     | *Sonchus auriculata* L.     | Asteraceae  | Boti       | H     | Leaves    | +  | +  | -  | -  | -  | -  | -  | -  | -  | -  |
| 82     | *Sorghum halepense* (L.) Persoon | Poaceae | Dedam    | H     | Whole plant| -  | +  | +  | -  | -  | -  | -  | +  | -  | -  |
| 83     | *Spinacea oleracea* L.      | Chenopodiaceae | Paluk   | H     | Leaves    | +  | +  | -  | -  | -  | -  | -  | -  | -  | +  |
| 84     | *Stellaria media* (L.) Cry  | Caryophyllaceae | Bataki | H     | Leaves    | -  | +  | -  | -  | -  | -  | -  | -  | -  | -  |
| 85     | *Tamarix indica* Wild.      | Tamaricaceae | Ghaz     | T     | Gum, leaves| +  | -  | +  | -  | -  | +  | -  | +  | +  | +  |
| 86     | *Taraxacum officinale* Weber. | Asteraceae | Zir gul  | H     | Whole plant| +  | +  | -  | -  | -  | -  | -  | -  | -  | +  |
| 87     | *Tribulus terrestris* L.    | Zygophyllaceae | Malkinda | H     | Leaves, stem| +  | +  | -  | -  | -  | -  | -  | -  | -  | +  |
| 88     | *Vicia sativa* L.           | Papilionaceae | Chilo    | H     | Whole plant| +  | +  | -  | +  | -  | -  | -  | -  | -  | +  |
| 89     | *Withania somnifera* (L.) Dunal. | Solanaceae | Kotilal  | S     | Fruit, leaves| +  | -  | -  | -  | -  | -  | -  | -  | -  | +  |
| 90     | *Xanthium strumarium* L.    | Asteraceae  | Geshke    | H     | Leaves    | +  | -  | +  | -  | -  | -  | -  | -  | -  | +  |
| 91     | *Zea mays* L.               | Poaceae     | Jowar     | H     | Fruit, leaves| +  | +  | +  | +  | +  | -  | -  | -  | -  | +  |
| 92     | *Ziziphus jujuba* Mill.     | Rhamnaceae  | Bera      | T     | Leaves, fruit, gum| +  | +  | +  | +  | +  | +  | +  | +  | +  | +  |

Total 73 51 30 20 16 15 16 11 8 56 19

Percentage 79.3 55.4 32.6 21.7 17.4 16.3 17.4 12 8.7 60.9 20.7

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