

Ethno Medicinal Survey of Herbal Tree Shrub and its Distribution In Khanpur Valley Khyber Pakhunkhwa of Pakistan

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Abstract

Khanpur Valley, located in the sub-Himalayan Mountains of Pakistan, is a rich repository of the diverse flora of immense medicinal importance. During the survey, 202 plants were recorded. Similarly, the maximum species were herbs (141), followed by trees (31), while the minimum species were shrubs (30). Moreover, out of the total 202 plant species, 71 (34%) belonged to 42 families that were identified as medicinally important. The findings further established that the most significant number of illnesses cured with medicinal plants were associated with the digestive system (36.05%), followed by respiratory disorders (14.83%), blood purification (14.42%), reproductive diseases (9.7%), skin problems (6.64%), urinary diseases (5.62%), nutritional & tonic supplement (5.21), brains & nerves (4.73%) and bones and joints (2.8%). Finally, the study found that the maximum utilization of medicinal plants was in the form of powder (39.14%), followed by decoction (21.22%), tea (8.41%), paste (7.13%), fresh or raw form (7.1%), juice (6.04%), cooked (4.31%), cream (3.84%) and tincture (2.81%). Based on the result, the local people preferred the herbs and leaves of woody plants for use in various recipes and to cure diseases most preferably associated with the digestive system.

Keywords: Ethno medicinal, survey, distribution, Khanpur valley

Highlights:

- Survey of Khan pur valley of Pakistan
- Medicinal plants to treat diseases
- Cure associated with plants to treat the digestive disorder

1. Introduction

Species diversity contributes to the main elements of medicines in traditional healing systems and has been the source of stimulus for many major pharmaceutical drugs. (Haq *et al.*, 2010). More than 8,000 plant species in South Asia are used in alternative medicines and are an integral part of traditional health care systems (Hussain *et al.*, 2007). Pakistan, though not among the world's biodiversity hot spots, still faces immense challenges in the conservation and sustainable operation of biological resources. Degradation in natural resources is visible, caused by increased human activities related to the growing population coupled with human destruction of natural habitats and migration of the human population (Haq *et al.*, 2010). That resulted in the change in land use patterns, the spread of invasive species, the growing demand for natural resources, and its inappropriate management. In addition, no systematic work has been carried out on the status, ecosystem manager's grip, threats to ecosystems, and the effects of global climate change. Research suggested that many medicines have been derived from the folk use of the traditional civilizations (Shiva, 1996).

About 50 drugs have been discovered from ethno-botanical technologies through translating folk knowledge into new pharmaceutical approaches. Moreover, very few of the wide medicinal species have been domesticated globally, and most of these species are still collected from their wild habitats (Gupta and Chadha, 1995). Plant species have contributed significantly to the development of modern drugs. The use of medicinal plants is increasing worldwide due to the expansion of traditional medicine and a growing interest in herbal treatments.

Pakistan is among the reasonably diverse countries in plant resources, where people's reliance on biological sources for survival and well-being is firm (Ahmad *et al.*, 2008). Additionally, the country has rich and unbroken traditions of the use of medicinal plants and their natural products for healthcare needs (Zaman *et al.*, 1972). Focusing on medicinal plants raises some major conservation questions and endangered species. The treatment and the conservation of plants are linked with each other to get sustainable life. If preserved, medicinal plants will endure being available for health benefits to cure, income, and support cultural heritage. The overexploitation of habitats regarding farm conversions and human interference is a significant threat to biodiversity (Khan *et al.*, 2013). The only way to conserve biological diversity is the involvement of all stakeholders and professionals to take it on a war footing. The sub-Himalayan mountainous Valley of Khanpur has a unique ecosystem that provides all eco-physiological support to its inhabitants. It has reserve forests, cultivated lands, range lands, water reservoirs, uplands, diverse plants, wildlife, and climatic extremes. The Valley is at the gateway of the great

Himalayan Mountains. It is easily approached from different population centers like Islamabad and Taxila on one side and Haripur and Abbottabad on the other. So there is massive pressure on the natural resources, especially on the medicinal flora of the Valley, which otherwise magnifies its immense scope for conservation. Very little work has been undertaken on their selection and improvement for developing suitable varieties.

Regarding the importance of species diversity and conservation of medicinal wealth, the current study was initiated by the Department of Horticulture University of Agriculture, Peshawar. The Khanpur Valley was selected for this study because the Valley is a rich source of indigenous medicinal flora and is located adjacent to the medicinal and food industries at Hattar Industrial Estate. The Khanpur Valley can become a source of raw material supply to Hattar industries if scientific methods of collection and utilization are adopted. The current study was designed to achieve the following objectives, i) to enlist and documentary from of plant species in the Valley, ii) to identify the photo medicinal species of the Valley, and iii) to determine the use of medicinal plant species in the area.

2. Materials and methods

2.1 Experimental site and survey:

The study was conducted at Khanpur Valley in the Sub Himalayan Mountains of Pakistan from 2010 to 2011. An expert team of Hazara University, Mansehra, accompanied the scholar in the initial visits for technical assistance to undertake this critical study. In the first instance, during early 2010, the whole Valley was extensively visited, and agricultural, industrial & forest experts, local elders, herbalists, and leaders were interviewed. These interviews were done randomly during face-to-face meetings and group discussions, and the information collected was utilized in the designing and planning the research project.

2.2 Selection of Sites:

After discussion with stakeholders for a valley visit, four ecologically diverse sites, Mang, Dam, Dabola, and Jabri, were identified and selected. These sites differed in their environmental attributes, especially in altitude, slope, topography, habitat, vegetation type and plant community.

2.3 Selection of Seasons for identifying medicinal plants:

Medicinal plants of Khanpur valley were studied in two major seasons: winter and summer. Plants specimens for identification and data on various parameters were collected from October to March for winter and during April to September for summer.

2.4 Enlistment of the total plant species available at Khanpur Valley:

The research area was visited weekly in both summer & winter, and specimens of all the available species were collected from all four sites and brought to the herbarium of Hazara University, Mansehra, for identification by the experts and with the help of the flora of Pakistan. The local names, common names, technical names, family names, and type of plant or growth habit were adequately documented.

2.5 Identification of Phytomedicine plant in Valley:

Local herbalists, agricultural and forest experts, elders, and leaders were interviewed, and the plant species enlisted in the first part of the study were discussed with them. Moreover, the available literature on the subject was thoroughly studied, and relevant information was used to help document the plant species which were medicinally essential and available in the Valley.

2.6 Used for these Medicinal plants in Valley

The respondents were asked to mention the form of utilization or recipe the local people mostly preferred for traditional healthcare. The percent preferences for each mentioned form or recipe were calculated with the help of the following formula

$$Fic = \frac{Nur - Nt}{Nur - 1} \quad Fic = \frac{Nur - Nt}{Nur - 1}$$

Where;

Nur = reports of use in the selected disease group, Nt = species used to treat various diseases of this group. Informant Consensus Factor (ICF) values ranged from 0 to 1, where a value (close to 1) indicates that plant species are selected using well-defined criteria or information and their use is extremely exchanged between informants, and low values (close to 0) are obtained, when plant species are randomly selected or information about their use is not exchanged between informants

2.7 Statistical Analysis:

The data recorded was tabulated theme-wise, and the Microsoft Excel program was used to calculate percent preferences and its presentation in graphic form.

3. Results and Discussion

3.1 Enlistment of the total plant species available at Khanpur Valley:

The detailed list of total plant species enlisted at Khanpur valley is given in Table 1, while the Summary of Enlistment of Total Plant Species and Medicinally Important Plants found at Khanpur Valley, the total species identified were 202 belonging to 48 families (Appendix 1). Maximum species 19 were from the family Asteraceae (Compositae), followed by 18 species belonging to the Poaceae family, while Fabaceae and Solanaceae families were found with 12 species each, and Euphorbeaceae, Brassicaceae, and Moraceae were revealed with 9 species each. Similarly, the maximum species were of growth habit herbs (141), followed by shrubs (31), while the minimum plant species were trees (29) in nature. The results show that Khanpur valley is rich source of species diversity, as there were 202 total plant species belonging to 48 families, with 71 medicinally essential species. Maximum species were from the Asteraceae (Compositae), followed by the Poaceae family. Asteraceae and Poaceae were two larger families of plant species indigenous to the valleys of Pakistan (Fazal *et al.*, 2010). Similarly, maximum species were of growth habit herbs, followed by trees, while minimum plant species were shrubs in nature. Similar results were obtained by Murad *et al.* (2011) for Malakand Agency, KP, Pakistan; Qureshi *et al.* (2009) for Chakwal district of Punjab, Alam *et al.* (2011) for Chagharzai area Buner Pakistan, and Fazal *et al.* (2010) who documented 211 species of wild and cultivated plants of Haripur, Pakistan, with all mention of plant type and part used.

3.2 Identification of Phytomedicine Plant Species.

As a second part of the experiment, 71 species (35.15%) out of 202 total plant species were medicinally important (Appendix 2). These medicinally important species belonged to 42 families (Table 1.1). Maximum species were from the family Solanaceae (8), followed by Asteraceae (7) and Euphorbeaceae (4), while Fabaceae and Moraceae were found with 3 species each. Similarly, maximum species were of growth habit herbs (42), followed by shrubs (15), while minimum plant species were of growth habit tree (14). The efforts on the ethnobotany and documentation of valuable flora have been carried out for a long. Abbasi *et al.* (2009) reported 30 plant species belonging to 24 families used by local practitioners to treat Jaundice and hepatitis. Alam *et al.* (2011) concluded that 141 plant species of medicinal importance are found in Chagharzai Area of Buner district, Pakistan. Khan (1985) conducted another survey and reported that Hakims used 95 species for treatment, where the yearly consumption of medicinal plants was more than 5.65 million kg, valued at approximately Rs. 36 million. Khan *et al.* (2012) identified the use of medicinal Plants in Folk Recipes by the Inhabitants of the Himalayan Region Poonch Valley Azad Kashmir (Pakistan). Shinwari & Khan, (2000) recorded a total of 68 species of plants belonging to 44 families used medicinally to prepare folk recipes for 68 ailments. Leporatti and Lattanzi, (1994) studied 27 medicinal plants ethnobotanically in Makran (Southern Pakistan). They reported and discussed their traditional medicinal uses.

3.3 Phytomedicine for controlling disease

The results obtained on this parameter are given in Figure 1. The results revealed that the most significant number of ailments cured with medicinal plants were associated with the digestive system (36.05%), followed by those associated with respiratory, blood purification, reproductive, skin, urinary, nutritional and tonic, brain and nerves, and bones and tonic (14.83%, 14.42%, 9.7%, 6.64%, 5.21%, 5.62, 4.73 and 2.8% respectively). Further, findings were regarding ailments cured. The largest number of ailments cured with medicinal plants were associated with the digestive system, followed by those associated with respiratory, blood purification, reproductive, skin, urinary, nutritional and tonic, brain and nerves, and bones and joints (Khan, et al 2013). The logic behind this finding could be that most everyday diseases are associated with digestive and respiratory disorders (Rasool et al., 2010; Hussain, & Ghani, 2008); hence, the people of the research area use medicinal plants for these ailments. Similar results were obtained by Khan *et al.* (2012). who identified the use of Medicinal Plants in Folk Recipes by the Inhabitants of the Himalayan Region, Poonch Valley of Azad Kashmir (Pakistan).

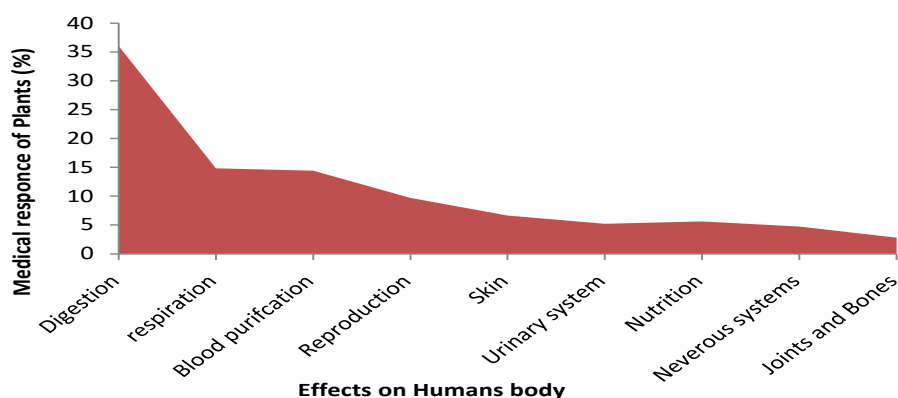


Figure 1. Phytomedicine plants for cured with diseases

3.4 Used for these Medicinal plants in Valley

The third outcome of the survey was regarding the type of use (recipe), which revealed that maximum utilization of medicinal plants was in the form of powder (39.14%), followed by decoction (21.22%), tea (8.41%), paste (7.13%), fresh (7.1%), juice (6.04%), cooked (4.31%), cream (3.84%) and tincture (2.81%). The survey found that powder form followed by decoction was the most preferred form of utilization by the local community of Khanpur valley. This may be due to ease of utilization in the preferred forms and is in connivance with the findings of other ethnobotanists (Rasool *et al.*, 2010; Hussain, & Ghani, 2008; Khan *et al.*, 2012). In line with the findings of this experiment, Khan *et al.* (2013) have also reported the preferences of respondents for part used, ailments cured, and form of the recipe, in Naran Valley of Pakistan.

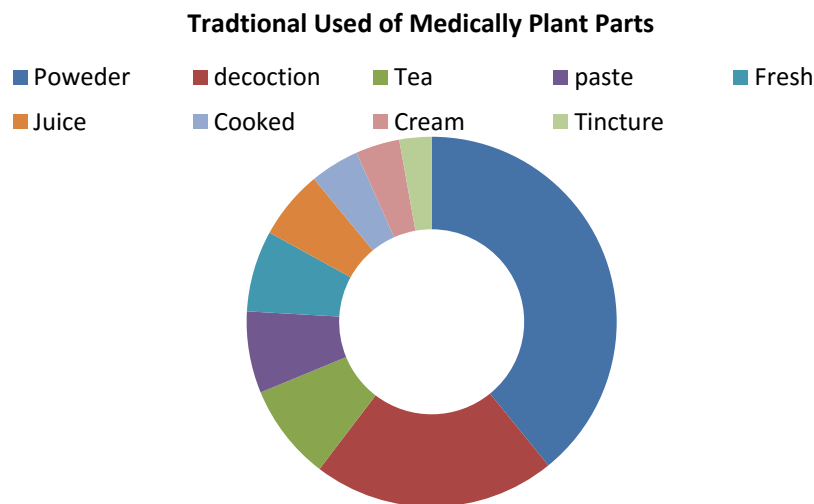


Figure 2. Used of medicinal plants

4. Conclusions:

It was concluded that the 202 species belonging to 48 different families recorded at Khanpur valley show that the Valley is rich in plant diversity. The 71 medicinally essential species were identified at the investigation area, which means that 35.15% of the flora of Khanpur is pharmaceutically significant. The survey found that the people of Khanpur prefer medicinal plants used to cure diseases related to digestive and respiratory systems, and they desire powder and decoction form of its application.

Recommendations:

- Being a repository of 202 plant species with 71 medicinal plants, it will be worthwhile if a herbal garden of indigenous medicinal flora is established in the Valley to preserve this national wealth.
- Khanpur valley is in close locality of Hattar Trade Estate a connection between the local community and industry at Hattar, may be recognized to supply raw material from the wild for products preparation. *Adhatoda vasica* which is used in Joshanda can be the one to start with.
- Local community needs trainings and awareness about the usefulness and sustainable utilization of the herbal plants to make this invaluable source of living available to the generations to come.

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APPENDICES

Appendix1. List of total plant species identified at Khanpur Valley.

Trees

Scientific name	Family	Commen name
<i>Acacia modesta</i>	Memosaceae	Phulai
<i>Acacia muricata</i>	Fabaceae	spineless wattle
<i>Acacia nilotica</i>	Memosaceae	Kikar
<i>Acacia victoriae</i>	Fabaceae	Bardi bush
<i>Ailanthus altissima</i>	Simaroubaceae	barabro
<i>Bauhinia variegata</i>	Fabaceae	Kachnar
<i>Cassia fistula</i>	Fabaceae	Amaltas
<i>Cassia sophora</i>	Fabaceae	Senna, kasaundi
<i>Celtis australis</i>	Canabaceae	Wild falsa
<i>Dalbergia sissoo</i>	Fabaceae	Shisham
<i>Ferula assafoetida</i>	Apiaceae	Landes
<i>Ficus benghalensis L.</i>	Moraceae	Banyan
<i>Ficus carica</i>	Moraceae	Injir
<i>Ficus hispida</i>	Moraceae	Injire dashti
<i>Ficus johannis</i>	Moraceae	Lobed fig
<i>Ficus palmata</i>	Moraceae	Phagwara
<i>Ficus variegata</i>	Moraceae	Wild fig
<i>Grewia optiva</i>	Malvaceae	Bihul, bhimal
<i>Lagerstroemia speciosa</i>	Lythraceae	Banaba
<i>Mallotus philippensis</i>	Euphorbiaceae	Kambela
<i>Melia azaderachta L.</i>	Meliaceae	Bakayen
<i>Morus alba L.</i>	Moraceae	sofaid toot
<i>Morus nigra L.</i>	Moraceae	Shahtoot
<i>Olea ferruginea</i>	Oleaceae	Jangali zaitoon
<i>Pinus roxbergi</i>		Peech
<i>Prunus serotina</i>	Solanaceae	Wild cherry
<i>Robinia pseudo-acacia</i>	Papilionaceae	Vilayati kikar
<i>Tecomella undulate</i>	Bibnomiaceae	Rohida
<i>Zizyphus vulgaris</i>	Rhamnaceae	Wild ber

Shrub

Scientific name	Family	Common name
<i>Adhatoda vasica</i>	Acanthaceae	Malaber nut
<i>Arundo donax</i>	Poaceae	Kalam bote
<i>Barleria prionitis</i>	Acanthaceae	(Porcupine flower, yellow picanier)
<i>Berberis lycium</i>	Berberidaceae	Kwaray
<i>Broussonetia papyrifera</i>	Moraceae	Gul toot
<i>Calotropis procera</i>	Asclepidaceae	Mundar
<i>Dodonea viscosa</i>	Sapindaceae	Sanata
<i>Ipomoea carnea</i>	Convolvulaceae	Pink bush
<i>Lantana camara L.</i>	Verbenaceae	Panchphuli
<i>Lycium barbarum</i>	Solanaceae	Thornless berberes
<i>Monothecha buxifolia</i>	Sapotaceae	Gurgura
<i>Myrsine Africana</i>	Myrsinaceae	Purple beryy plant
<i>Nerium oleander</i>	Apocynaceae	Kaner
<i>Otostegia limbata</i>	Lamiaceae	Spiny plant,
<i>Punica granatum</i>	Lythraceae	Ananguray
<i>Randia Formosa</i>	Rubiaceae	Blackberry jam fruit
<i>Recinus communis L.</i>	Euphorbiaceae	Arand
<i>Rubus fruticosus</i>	Rosaceae	Gurguray
<i>Rumax histatus</i>	Polygonaceae	Gato Tharokay
<i>Saccharum spontaneum</i>	Poaceae	Qalam butay
<i>Skimmia laureola</i>	Rutaceae	Nazar panra
<i>Solanum pseudo-capsicum</i>	Solanaceae	Jerusalem Cherry
<i>Vitex negundo L.</i>	Verbenaceae	Sanbhaalo
<i>Withania somnifera</i>	Solanaceae	Asgand
<i>Zizyphus nummularia</i>	Rhamnaceae	Wild ber (Indian jujube)

Herb

Scientific name	Family	Common name
<i>Ajuga bractiosa</i>	Labiatae	Karvi Buti
<i>Allium jaquemontii</i>	Alliaceae	Jangli piaz
<i>Alternanthera pungens</i> Kunth.	Amaranthaceae	Kanchari
<i>Amaranthus graecizans L.</i>	Amaranthaceae	chulai
<i>Amaranthus hybridus</i>	Amaranthaceae	Shalkhay,
<i>Amaranthus spinosus L.</i>	Amaranthaceae	Khاردar Chulai
<i>Amaranthus viridis L.</i>	Amaranthaceae	Chulai, shalkhay
<i>Anagallis arvensis L.</i>	Primulaceae	Dhabbar
<i>Androsace rotundifolia</i>	Primulaceae	Arrow head alpine
<i>Anthemis cotula L.</i>	Asteraceae	Tharkha babona
<i>Arenaria leptoclados</i>	Caryophyllaceae	Thyme leaf
<i>Artemisia brevifolia</i>	Asteraceae(compositae)	Tharkha
<i>Artemisia scoparia</i>	Asteraceae	Jhao
<i>Asparagus gracilis</i>	Liliaceae	Shahghandal
<i>Avena sativa L.</i>	Poaceae	Jangali jao
<i>Bidens biternata</i>	Asteraceae	Black jack
<i>Boerhavia diffusa</i>	Nyctaginaceae	Tukhme ispast
<i>Boerhavia procumbens</i>	Nyctangiaceae	Sentori
<i>Bombax malabaricum</i>	Malvaceae	Silk cotton tree
<i>Brassica campestris L.</i>	Brassicaceae	Sarson
<i>Calendula arvensis L.</i>	Asteraceae	Ziar gula
<i>Canna indica L.</i>	Cannaceae	Hakik
<i>Cannabis sativa L.</i>	Cannabaceae	Bhang
<i>Capsilla bursa-pastoris L.</i>	Brassicaceae	Chambraka
<i>Carthamus oxycantha</i>	Asteraceae	Jeweled distaff thistle
<i>Cassia absus L.</i>	Caesalpiniaceae	Chaksu, jasmeejaz
<i>Centaurea iberica</i>	Asteraceae	Star thistle

<i>Centaurium pulchellum</i>	Gentianaceae	Lesser centaury
<i>Cerastium glomeratum</i>	Caryophyllaceae	Sticky chick weed
<i>Chenopodium album</i> L.	Chenopodiaceae	Bathu
<i>Chenopodium ambrosioides</i> L.	Chenopodiaceae	Katto
<i>Chenopodium murale</i> L.	Chenopodiaceae	Bathu
<i>Cleome viscosa</i> L.	Capparidaceae	Asian spider flower
<i>Clitoria annua</i>	Fabaceae	Desi banafsha
<i>Convolvulus arvensis</i> L.	Convolvulaceae	leli
<i>Conyza bonariensis</i>	Asteraceae	Asthma weed
<i>Coronopus didymus</i>	Brassicaceae	Swiss cress
<i>Cousinia prolifera</i>	Asteraceae	Cousinia
<i>Cuscuta reflexa</i>	Cuscutaceae	Dodder
<i>Cynodon dactylon</i> L.	Poaceae	Bermuda grass
<i>Cyperus rotundus</i> L.	Cyperaceae	Nut grass,
<i>Dactyloctenium annulatum</i> L.	Poaceae	Madhana
<i>Datura alba</i>	Solanaceae	Mangaz butay
<i>Datura stramonium</i> L.	Solanaceae	Datura siah
<i>Desmodium elegans</i>	Fabaceae	Tick clover
<i>Dichanthium annulatum</i>	Poaceae	Palwan
<i>Dicliptera bubleuroides</i> Nees.	Acanthaceae	Foldwing
<i>Digera muricata</i> L.	Amaranthaceae	Sur gulay
<i>Echinochloa colona</i>	Poaceae	Jungle rice grass
<i>Echinops echinatus</i>	Asteraceae	Ont katara
<i>Eclipta prostrata</i> L.	Asteraceae	Bhangra
<i>Ellusine indica</i> L.	Poaceae	Chimber
<i>Eragrostice minor</i> Host, Gram.Auster	Poaceae	Pungent meadow grass
<i>Eryngium coerolium</i> M-Bieb.	Apiaceae	Pimpiti
<i>Euphorbia falcata</i> L.	Euphorbiaceae	Sickle spurge
<i>Euphorbia granulate</i>	Euphorbiaceae	Prostrate spurge
<i>Euphorbia helioscopia</i> L.	Euphorbiaceae	Chatri dodak
<i>Euphorbia heterophylla</i> L.	Euphorbiaceae	Lechosa
<i>Euphorbia hirta</i> L.	Euphorbiaceae	Dhudi
<i>Euphorbia humifusa</i>	Euphorbiaceae	Light spreading
<i>Euphorbia prostrate</i>	Euphorbiaceae	Prostrate sandman
<i>Fagonia indica</i>	Zygophyllaceae	Dhamasa
<i>Foeniculum vulgare</i>	Apiaceae	Kaga
<i>Fragaria orientalis</i>	Rosaceae	Zmake totan
<i>Fumaria indica</i>	Fumariaceae	Pit-papra
<i>Fumaria officinalis</i>	Fumariaceae	Papra
<i>Gallium aparine</i> L.	Rubiaceae	Sticky villy
<i>Hedera nepalensis</i>	Araliaceae	Perennial iv
<i>Imperata cylindrical</i> L.	Poaceae	Blady grass
<i>Indigofera spicata</i>	Fabaceae	Chelo
<i>Iris ensata</i>	Iridaceae	Sword leaved
<i>Justica peploides</i>	Acanthaceae	Dianthera
<i>Koeleria makrantha</i> (Ledeb)	Poaceae	Hair grass crested coelaria
<i>Lamium amplexicaule</i> L.	Lamiaceae	Henbit
<i>Lathyrus aphaca</i> L.	Papilionaceae	Sweet pea
<i>Lepidium pinnatifidum</i> L.	Brassicaceae	Lipidium
<i>Malva parviflora</i>	Malvaceae	Sonchal
<i>Malvastrum coromendilianum</i>	Malvaceae	Sticky mallow
<i>Malvestrum coromandelianum</i>	Malvaceae	False mallow
<i>Matricaria auria</i>	Asteraceae	Golden may weed
<i>Matricaria chamomile</i>	Asteraceae	Babona

<i>Medicago denticulata</i>	Fabaceae	Shpeshtaray
<i>Medicago polymorpha</i> L.	Papilionaceae	Sijee
<i>Melilotus indica</i>	Papilionaceae	Ran methi
<i>Menthe arvensis</i> L.	Lamiaceae	Podina
<i>Menthe longifolia</i>	Lamiaceae	Sofaid podina
<i>Menthe royleana</i>	Lamiaceae	Velanay
<i>Mirabilis jalapa</i> L.	Nyctangiaceae	Gule abbasi
<i>Narcissus tazetta</i> L.	Amaryllidaceae	Gul e nargas
<i>Nasturtium officinale</i>	Brassicaceae	Tarmira
<i>Neslia apiculata</i>	Brassicaceae	Neslia
<i>Oxalis corniculata</i> L.	Oxalidaceae	Khatti biti
<i>Oxalis pescaprae</i> L.	Oxalidaceae	Khatmit
<i>Papaver hybridum</i> L.	Papaveraceae	Prickly headed poppy
<i>Papaver rhoeas</i> L.	Papaveraceae	Gule lala
<i>Parthenium hysterophorus</i> L.	Asteraceae	Bitter weed
<i>Phalaris aquatica</i>	Poaceae	Ghuand wagay
<i>Pistia stratiotus</i> L.	Araceae	Water cabbage
<i>Plantago lanceolata</i> L.	Plantaginaceae	Ispaghol
<i>Plantago major</i>	Plantaginaceae	Gule ispagol
<i>Plantago ovata</i>	Plantaginaceae	Isbaghol
<i>Poa annua</i> L.	Poaceae	Meadow grass
<i>Polygonum plebejum</i>	Polygonaceae	Macheche
<i>Polypogon fugax</i>	Poaceae	Rabit foot grass
<i>Portulaca oleracea</i>	Portulacaceae	Warkharay
<i>Pteridium equilinium</i>	Dennstaedtiaceae	Kuanjay
<i>Ranunculus arvensis</i> L.	Ranunculaceae	Chambul
<i>Ranunculus muricatus</i>	Ranunculaceae	Spiny fruited butter cup
<i>Ranunculus repens</i>	Ranunculaceae	Creeping butter cup
<i>Rumex dentatus</i>	Polygonaceae	Shalkhay
<i>Rumex longifolius</i>	Polygonaceae	Shalkhay
<i>Rumex vasicaricus</i>	Polygonaceae	Shalkhay
<i>Scandix pecten-veneris</i> L.	Apiaceae	Billi Puncha
<i>Silene conoidea</i> L.	Caryophyllaceae	Takla, Qardi
<i>Silybum marianum</i>	Asteraceae	Kkandiari
<i>Sinapis arvensis</i>	Brassicaceae	Jangali sarson, charlock
<i>Sisymbrium irio</i> L.	Brassicaceae	Khubkalan
<i>Sitaria pumila</i>	Poaceae	Band Kangni
<i>Solanum nigrum</i> L.	Solanaceae	Kachmach
<i>Solanum surrattense</i>	Solanaceae	Kindiari
<i>Solanum xanthocarpum</i>	Solanaceae	Kamtakari
<i>Sonchus asper</i> L.	Asteraceae	Sontati
<i>Sorghum halepense</i> L.	Poaceae	lawar
<i>Stellaria media</i>	Caryophyllaceae	Olalai
<i>Tagetes minuta</i>	Asteraceae	Cone marigold
<i>Taraxicum officinale</i>	Asteraceae	Dandelion, hand dubal
<i>Themeda triandra</i>	Poaceae	Red grass, red oat grass
<i>Thlaspi arvense</i> L.	Brassicaceae	Penny cress
<i>Tinospora cordifolia</i>	Minispremeae	Gilo
<i>Trianthema portulacastrum</i> L.	Aizoaceae	Horse purslane
<i>Tribulus terrestris</i> L.	Zygophyllaceae	Tirkundi, bhakhra
<i>Trifolium repens</i> L.	Papilionaceae	Shaftal
<i>Urtica dioica</i>	Urticaceae	Jalbang
<i>Urtica dubia</i>	Urticaceae	jalbang
<i>Urtica pilulifera</i>	Urticaceae	Bechu buti
<i>Vaccaria hispanica</i>	Caryophyllaceae	China rockle
<i>Verbascum thapsus</i>	Scrophulariaceae	Gidar tambako
<i>Verbena officinalis</i> L.	Verbenaceae	Karenta
<i>Veronica anagallis-aquatica</i>	Scrophulariaceae	Blue water speed well

<i>Veronica persica</i>	Scrophulariaceae	Persian soeed well
<i>Vicia sativa L.</i>	Papilionaceae	Bakla

• **Appendix 2 List of Phytomedicinally Plant at Khanpur Valley.**

Table: List of Tree used as a medicinal purpose

Tree			
Scientific Name	Family Name	Common Name	Medicinal Value
<i>Acacia modesta</i>	Mimosaceae	Phulai	Help in Wound healing, cough, chronic stomach problems and backache of women after delivery
<i>Bauhinia variegata</i>	Fabaceae	Kachnar	Help to reduce piles, cures biliousness, cough, asthma, diseases of the blood, ulcers, vaginal discharges, cough, eye diseases and liver complaints.
<i>Cassia fistula</i>	Fabaceae	Amaltas	Help to reduce skin diseases, leprosy, tuberculosis, and glands, laxative, antipyretic, anti ulcers and cure ringworms.
<i>Celtis australis</i>	Canabaceae	Jangle Falsa	Help to reduce amenorrhoea, diarrhoea, dysentery and peptic ulcers.
<i>Ficus variegata</i>	Moraceae	Jangle fig	used in ulcers and gout. Leaves are utilized in cancer, tumours and dermatitis.
<i>Grewia optivia</i>	Malvaceae	Bihul, bhimal, (wild falsa)	Help to reduce digestible, toxic; aphrodisiac allays thirst and burning sensation, cures inflammation, heart and blood disorders, fever and consumption. It is also good for troubles of the throat, helps removal of dead foetus. The bark cures biliousness, removes troubles and
<i>Mallotus philippensis</i>	Euphorbiaceae	Kambela (red kamala)	Help in heating, Purgative, anthelmintic, detergent, maturant, carminative, alexiteric and useful in cure of bronchitis, abdominal diseases and against spleen enlargement.
<i>Olea ferrugineae</i>	Oleaceae	Khona, kao, jangali zaitoon (wild olive)	useful in rheumatism and diseases of the brain. The fruit is appetizer, useful in biliousness, liver complaints, scabies and toothache. Its oil is useful in liver troubles and pain in joints.
<i>Prunus serotina</i>	Solanaceae	Wild cherry	useful for irregular menstruation and debility following miscarriage
<i>Zizyphus vulgaris</i>	Rhamnaceae	Makhranay (hilly jujube)	Help to dysentery and diarrhoea. The leaves are bitter, cooling, laxative, diarrhoea, antipyretic, reduce obesity. The ripe fruit is tonic, removes biliousness, burning sensation, thirst, vomiting and blood diseases.

Table: List of shrub used as a medicinal purpose

Shrub			
Scientific Name	Family Name	Common Name	Medicinal Value
<i>Adhatoda vasika</i>	Acanthaceae	Baikar	used in bronchitis, tuberculosis, heart troubles, asthma, fever, tumours, diseases of the mouth, and leucorrhoea
<i>Calatropis procera</i>	Asclepidaceae	Spalwaka	Help in heating, laxative, anthelmintic, relieves strangury, cures ulcers, the ash act as an expectorant. The plant cures leprosy, ulcers, tumours, piles, disease of the spleen, the liver and the abdomen.
<i>Lycium barbarum</i>	Solanaceae	Thornless berberes	used to nourish kidneys and cure other deficiency syndromes. As a traditional use, lycium fruit is best known as an aid to vision, anti aging agent and a remedy for diabetes.
<i>Morus nigra L.</i>	Moraceae	shahtoot,	Act as cooling and prevent from laxative, vermifuge, purgative, anthelmintic and astringent.

<i>Olea ferrugineae</i>	Oleaceae	Khona, kao,	useful in rheumatism and diseases of the brain. The fruit is appetizer, useful in biliousness, liver complaints, scabies and toothache. Its oil is useful in liver troubles and pain in joints.
<i>Nirium oleander</i>	Apocynaceae	Kaner,	Used in piles diseases, good tonic for chronic pain in the abdomen and pain in the joints.
<i>Punica granatum</i>	Lythraceae	Ananguray,	used as tonic in fever, killing tapeworms. Also used in diarrhoea and dysentery and dyes preparation.
<i>Randia Formosa</i>	Rubiaceae	Jangle pomegranate	The fruit is taken against dysentery. Leaves are used in baths to cure infected sores.
<i>Recinus communis L.</i>	Euphorbiaceae	Arand	used for stomach-ache and for burns, leprosy, purgative, good in skin diseases, piles, ringworm, paralysis, inflammations, asthma, rheumatism, and amenorrhea.
<i>Rubus fruticosus</i>	Rosaceae	Gurguray	Useful against dysentery, diarrhoea, haemorrhoids and cystitis, sores, scratches, gum inflammations, ulcers and sore throat.
<i>Rumax histatus</i>	Polygonaceae	Salumi,	The juice of the plant is considered cooling, aperients and to a certain extent diuretic.
<i>Skimmia laureola</i>	Rutaceae	Nazar panra	used as an incense.
<i>Solanum pseudo-capsicum</i>	Solanaceae	Jangli bangan	used as a medicine for horses., remedy for toothache and sore throat, pleurisy and pneumonia.
<i>Vitex negundo L.</i>	Verbenaceae	Sanbhaalo, Nirgunda	
<i>Xanthium strumarium</i>	Asteraceae	Katula (Cocklebur)	Effective in the small pox and urinary diseases.
<i>Zanthoxylum armatum</i>	Rutaceae	Dambara, Thimer	It is used in the treatment of toothache, common cold, cough, and fever. Young shoots of thimer are used as toothbrushes. Local Chatni and soup are prepared from its fruits.

Table: List of herbs used as a medicinal purpose

Herb			
Scientific Name	Family Name	Common Name	Medicinal Value
<i>Ajuga bractiosa</i>	Labiatae	Karvi buti	Useful in diabetes, hypertension, fever, blood purification, malaria and stomach pain. used in the treatment of diarrhoea and dysentery.
<i>Amaranthus viridis L.</i>	Amaranthaceae	Chulai	Useful in laxative, diuretic, stomachic, antipyretic, blood diseases, leprosy, bronchitis, rat-bite and piles. The root lessens the menstrual flow.
<i>Artemisia bivifolia</i>	Asteraceae	Tharkha	used as purgative and as cure for earache. Smoke is known to be good for burns.
<i>Asparagus gracilis</i>	Liliaceae	Shahghandal	used as demulcent, toxic and in diarrhoea, dysentery and general debility.
<i>Avena sativa L.</i>	Poaceae	Jangali joo	Useful in nerve tonic, stimulant, antispasmodic, as tonic in spermatorrhoea insomnia, heart muscles and for bladder and urethras.
<i>Boerhavia diffusa</i>	Nyctaginaceae	Chalaray runner	used in eye wounds and pain of the joints, expectorant, carminative and useful in muscular pain, lumbago scabies, hasten delivery.
<i>Cannabis sativa L.</i>	Cannabaceae	Bhang	useful for malaria, black water fever, blood poisoning, anthrax and dysentery.
<i>Carthamus oxycantha</i>	Asteraceae	Jewled distaff thistle	used for dressing of ulcers
<i>Cassia absus L.</i>	Caesalpiaceae	Chaksu	Useful in blood-purifier, astringent, stimulant, diuretic, leucoderma, ringworm, venereal ulcers and other skin diseases.
<i>Chenopodium album L.</i>	Chenopodiaceae	Bathu	The plant improves the appetite, oleaginous, anthelmintic, diuretic, aphrodisiac, tonic, eye

<i>Conyza bonariensis</i>	Asteraceae	Paleet	diseases, throat troubles, useful in biliousness, abdominal pain, diseases of the blood, heart and the spleen. The herb is used in dysentery, diarrhoea and haemorrhage.
<i>Datura alba</i>	Solanaceae	Mangaz butay, (devils trumpet and metel)	Useful in treatment of skin eruptions, colds, and nervous disorders.
<i>Datura stramonium L.</i>	Solanaceae	Kala datura	used as emollient and supportive.
<i>Euphorbia helioscopia L.</i>	Euphorbiaceae	chatri dodak,	Useful in anthelmintic. Anticancer properties and purgative properties.
<i>Euphorbia heterophylla L.</i>	Euphorbiaceae	lechosia	treat stomach-ache and constipation, expel intestinal worms and treat skin problems like fungal diseases and abscesses.
<i>Euphorbia hirta L.</i>	Euphorbiaceae	Dhudi,	Useful in fever, colic, and the milk is applied to dysentery warts. A decoction is used in asthma and chronic bronchial infection. dengue fever, anti-worms, bowel complaints and cough.
<i>Fagonia indica</i>	Zygophyllaceae	Dhamasa,	Usefull in cures fever, dysentery, urinary discharges, erysipelas, typhoid, alexipharmic, reduces tumours, and purifies the blood, chronic bronchitis, asthma, spitting of blood, ophthalmic and toothache.
<i>Foeniculum vulgare</i>	Apiaceae	Kaga	Carminative; aromatic, stomach diseases, its decoction is good for eyesight.
<i>Fragaria orientalis</i>	Rosaceae	Zmakay totan	Useful in digestive tonic and bones strengthening
<i>Fumaria officinalis</i>	Fumariaceae	Papra,	Useful in laxative, diuretic, alterative, toxic, diaphoretic, febrifuge, Jaundice, as coolant and blood purifier
<i>Malvastrum coromendelianum</i>	Malvaceae	Sticky mallow	Useful in traditional medicine as an antiinflammatory, analgesic, antidyenteric. and diabetes.
<i>Matricaria chamomilla</i>	Asteraceae	Babona	Chamomile plant is locally used as analgesic, anti-inflammatory, antispasmodic, anodyne, carminative, diaphoretic, laxative, stomachic, sedative and as tonic. It bears calming and soothing characteristics.
<i>Medicago denticulata</i>	Fabaceae	Shpeshtaray	Useful in immunological disorders, microbial infection and cancer.
<i>Melia azaderachta L.</i>	Meliaceae	bakayen	Useful in vomiting, blood impurities, heart diseases, ulcers, headache, fever and lung complaints. The oil from the seeds is a brain tonic, good for earache and liver disorders.
<i>Melilotus indica</i>	Papilionaceae	Ran methi	Useful in poultice or plaster for swellings.
<i>Mentha longifolia</i>	Lamiaceae	chitta podina (Lamb mint)	It is carminative, a cooling medicine.
<i>Mentha royleana</i>	Lamiaceae	Velanay	Useful as ant diarrhoeal and spasmolytic effects and stomach problems.
<i>Narcissus tazetta L.</i>	Amaryrillidaceae	Gul e nargas	Used in healing treatments especially in cancer.
<i>Nasturtium officinale</i>	Brasicaceae	Tarmira	Useful as an anti-scorbutic, depurative, diuretic, expectorant, purgative, hypoglycaemic, stimulant, tonic and stomachic.
<i>Oxalis corniculata L.</i>	Oxilidaceae	Khatti biti, tharoka	Useful in dysentery and diarrhoea. It also cures skin diseases and fevers.

<i>Papaver hybridum</i> L.	Papaveraceae	Prickly poppy	Used in digestion and treatment of bronchitis.
<i>Plantago major</i>	Plantaginaceae	Gule ispagol	used in chronic dysentery, diarrhoea and constipation and headache.
<i>Portulaca oleraceae</i>	Portulacaceae	Warkharay,	Used in diseases of kidney and the spleen, in stomatitis of children, piles, scabies and burns.
<i>Rumax longifolius</i>	Polygonaceae	Chora chitra, S	Used as an astringent application in coetaneous disorders.
<i>Silybum marianum</i>	Asteraceae	kandiari	Used to stimulate lactation in nursing mothers and treatments of liver and gallbladder problems.
<i>Sinapis arvensis</i>	Brasicaceae	Jangali sarson, charlock	Used in Bach flower remedies (black depression) and against headache
<i>Solanum nigram</i> L.	Solanaceae	Kachmach	useful in diseases of heart, diseases of ears, eyes and nose.
<i>Solanum surrattense</i>	Solanaceae	Kindiari	Used in cough, asthma and catarrh.
<i>Stellaria media</i>	Caryophyllaceae	Olalai	Used as apitizer and as vegetable
<i>Tagetes minuta</i>	Asteraceae	Wild marigold	Used as a remedy for the common cold, stomach upset, diarrhoea, and liver diseases.
<i>Urtica pilulifera</i>	Urticaceae	Bechu buti,	Used as anti-diabetic, anti-oxidant and anti-inflammatory agent.
<i>Verbascum thapsus</i>	Scrophulariaceae	Gidar tambako	Useful in case of pulmonary diseases, bleeding of the lungs, cough and bowels.
<i>Xanthium strumarium</i>	Asteraceae	Katula	Useful in the small pox and urinary diseases.

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