Ethnomedicinal study of medicinal plants used by the population of Taunsa Sharif, Dera Ghazi Khan, Punjab, Pakistan

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Research

Abstract

Background: Many human illnesses are treated by plant-based medicines because medicinal plants are rich sources of bioactive chemicals. The aim of this study was to document the traditional uses of medicinal plants used by the indigenous communities of Tehsil Taunsa Sharif, District DG Khan, Pakistan.

Methods: The ethnobotanical data was collected using a semi-structured questionnaire as a tool for face-to-face interviews, and group discussions during the year 2021 to 2022. Fidelity level (FL), usage value (UV) and informant consensus factor (ICF) indices were used to calculate the relevance of described species in terms of culture.

Results: A total of 130 (75 male and 55 female) local residents of different villages were interviewed about 104 plant species belonging to 42 families. Poaceae and Fabaceae were dominant families with 14 species each. The highest percentage of fidelity level calculated for *Calotropis procera, Psidium guajava* and *Salvadora oleoides*. Similarly, the highest use value was calculated for *Calotropis procera* (0.75). The highest value of ICF was obtained for digestive disorders (0.80).

Conclusion: It was concluded that the indigenous population still use medicinal plants in their daily life for the treatment of various diseases. Furthermore, this research will be helpful for local government agencies to protect the natural resources.

Keywords: Medicinal plants; Indigenous knowledge; Traditional medicines; Taunsa Sharif, Punjab Pakistan

Background

An ethnobotanical research focuses on the nuanced relationships between local people and their natural surroundings, including customs and cultural beliefs connected to many types of applications (Amjad *et al.* 2020). The ethnomedicinal study is essential for highlighting the significance of plant species utilized by the native community (Cox, 2000). The survival of many people across the globe depends on medicinal plants; with about 35,000–70,000 herbal plants utilized as traditional medicines worldwide, because they offer an affordable and secure alternative to allopathic medication, which is sometimes inaccessible in underdeveloped nations (Amjad *et al.* 2020). Herbal treatments are widely utilized, even in developed nations. For instance, between 30 and 50 percent of people in China, 40 to 50 percent in Germany, 48 percent in Australia, 42 percent in the USA, and 49 percent in France are using herbal medicine. A quarter of contemporary allopathic medications are made

entirely from plants or from synthetic compounds of various substances obtained from medicinal plants. Plant-based medications work well and have fewer negative effects. The easiest way to understand this is to contrast the synthetic medicine aspirin with the extract bark of the significant medicinal plant *Salix alba* (white willow), the aspirin has recorded more adverse effects. Several studies have shown that an extract from the bark of *Salix alba* can reduce the negative effects of aspirin (Mahdi, 2010). Plant sources have been used by people in rural areas for herbal supplements, food, fodder, construction of homes, creating domestic tools, resting mats, and for fires and protection (Ibrar *et al.* 2003).

Plants are used by the indigenous people for a variety of ailments, mostly in remote areas of Pakistan. Pakistan contains a diverse range of plants, notably medicinal ones. There are around 4000 fungal species and 6000 advanced plant species identified here. Pakistan has yielded over a hundred different medicinal plants. Approximately 600 species of plants out of 1000 recorded higher plants are used in healthcare system, and nearly 350 species have highly economic value and traded in billions of dollars in the domestic and international markets (Jan *et al.* 2020a). According to previous study, 25% of homoeopathic medicines are made from plants or their derivatives, and approximately 80% of the world's population is still reliant on folk medicine made from fresh or dry plants or their derivatives for the treatment of various ailments (Ayaa and Waswa, 2016). Food, vegetables, and fruits are harvested from a variety of natural indigenous species. Many natural indigenous plants are utilized to provide fuel, feed, and fodder for household pets. The literature review revealed that older indigenous people in the Taunsa Sharif land have more ethnobotanical awareness of exotic indigenous plants than the younger generation, owing to the former's firm belief in culture and traditions customs, as well as their preference for plant-based drugs, which they consider protected and cost-effective (Hamayun, 2005). Because plant-based drugs cure a variety of human disorders, medicinal plants are essential for most disease treatment. According to the World Health Organization (WHO), about 4 billion people in developing countries not just to depend on but also regularly use medicinal plants. Worldwide, between 35,000 and 70,000 plant species are utilized in traditional medicine, according to estimates (Jan *et al.* 2020a*).* The main objectives of the present work include the development of a local plant inventory and exploration of indigenous knowledge of native flora in the tehsil. The data documentation that might be beneficial to persons working in the domains of ethnobotany, ethnopharmacology, plant conservation, plant ecology, and other related subjects are also included in the objectives of this work. To create the awareness among the local community about the protection of native medicinal flora and to collect native medicinal plants of the area for proper identification and future references will be studied.

Material and Methods

Study Area

This research was conducted in the Tehsil Taunsa Sharif, District DG Khan, Punjab, Pakistan. It has a total covered area of 2769 km^2 and is located between 30 42'0" North and 70 39'0" East (Fig. 1). The majority of the land is plain alluvium from of the Indus River, which stretches across the mountains on the west side. The study area is home to several renowned Sufi temples, the most famous of which is that of Hazrat Muhammad Suleman Taunsvi. Tehsil Taunsa Sharif is 157 metres above sea level. The weather is hot, with temperatures reaching up to 45°C in the summer and below freezing in the winter. Annually about 104mm of precipitation occur. Saraiki is the primary language, but Balochi and Urdu are also spoken by residents. The population is about 675,756 (Urban 97,100, rural 578,656). The study area was entitled as a Ramsar site on March 22, 1996. The Taunsa Barrage, built in 1958, has indeed been recognized as the barrage with the highest priority for restoration. The disruption of irrigation on two million acres (8,000 km^2) and drinking water in remote portions of southern Punjab, which might benefit several million farmers, need prompt action to avoid disastrous economic and social effects for millions of destitute farmers. The economic crops include sugarcane (*Saccaharum officinarum*), cotton (*Gossypium*), rice (*Oryza sativa*), corn (*Zea mays*), wheat (*Triticum aestivum*) and gramme (*Cicer aretinum*). The main ruby crops are chana (*Cicer arietinum*) and wheat (*Triticum aestivum*). The principal kharif crops are moong (*Vigna radiata*)., cotton (*Gossypium spp.),* and sugarcane (*Saccaharum officinarum*). The major vegetables include peas, potato and tomato. The majority of the territory is covered by mountains, it is also known as the "land of the hills." As a result, it possesses a wide range of ethno-medicinal plants. Unfortunately, there is no reliable literature on these indigenous plants. Tehsil Taunsa Sharif has a diverse flora due to the fact that half of the Tehsil is mountainous, and the other half runs parallel to the Indus River in the Taunsa Barrage, which is particularly fertile. As a result, both xerophytic and mesophytic plants may be found in this area.

Data collection

The informants were selected through snow-ball technique (Rashid *et al.* 2023). The aim and objectives of the work were shared with the informants before interview. During 2021-2022, in different season of the year medicinal plants and ethnomedicinal data were collected. At least four to five field visits were planned at random during each season. We met with local informants on each field trip for collecting the regional traditional knowledge about the therapeutic plants after obtaining their oral prior informed consent, and after collecting plants under the guidance of the indigenous guide. For the

preservation of the collected medicinal herbs, Forman and Birdson (1989) method was used. The digital camera was used to take appropriate pictures of the flowers, fruits and vegetative parts of the medicinal plants during field work to identify plants easily later on. With the help of literature available online and in the library the collected specimens were identified. The correct botanical names of plants were ascertained by consulting the websites of the International Plant Names Index (IPNI: http://www.ipni.org), Tropicos Flora of Pakistan (www.tropicos.org/Project/Pakistan), and the medicinal plants name service (http://mpns.kew.org/mpns-portal/). All the plants were mounted on the herbarium sheets and allotted with voucher numbers and were submitted to the Herbarium of the University.

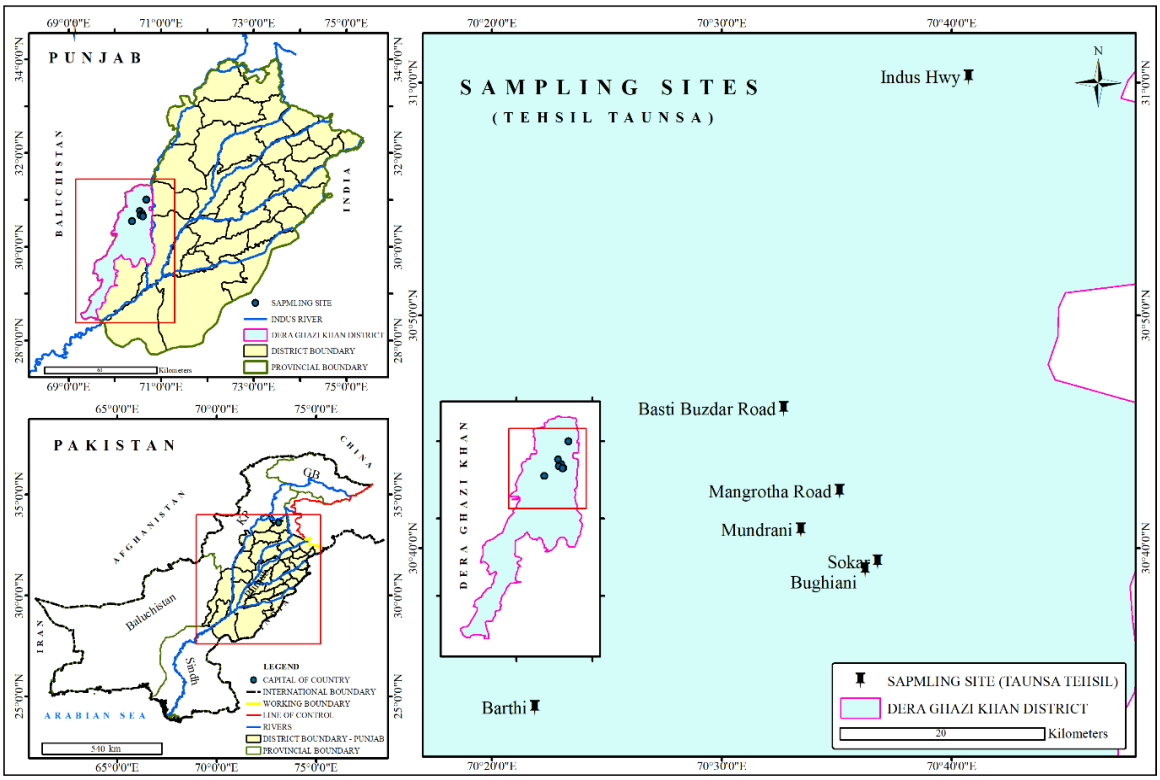

Figure 1. Study area map with ethnomedicinal data collection site

Collection and identification of the plants

The snowball method was used to choose the informants. The semi-structure questionnaire was used as a tool during the face-to-face interviews, and group discussions with the local people for the collection of the data (Ghorbani *et al.* 2011; Mir *et al.* 2022b). In-depth interviews were often followed by free listing. The size of the free listing should be increased, we asked the residents. Cross-checking of the collected ethnomedical data among the informants helped for confirming the correctness of the data. All of the informants verbally consented in advance (Abidin *et al.* 2022). Interviews with every informant were conducted in their mother language. Demographic data on the informants was also gathered. While female informants were interrogated at their houses, interviews with males took place at the Masjid, Hujra, and/or Baithaks and in the field. For documenting the current status of traditional knowledge, local herbalists (hakims) were interviewed at their herbal shops. The questionnaire was examined in two steps: first, the informant replies were recorded; second, binary values for the questions were taken into consideration; a value of 0 was given for a "NO" response and a value of 1 for a "YES" response (Andrade-Cetto, 2009).

Informal interviews and field trips were conducted with key informants, who included farmers, herders, housewives, shepherds, students, and teachers to better comprehend the data assimilated on the medicinal plants prevalent in the research area. According to the methodology adopted by Rashid *et al.* (2023) the information they gave us was accurately recorded. The collected information regarding therapeutic plants was cross checked among the local population to ensure its accuracy by showing fresh or dried specimens of the plant, mentioning the plant's common names, or showing the informants the plant's photos.

Quantitative analysis

In the data collected in the field was quantified with the help of Fidelity Level (FL), Use Vale (UV), and Informants Consensus Factor (ICF).

Fidelity Level (FL)

The degree of fidelity reveals which species prefers to treat a certain sickness or ailment over the others. Using FL, we can quickly identify the species that would be best suited to treating a certain ailment. FL is determined using the method provided by (Mir *et al.* 2022).

$$FL = Ip/Iu \times 100$$

Iu denotes the overall number of informants who reported the same plant for any sickness, whereas Ip denotes the number of informants who utilize a particular plant species for a specific ailment.

Use Value (UV)

To find out the relative significance of every medicinal plant collected we have used UV. It was calculated by using the formula given below.

$$UV = \sum U/n$$

In the above formula "∑U" denotes the uses of a specific medicinal plant reported in this study and "n" is sum of informants who reported the uses of this medicinal plant. The value of UV varies between 0-1. The value will be close to "1" if the medicinal plants is used for many diseases and if the medicinal plant has single or few medicinal uses its value will be close to "0" (Rashid *et al.* 2023).

Informants Consensus Factor (ICF)

This statistical measure may be used to determine how homogeneous the data is. Every reference was categorized according to the diseases that each plant was said to affect using the informant consensus factor (Ullah *et al.* 2021).

$$ICF = NUR - Nt / NUR - 1$$

Nt is the number of species used as medicines, and NUR is the number of use citations for each category.

Results and Discussion

Demographic characteristic of the study area

In this study we have interviewed 130 informants, which included 75 male and 55 female. Dayiahs, shepherds, drivers, farmers, housewives, laboeors, teachers, students (from elementary to university), merchants, pansaries, herbalists, and hakims were interrogated during the fieldwork for this research. Seven different age groups were made, 56 informants were from age group 20-29 years, 30 were from age group 30-39, 22 were from age group 40-49, 10 were from age group 50-59, 08 were from age group 60-69 and 02 informants belongs to age group 70-80 and 02 informants belongs to age group 80 and above. The informants were also sorted into six categories based on levels of literacy. We found that most of the data was obtained from the informants of ages 40 and 59, followed by those in the 60-69, 70-79, and 80 plus age groups. A decline in ethnomedicinal knowledge was seen among informants under the age of 20-30. The informants in the 20–30 age groups having the least knowledge (Table 1). The modernization of life encourages younger generations on choosing allopathic drugs over natural therapies, is likely one factor contributing to knowledge loss (Sargin, 2015). Furthermore, a decreasing trend of ethnomedicinal knowledge was noted with increasing literacy rate. A decreasing trend of ethnomedicinal knowledge was noted with increasing literacy rate. This may be because of the fact that educated people prefer contemporary healthcare system (Jan *et al.* 2022b; Heera *et al.* 2023). Other researchers also observed similar findings (Bhatia *et al.* 2014; Jan *et al.* 2021). Men and women both had almost equal ethnomedicinal knowledge.

Table 1. Demographic characteristics of the informants

Category	Total
Gender	
Male	75
Female	55
Age group	
20-29	56
30-39	30
40-49	22
50-59	10
60-69	8
70-79	2
80 and above	2
Education	
MPhil.	9
Graduation	15
Illiterate	56
Primary	35
Middle	10
Secondary	5

Ethnomedicinal flora diversity

The current study reported a total of 104 medicinal plants belonging to 42 families. In the Table 2 the botanical name, family name, local name, part used, mode of preparation and uses of each medicinal plant is given. The dominant family in this study in terms of number of medicinal plants species was Poaceae and Fabaceae (N=14) followed by Asteraceae and Euphorbiaceae (N=06). In this study the most dominant life form was herb (57 Sp.) followed by trees (27 Sp.) and shrubs (20 Sp.) (Fig. 2). The members of these families are mostly used because they are easily collected and commonly used in medicine due to their rich bioactive compounds and associated pharmacological activities (Jan *et al.* 2021). The herbs dominancy may be due to greater adaptability to the climate and geography of the studied area. Besides, herbs are more potent and regenerate faster than shrubs and trees (Shah and Rahim, 2017; Jan *et al.* 2022). Moreover, herbs are easily available (Malik *et al.* 2019). Herbs have a wide variety of bioactive compounds that enable the herbs to adapt to any climatic condition with ease (Jan *et al.* 2022). Furthermore, herbs frequently have higher concentrations of various bioactive compounds than other life forms and are more potent as medicines than shrubs and trees (Ullah *et al.* 2021). In contrast to shrubs and trees, high altitude locations often have a dominating herbaceous flora (Amjad *et al.* 2017). Other researchers have also reported similar results from the surrounding areas (Wali *et al.* 2019; Jan *et al.* 2021; Ullah *et al.* 2021; Heera *et al.* 2023).

Plants parts used in medicine and mode of medicine preparation

The current study reported that leaves (39 Sp.) as the most common plant part used locally in the preparation of herbal medicines followed by whole plant (25 Sp.) (Table 2). The majority of flora listed in this survey was consumed internally. The two most popular preparations were decoction (N1) (40%) and infusion (20%) (N2). This usage method is prevalent throughout the remainder of Pakistan and the world. To produce the decoction, the plant materials were boiled. While 15% was recommended for topical application as a paste (N3), 10% extract (N4), 8% oil (N5), 5% powder (N6), 2% latex (N7) (Fig. 3). When producing herbal medications, fresh plant material was typically used rather than dried plant material. As the primary photosynthetic organ of the plant, leaves' frequent usage in herbal remedies may be attributed to their abundance of various kinds of metabolites (Ullah *et al.* 2021). Besides, leaf is the plant part which is produced in large quantity as well as easy to collect (Ahmad *et al.* 2021). The usage of leaves is sustainable and safe for plant life from the perspective of conservation (Jan *et al.* 2020). The ease of gathering, accessibility, and existence of a variety of biochemical may all contribute to the use of whole plant in herbal medicine (Hassan *et al.* 2020). The findings of this study are in consistent with other studies (Wali *et al.* 2019; Ahmad *et al.* 2021; Ullah *et al.* 2021).

Table 2. Ethnomedicinal data the collected medicinal plants along with their botanical names, local names, families, part used

Families	Botanical name	Local names	Flowering period	Life form	Parts used	Distribution	Dicot/ monocot	Ethnobotanical uses
1-Apocynaceae	*Calotropis procera* (Aiton) W. T. Aiton	Ak	Throughout the year.	Shrub	Root, leaves	Mostly grow in waste land of retrha, basti buzdar, barthi and sokar.	Dicot	The alcoholic solutions of *C. procera* root and leaves Fever, rheumatism, indigestion, chest infections, eczema, and diarrhea are all common problems that can be treated with this medicine. To treat boils and to remove thorns from the body. Leaf part is used to treat jaundice. Local inhabitants also used it for the treatment of their animals.
	Nerium oleander L.	Karabi	June to October	Shrub	seeds and leaves	Mostly grow in warm places (also has been found in Taunsa Sharif parks).	dicot	The *oleander* plant is extremely poisonous due to the presence of a highly toxic cardiac toxin. Decoction leaves are used to treat parasitic skin worms, scabies, and swellings. Its sap has been used as rat poison.
2-Arecaceae	*Caryota mitis* Lour.	Khaji	Summer	Shrub	Leaves	Taunsa Sharif city	Monocot	As a vegetable, its leaves are consumed. Leaf petioles are used to make a fiber. They may be utilized to caulk wooden vessels as well. To ignite a fire, fresh leaves are utilized as tinder. we can find shelter within its leaves.
	Chamaedorea cataractarum Mart.	Khaji	Summer	Small tree	ruit and leaves	Indoor plant	Monocot	Cooked and consumed like asparagus, the immature blooming spikes are collected before they open. It is a great air purifier. Its plant leaves are used to make different products such as baskets, mats, Jae Namaz, hand fans and other different products.
	Phoenix dactylifera L**.**	Pind	May to September	Tree	Fruit, leaves	Sokar, mangrotha and kareem wla	monocot	Its fruit is edible. Its plant leaves are used to make different products such as baskets, mats, Jae Namaz, hand fans and other different products.
3-Asteraceae	*Conyza canadensis* L.	Fleabane	July to October	Herb	Leaves	Roadside of narii and mundrani.	Dicot	The sources of a volatile oil which is used to flavor candies, sauces, and soft drinks commercially. Diarrhea, dysentery, and internal hemorrhages are cured with the lavender oilfound in the leaves. It is uterus stimulant which is also useful for the treatment of swollen tonsils,
								ulceration, and throat inflammation. A tea of the boiled roots is used to treat menstrual irregularities.

	Chrysanthemum indicum L.	Juhua	Last summer into early winter	Herb	Flowers	Commonly cultivated in garden	Dicot	Chest pain (angina), high blood pressure, type 2 diabetes, fever, cold, headache, dizziness, and edoema are all cured with chrysanthemum. Chrysanthemum can also be used to treat the cancer when mixed with other herbs. Indoor air pollution has been found to be reduced by chrysanthemum plants.
	Helianthus annuus L.	Suraj mukhi	Summer and into autumn	Herb	Flowers, seed, leaves	Field area	Dicot	Major source of edible oil, sun flower is good for health. Also used in soaps, lamination and in lubrication. Its flowers used for the treatment of malaria. It also provides the aesthetic beauty to local people.
	*Sonchus asper (*L.) Hill	Thistle	Late spring to early fall	Herb	Whole plant	Field area of kareem wla	Dicot	Sonchus asper is a plant that has been used to treat a variety of illnesses, including skin disorders. They may be used like spinach or added to salads. To treat wounds, the herb is crushed and used as a poultice. Warts have been treated using the plant's latex in the past.
	Sonchus oleraceus L.	Doda	Late spring to early fall	Herb	Whole plant	Wild area of basti mandrani	Dicot	Used for the treatment of common diseases like headache, pain, diarrhea and fever. It is edible and cool tonic.
	Xanthium strumarium L.	Chota dhatura	Late summer	Herb	Leaves, root and seed	Found in the crop field of Jalo wali.	Dicot	As a traditional herbal medicine, X. strumarium has been used to treat a variety of ailments, including rhinitis, nasal sinusitis, fungal infections, and arthritis. The plant is thought to be effective in treating long-term malaria patients. Bladder symptoms have been treated using a decoction of the seeds.
4- Amaranthaceae	*Aerva javanica* (burm. f.) Shult.	Chiti jharii	January and October	Shrub	Roots and flowers	Mangrotha and sokar	Dicot	In both human and animal ethnomedicine, Aerva javanica has various applications. It is employed in Pakistan as an anthelmintic and purgative for cattle. Animals with foot and mouth disease are given boiling seeds. It serves as both fuel and goat feed.
	Chenopodium album L.	Jari buti	July to October	Herb	Leaves and young shoot	Sokar and kot qaisrani	Dicot	The herb has historically been used as a diuretic and blood cleanser. You may get a green dye from the young shoots. Dysentery with blood is treated with the root's juice.

	Suaeda fruticose Forssk. Ex J.F. Gmel.	Laana	June to Novem ber	Shrub	Seed	Common in saline area	Dicot	The majority of desert indigenous plant species have medicinal value, and local people employ them to treat a variety of ailments. Suaeda fruticosa This plant is used to treat wounds in the medical field. It's a laxative, diuretic, and emetic all in one. The plant is an invasive halophyte that can help to lower soil salinity.
5- Anacardiaceae	*Cotinus coggygria Scop.*	Bush	July to October	Shrub	Whole plant	Taunsa sharif	Dicot	The tannins are mostly found in the leaves and bark. Wood is decorative. used to make picture frames and cabinets. The branches are used to make baskets. Eye problems are treated using the yellow wood. It smells somewhat like mangoes.
	Mangifera indica L.	Amb	Mid to late winter	Tree	Fruit and leaves	Taunsa Sharif	Dicot	It has edible fruit and its leaves used as fodder. Pickle can be made from its unripe fruits. It is used to treat various ailments such as diarrhea, dysentry, cough, asthma, anaemia and piles.
6-Annonaceae	*polyalthia longifolia* (Sonn.) Thwaites	Ashok	April to June	tree	Leaves and seed	Dry region of Taunsa sharif	Dicot	*Polyalthia longifolia* is a high evergreen tree that is widely cultivated in Pakistan. Fever, skin disorders, diabetes, hypertension, and helminthiasis have all been cured with the herb in traditional medicine. The leaves are used for ornamental decoration during festivals. Its wood is usually used to make little items like pencils, boxes, and matchsticks.
7- Apiaceae	*Coriandrum sativum* L.	Dhania	The foliage ready in 45 to 80 days	Herb	Whole plant	Mostly found in field area	Dicot	It has been used as a digestive aid, anti-rheumatic, and analgesic. Although all parts of the plant are edible and the roots are a key component of Thai cuisine, the fresh leaves and dried seeds are the sections that are most frequently utilized in cooking. Every cuisine in the world uses coriander. The fresh leaves are frequently used as
								A garnish for soup, fish, and meat dishes as well as a component in chutneys, salads and salsa.
8- Amarylilidaceae	*Allium cepa* L.	Wasal	June to July	Herb	Bulbs	Field area	Monocot	In order to lessen edoema, it has been used as a diuretic. It is believed that onions can reduce blood sugar levels and have been used to treat diabetes. daily usage of onions in food Additionally, it is grilled and eaten raw. When onions are still young, they are edible. Various hearty, warm recipes frequently use onions as an ingredient. Salads also incorporate it.

9-Alliaceae	*Allium sativum* L.	Thome	May to June harvest time	Herb	Bulb	Field area	Monocot	It is used as flavoring agent in cooking. Cardiovascular diseases can be reduced by using garlic. It is also useful in reducing the risk of cancer.
10-Fumariaceae	*Fumaria indica* L.	Pit para	Early summer	Herb	Whole plant	Sokar and mangrotha	Dicot	It is used to cure common diseases like fever, vomiting, constipation, blood purification and pain. It is also anthelmintic and diuretic agent. Local people used it to cure jaundice in combination with black pepper
11-Brassicaceae	*Brassica campestris* L.	Sarsoo	January to onward	Herb	Seed, leaf and flower	Common in cultivated crops of area.	Dicot	Seeds are frequently used in the kitchen as a cooking medium. The leftovers from the separation of oils from seeds are consumed as high-nutrient calf feed. This waste is also consumed as fertilizer for the soil. Young leaves are a great leaf vegetable to eat raw, but older leaves are preferable cooked.
	Brassica napus L.	Ghangloo	July	Herb	Fruit and leaves	Common in cultivated crops of area.	Dicot	It is eaten as raw fruit. It is also used as vegetable. Its leaves are used as fodder for animals.
	Capsella bursa pastoris (L.) Medik.	Shepherd	Summe r	Herb	Seed pods	Sokar and basti mandrani	Dicot	In medicine, capsella is used to treat haemorrhages, diarrhea, and dysentery. Capsella bursa-pastoris, whether it is harvested from the wild or grown, has a wide range of applications, including as a food additive, a cosmetic, and a traditional medicine. It is consumed as food and transformed into a beverage.
	epidium didymum L.	Jangli halon	July and Septem ber	Herb	hole plant	Wild area	Dicot	Traditional medicine uses it to treat wounds, fevers, and headaches. As a vegetable, its leaves are consumed.
	Raphanus sativus L.	Mooli	October to January	Herb	Root and leaves	Common in cultivated crops of area.	Dicot	It is used in salad. It is also eaten as raw fruit. It is used to treat various diseases like indigestion, abdominal bloating and acid regulation.
12- Boraginaceae	*Heliotropium europaeum* L.	Hathajori	Summe r	Herb	Seed and leaves	Wasti tub	Dicot	It is an essential oil rich species that has been utilized as an antipyretic and cardio-tonic. Its leaves are used in vegetables. Its blooms are used to treat yaws, skin lesions and menstrual blood loss.

13- Combretaceae	*Conocarpus eractus* L.	Button	Free flowering	Tree	Leaves and bark	Mostly present in sandy and costal places of Tibbi qaisrani and Taunsa Sharif.	Dicot	Its leaves, bark and fruits are used to treat many ailments as orchitis, fever, diarrhea, catarrh, gonorrhea and syphilis. Leaves and bark contains tannins that can also be used for dying procedure. Its wood is used for boat building, crossties, fence posts and turnery. Good fuel can make from its wood.
14- Cupressaceae	*Thuja orientalis* (L.) Franco	Morpankh	September to October.	Tree	Leaf	Common throughout the mountainous area of retrha, basti buzdar and barthi.	Dicot	It is used to treatment of cystitis, amenorrhea, bullous bronchitis, diarrhea, carcinomas, psoriasis and liver diseases. This plant leaf oil was used in the treatment of intestinal worms, cancer and fungal infections. Herb extracts can be applied to painful joints. Mostly used as timber.
15- Capparaceae	*Capparis decidua* (Forssk.) Edgew.	Karih	Summer season	Tree	Root and fruit	Mostly found in Arid plains of retrha and sokar.	Dicot	It is a fuel wood and honey -bee species. The camels graze it. Its plant branches are used in fencing and hedging. Powder makes by it root barks is used in cough, rheumatism, malignant ulcers and gout. The pulp of the ripened fruit is edible.
16- Cycadaceae	*Cycas revoluta* Thunb.	choti khaji	May to july	Tree	Stem, seed and leaves	Taunsa Sharif	Monocot	It is utilized as a food in a variety of forms, including sago, flour, bread, cake, vegetables, and so on. High blood pressure, headaches, congestion, rheumatism, and bone pain are all treated with cycad stems and seeds. Leaves are used to cure cancer and hepatoma. Astringent and diuretic properties of terminal shoots.
17- Cleomaceae	*Cleome gynandra* L.	Hurhur	July to August	Herb	Leaves, seed and root	Rakh tariman	Dicot	C. gynandra is crushed and applied topically to treat Tinea captitis, as well as eaten as a vegetable food. The leaves and seeds are used as a rubefacient and vesicant in medicine. The roots are used to relieve chest pain, and the leaves are used to treat diarrhea.
18- Cyperaceae	*Cyperus rotundus* L.	Mustak	Summer	Herb	Whole plant	Moist rode side of Buzdar Shumali.	Monocot	It's a medicinal herb that's been used for centuries to treat a variety of clinical diseases at home.
								Including diarrhea, diabetes, pyresis, inflammation, malaria, and stomach and intestinal problems. Seed. Mats made of well-dried coco grass are used for sleeping.

19-Cornaceae	*Cornus sanguinea* L.	Sanguine	May to early June	Shrub	Whole plant	Basti buzdar	Dicot	Fever is treated using its bark. In basketry, the young stems are employed. Hard and tough is wood. used for little objects like tool handles and turnery, among others. The wood yields charcoal of high grade.
20- Cucurbitaceae	*Momordica charantia* L.	Karela	25-33 days	Herb	Fruit	field	Dicot	It used as vegetable. Its juice is good for diabetic patients.
	Citrullus colocynthis (L.) Schrad	Burambba	May-August	A vine like herb	Fruits, seeds, roots	Sokar	Dicot	Fruit pulp and juice is traditionally used in treating yellow fever and jaundice. Fruits are highly purgative and used in cattle for gastrointestinal disorders. The dried fruit powders also mixed with honey and used against constipation. Careless use of fruits and seeds may also be fatal.
21- Euphorbiaceae	*Chrozophora tinctoria* (L.) A. juss.	Giradol	July to September	Herb	Flower and fruit	Mostly common in dry places near the coast of retrha and nari.	Dicot	Red and blue dyes can be produced by using its flower, fruit and sap. It is used to treatment of fever, warts, emetic and cathartic diseases. Root ashes are given to children for cough.
	Euphorbia prostrata Aiton	guchay mar ghaa	July to October	Herb	Whole plant	Waste area of sokar and basti buzdar.	Dicot	Euphorbia prostrata extract has been shown to be helpful in the treatment of bleeding haemorrhoids. This plant's latex is used to treat warts and abscesses.
	Euphorbia hirta L.	Bara dudhi	Summer	Herb	Whole plant	Cultivated in fields of that area.	Dicot	Female diseases, respiratory illnesses, worm infestations in youngsters, diarrhea, digestive issues, and tumors are all traditional uses for Euphorbia hirta. Young tender leaves and shoots that can be prepared as a vegetable. Internal use of the stem is a well-known asthma therapy.
	Euphorbia pulcherrima Willd. ex Klotzsch	Poinsettia	December	Herb	Whole plant	aunsa Sharif city	Dicot	This plant is used to make a delicious vegetable. The plant's various components are used to treat inflammatory conditions, heart debility, neuralgia, nasal ulcers, and cholera.
	Jatropha		Free	Shrub	Whole plant	Ornamental plant mostly found in parks.	Dicot	It has been used as a purgative, styptic, and emetic in the treatment of warts, tumours, rheumatism, herpes, skin rash, toothache, scabies, eczema, and ringworm in the past. Jatropha latex includes the alkaloid "Jatrophine," which is thought to have anti-cancer effects. It's also used to treat skin conditions, rheumatism, and ulcers on domestic animals. In children's mouth infections, white latex acts as a disinfectant.

	integerrima Jacq.	bubble bush	flowering	Shru	Seed, leaf and root	Sokar	Dicot	It is used in different ailments such as insomnia, menstrual cramps, backache, sciatica, gallbladder pain, rheumatism and abdominal disorders. Castor beans may be used to make jewellery, especially necklaces and bracelets.
22-Fabaceae	*Albizia lebbeck* (L.) Benth.	Saree	March to May	Tree	Bark, seed, wood and leaves	Mostly grow on the roadsides of that area.	Dicot	Albizia lebbeck plant is an astringent. It is used in some cultures to treat boils, cough. And also used to cure the eye, flu, pectoral problems, gingivitis, lung problems and abdominal tumors. The bark is helpful to cure the inflammation. It decreases the problems of insomnia and depression.it is helpful on skin to treat the skin infections and insect bites.
	Acacia nilotica (Linn.) Delile.	Kikr	July to December	Tree	Whole plant	Common throughout the area.	Dicot	Acacia nilotica is widely used. It is used for the curing of hepatitis C virus, cancer and human immunodeficiency virus. And it is also helpful in the treatment of diarrhea, wounds, nausea, burns and venereal diseases. Its wood is used to clean teeth and make agricultural tools.
	Alhagi maurorum Medik.	Jharii	June to August	Shrub	Whole plant	Common throughout the mountainous area of Taunsa Sharif.	Dicot	it is used to treat folk medicine, as expectorant, purgative, diaphoretic, rheumatism, warts, and piles. Oil taken from leaves is used to cure the rheumatism disease. Its flower is used to cure of piles. Leaves and stems extracts is used as an ingredient in commercial cosmetic preparations as a skin conditioner.
	Crotalaria pumila Ortega L.	Rattle box	August - October	Herb	Flower, leaves and shoot	Sokar	Dicot	It has edible blooms and pods, decorative flowers and buds, and edible seeds that are used as pulses. The plant's leaves and shoots, which are prepared and eaten as a leafy green vegetable, are its edible parts.
	Dalbergia sissoo Roxb.	Thali	March-April	Tree	Whole plant	Taunsa Sharif	Dicot	Young branches and leaves of a timber tree are consumed by animals. Sissoo produces high- quality furniture and cabinets. It is used for plywood, boats, floors, skis, sculptures, and musical and agricultural equipment. The leaves are utilized as animal feed. Use the wood and bark for skin conditions, diarrhea, anal infections, and blood problems. Timber is utilized for shade, shelter, and as fuel. Thin tree twigs are traditionally chewed before being used as a toothbrush.

	Medicago polymorpha L.	Clover	Februar y-March	Herb	leaves	Field	Dicot	It fixes nitrogen from the atmosphere when used as green manure. It is a beneficial plant for restoring ruined soils. Animals can be fed with it.
	Medicago orbicularis (L.) Bartal.	Mhnraa	Februar y-March	Herb	Leaves	Field	Dicot	Animals can be fed with it. It fixes nitrogen in the atmosphere.
	*Prosopis juliflora (*sw.) Dc.	Mesquites	April to June	Tree	Leaves and wood	common throughout the area	Dicot	leaves of this plant used for the curing of frequent urination, painful and oral infections. Its pods and leaves are applied for antimicrobial, anticancer, anti-inflammatory and anti-diabetic purposes. Its plants wood is used as flavouring to smoke foods. Plants can be used for erosion control, to stabilize dunes. Paper, paperboard and hardboard are made from the wood. its wood used in furniture, fence posts, crafts, corrals and construction.
	Pongamia pinnata (L.) panigrahi	Suk chain	April to june	Tree	Whole plant	Occurs on the roadside of Taunsa Sharif and creamwala.	Dicot	It is used to treat a variety of ailments such as ulcers, tumors, piles, and skin diseases. Its root is used to treat vaginal, skin, and gum diseases, as well as gonorrhea and ulcers. The flowers, fruit, and leaves of this plant are used to treat piles, female genital tract infections, coughs, leprosy, and diarrhea. Its bark is beneficial in the treatment of coughs, mental disorders, and colds. The root was used as a toothbrush by some locals.
	Phanera vahlii (Wight & Arn.) Benth.	Malu	April to June	Climbing shrub	Seed and leaves	Retrha	Dicot	The seeds are aphrodisiac and tonic. It's used to make straw mats out of fresh bark. Matting, basketry, and wickerwork are all made with its stems. Thatching, umbrellas, dishes, mugs, rough tablecloths, cloaks, and rain capes are all made from the leaves.
	Samanea saman (Jacq.) Merr.	Hujan darakht	Februar y to March	Tree	Leaves and bark	Basti buzdar	Dicot	It is a traditional medication that is used to treat headaches, colds, diarrhea, sore throats, and stomach cancer. Constipation is treated with boiling bark as a bandage. Diarrhoea is treated with a decoction of bark (inner) and leaves.
	Trifolium alexandrinum L.	Barseem	April-May	Herb	Whole plant	field	Dicot	Berseem clover can also be used as a green manure crop to provide nitrogen to succeeding crops or as a cover crop to control weeds. Up to 8 tons of feed may be produced by berseem clover in a single growing season.

	Trifolium substerraneum L.	Barseem	April-May	Herb	Whole	Field	Dicot	It gives cattle fodder of the highest quality. It is used as cattle feed. It helps with fire control. It may be used as green manure and for land revegetation.
	Tephrosia vicioides Schltdl.	Hoarypea		Herb	leaves	field	Dicot	It is one of the numerous advantageous nitrogen-fixing legumes that may be utilized as a source of live 'chop and drop' mulch in a permaculture forest gardening system
23- Hydrangeaceae	*Deutzia scabra* Thunb.	Fuzzy	Early spring to mid summer	Shrub	leaves	field	Monocot	Young leaves are prepared as food. Wooden nails and mosaic tiles are made with it.
24-Lamiaceae	*Ajuga reptans* L.	Bugle	May-june	Herbs	Whole plant	field	Dicot	The herbal tea is helpful for both healing and cardio. It is used to address issues with the spleen and liver.
	Ocimum basilicum L.	Babrii	June to septem ber	Herbs	Leaves	Taunsa Sharif	Dicot	It is used as a Common disease such as malfunctions, constipation, cough, headache, kidney and diarrhea. It leaves used as flavoring agent in cooking and foods.
	Ocimum sanctum L.	Tulsi		Herb	Leaves and root	Taunsa Sharif	Dicot	All parts of this plant (leaves, roots, stem and flowers) are used to cure the diseases like bronchitis, bronchial asthma, diarrhea, dysentery and skin diseases. It is an anti-aging. It fights against acne and give oral and eye health.
25-Moraceae	*Ficus benghalensis* L.	Bohr	Spring	Tree	Whole plant	Commonly inside Shrine of Taunsa Sharif	Dicot	The aerial root is styptic and can be used to treat syphilis, biliousness, diarrhea, liver inflammation, and other conditions. Well-curbs and furnishings are made of wood. A decoction of the root fibres can be used as a gonorrhoea therapy.
	Ficus glomerata Roxb.	Injeer da drakht	May to June	Tree	Leaves and flower	Taunsa sharif	Dicot	It is used against different ailment such as diabetes, liver disorder, diarrhea, respiratory and urinary diseases. Bark of this plant used as a home remedy.
	Ficus palmata Forssk.	Anjiri	March to April	Large deciduous Shrub	Fruit and seed	Taunsa Sharif	Dicot	The plant is used to treat a variety of ailments, including gastrointestinal problems, hypoglycemia, tumors, and ulcers. They are mostly utilized as a food item in the treatment of constipation and lung and bladder problems. They can also be applied as a poultice.

	Ficus elastica Roxb. Ex Hornem.	Rubber plant	May to june	Tree	Fruit, leaves and seed	Cultivated as ornamental	Dicot	Its plant roots and leaves are used to treat stomach issues, general pain, and nausea. It is latex that is used to treat trichuriasis. Young leaves are consumed as a vegetable. Latex is obtained from the bark of the stem and its branches and is used in tires, toys, gloves, and car rubber components. Its bark is used to make clothing and ropes.
	Morus alba L.	Toot	May	Tree	Whole plant	Taunsa sharif	Dicot	Dizziness, sleeplessness, and early ageing are all treated using *Morus alba* fruits, roots, and leaves. Bark is used to make a fiber that is used to weave clothing. Paper is made from the stem bark. The twigs are utilized to construct baskets. Additionally, it is employed in the construction industry to create picker arms, bobbins, tool handles, furniture, agricultural equipment, posts, beams, floors, and boats.
26- Myrtaceae	*Callistemon citrinus* (Curtis) Dum. Cours.	Bottle brush	Early Novem ber	Tree	Leaves, flower and wood	Common in garden of the area	Dicot	They are woody fragrant plants, and various portions of this herb have been utilized in traditional diarrhea and dysentery cures. All of the Bottlebrushes' flowers may be utilized to produce a sweet tea. Tool handles are made of wood, and it is also employed as a fire source.
	Eucalyptus alba Reinw. Ex Blume	Sufeda	August-Novem ber	Tree	Whole plant	Bahrthi	Dicot	An extract from the leaves is used as a skin conditioner to commercial cosmetic products. Heavy-duty construction, mine timber, boat building, furniture, handles, rail sleepers, poles, and carving all make use of the wood. Additionally, the wood serves as fuel.
	Eugenia uniflora L.	Cherry da darakht	January to Septem ber	Shrub	Whole plant	Common in garden of the area	Dicot	The fresh or dried leaves have been employed in the treatment of inflammatory and gastrointestinal illnesses, as well as hypertension. The fragrant leaves are used as a tea alternative. Blood pressure is reduced by eating the fruits. Locally, wood is utilized for tool handles and other goods.

	Psidium guajava L.	Amrood	October to Novem ber	Tree	Leaves, bark and fruit	Choni	Dicot	t is the most prominent and well-known traditional medicine for gastrointestinal illnesses like diarrhea, dysentery, stomach aches, and indigestion, and it's used all over the world. Its leaves are used in cooking. The fruit produces a really delicious jam and may also be pureed then incorporated to a range of recipes. Bark is applied topically to treat skin conditions such as ringworm, sores, and ulcers.
	Syzygium cumini (L.) Skeels.	Yamoo	March-April	Tree	Leaves,root and bark	Taunsa sharif	Dicot	It also works well to purify blood. Asthma, ulcers, diarrhea, and sore throat are among conditions that are treated with bark. jams, jellies, juices, and puddings prepared from fruit. The dried and powdered seeds are used to make a drink that is similar to coffee. The seeds are helpful in the treatment of diabetes and lower blood sugar levels as well.
27-Malvaceae	*Abutilon indicum* (Link) Sweet	Kanghi	Novem ber to January	Herb	Root and bark	Grow on the dry region of bughlani, cream wala and sokar.	Dicot	It is a very well plant species that is used to treat a variety of human illnesses. The plant has traditionally been used to treat inflammation, piles, gonorrhea, and as an immunological booster. Its root and bark are utilized as aphrodisiacs, anti-diabetics, and diuretics in general.
	Gossypium herbaceum L.	Kapass	April to October	Perennial Shrub	Whole plant	common in cultivated crops	Dicot	Its fiber is used to make pillow and mattresses. Paint can be produced by using its seed. Different unique clothes are made from its fiber in Pakistan. It is also used to cure different diseases diarrhea, nausea, fevers, headaches and cough. Its seeds are food, feed and oil extraction.
	Hibiscus sabdariffa L.	Lal ambari	Novem ber to Decemb er	Shrub	Flower and leaves	Taunsa Sharif	Dicot	It's used to treat high blood pressure, liver disorders, and fevers, among other things. The portion of the hibiscus that is utilized as medicine is the flower.
28- Nelumbonaceae	*Nelumbo nucifera* Gaertn.	Kanwal	June to July	Herb	Whole plant	Mostly found in rivers, canals, streams of that area.	Monocot	The whole plant is used as herbal medicine to cure the different ailments. Such as body heat imbalance, fever, insomnia, gastritis and fever. Leaves, seeds and rhizomes of this plant have been used as a folk medicines and oriental medicines. While leaves are helpful in hematuria, and epistaxis. Flowers are used for lowering blood sugar levels, fever, diarrhea, and cholera.

29-Nitrariaceae	*peganum harmala* L.	Harmal	April to October	Shrub	Seed, bark and root	Mangrotha	Dicot	Because of its abortive and mutagenic properties, harmala is not recommended for use during pregnancy. Inks, stains, and tattoos may be made from the stems, roots, and seeds. The root was used to eliminate body lice in a particular region of Pakistan.
30-Oleaceae	*Jasminum officinale* L.	Chambali	Summe r season	Shrub	Flower	Mostly found in parks of Taunsa Sharif	Dicot	Jasmine plant flower is used to make medicine. It is used to cure different ailments hepatitis (liver disease), cirrhosis, abdominal pain and diarrhea (dysentery). And also jasmine is used to treat cancer, skin diseases and wound healing. It is used as a food such as baked goods, gelatins, puddings and frozen dairy desserts.
31-Pinaceae	*pinus roxburghii* sarg.	Chir	Februar y to march	Tree	Wood and leaves	common in hilly areas	Conifer	The wood of this plant is stimulant, liver tonic, diuretic, aromatic, deodorant, anthelmintic, diaphoretic and digestive. Pine oil extracts from
								The wood used in varnishes, wetting agent in textiles, synergist in insecticides and paints. Also used in furniture polishes, shoe creams, printing inks, floor waxes and rubber industries.
32-Poaceae	*Arundo donax* L.	Giant	Late summer	Herb	leaves	field	Monocot	The split and flattened stems are used to build screens and house walls, while the leaves can be woven into mats. Clarinet and organ pipes' reeds are made from this plant.
	Bothriochloa pertusa (L.) A. Camus	Holcus	January - May	Herb	Whole plant	field	Monocot	The grass is often used as cattle feed. The plant is mostly utilized as ruminant feed. Due of its ability to create a dense mat, this grass is utilized for lawns. On occasion, it is sown in areas with poor soil, along the edges of highways, and in beautification projects.
	Cynodon dactylon (L.) pers.	Durva ghaa	Late summer	Perennial grass	Whole plant	Dry area of gulki	Monocot	It is used to curing the all types of skin problems and bleeding. Whole plant is used as treatment of different diseases such as cough, anasarca, headache, cramps, measles, sores, stomach, tumours, wounds and cancer. Its leaves are used to treatment stop the bleeding.
	Dichanthium annulatum (Forssk.) Stapf	Jargu grass	Through out the year	Herb	Flowers and leaves	Mostly grow in dry fields of mangrotha and bughlani.	Monocot	It is very important in agriculture. It is often utilized as a cattle fodder.

	Dicanthium aristatum (Poir.) C. E. Hubb.	Jangli ghaa		Herb	Leaves	Common in cultivated fields of the area.	Monocot	It is often utilized as a cattle fodder.
	Oryza sativa L.	Mungi	May to June	Herb	Whole plant	Common in cultivated field of the area.	Monocot	The seed is used to extract oil. It's a salad oil and a cooking oil. Rice can also be used for therapeutic purposes. It's a diuretic that's used to treat urinary problems. The seeds can be used to treat excessive lactation, weak appetite, and indigestion.
	Panicum repens L.	Luci ghaa	June to Novem ber	Perennial grasslike herb	Whole plant	mostly common in fields of basti buzdar.	Monocot	This plant is beneficial in reclaiming saline soils. It is used to treat a variety of ailments such as sores, wounds, cancer, and cough. Its leaves are used in the treatment of stopping bleeding.
	Paspalum vaginatum Sw.	Gha	May to Novem ber	Herb	leaves	field	Monocot	It may be utilized to feed cattle. The erosion in sandy coastal regions is controlled by this grass.
	Paspalum distichum L.	Gha	August-Decemb er	Herb	leaves	field	Monocot	useful for preventing erosion on salty soils and in places that have been recovered from tidal impacts. The grass is often used as cattle feed.
	Sorghum sp. (L.) Moench	Jowar	August-Decemb er	Perennial Herb	Whole plant	common in the cultivated fields of the crops	Monocot	Sorghum has been shown to be used as cattle feed, poultry feed, and drinkable alcohol, in addition to the traditional applications as food and fodder. Sorghum seed has mostly been utilized in distilleries, the starch sector, and animal feed.
	Setaria viridis (L.) P. Beauv.	Fox tail	March to August	Herb	Leaves and seed	Tauns sharif	Monocot	The seed is employed as an emollient and diuretic. When treating bruises, the plant is crushed, combined with water, and applied externally. Animals can be fed with it. It is utilized as millet or rice.
	Triticum aestivum L.	Karank	18 days after sowing	Herb	hole plant	Field	Monocot	Wheat used to make bread. Used in making pasta and also used in different ailments such as swelling wounds and kidney problems etc.
	Zea mays L.	Seta, Makai	October – March	Herb	Whole plant	common in cultivated field of the area	Monocot	Corn seeds, leaves, corn silks, stems, and inflorescence are among the plant parts being used ethnomedicine. Traditional medicine uses a warm tea prepared from the husk and leaf to treat malaria, depression, and other ailments.

33- Polygonaceae	*Polygonum plebeium* R.Br.	Knotweed	Hot season	Herb	Leaves and fruit	Mostly found on dry seasonal river beds of barthi, basti buzdar.	Dicot	Its plants leaves are cooked and eaten as a vegetable. Leaves of this plant used for the curing of painful and oral infection. Its leaves and fruit are used as lithontriptic and stomachic.
	Polygonum aviculare L.	Kuwar	July to August	Herb	Whole plant	Triman and Sokar.	Dicot	It is a safe and efficient astringent and diuretic plant that is mostly used to treat dysentery and haemorrhoids. It is used as an expectorant for cough and bronchitis.
	Rumex pulcher L.	boti	May-September	Herb	Whole plant	Field	Dicot	Whole flowering plant is used to make medicine. Salads is made from its leaves. For usage locally as a food source and a supply of materials, the plant is gathered from the wild.
34-Petiveriaceae	*Petiveria alliacea* L.	Guinea	March-April	Herb	Leaves	Taunsa sharif	Dicot	It has been used to treat cancer in conventional medicine.
35- Plantaginaceae	*Plantago ciliate* Desf.	Isobgol	February – April	Herb	Seeds	Taunsa sharif	dicot	Seeds husk swells up in the gut, acting as a bulk laxative and soothing irritated membranes.
36-Rhamnaceae	*Ziziphus mauritiana* Lam.	Ber	April to June	Tree	Leaves, fruit and root	common in the hilly regions of the area	Dicot	This plant serves as a honey bee, fuel, and timber source. Its plant leaves are fed to goats, sheep, and camels. The fruit was eaten by the locals. Fever is treated with a decoction of the root. Its bark and leaves are used to treat dysentery.
37-Rosaceae	*Rosa indica* L.	gulab da phool	February to March	Perennial flowering plant	Flowers, petals and sepals.	Taunsa Sharif	Dicot	Rose hips tea can also be used to cure diarrhea. Rose petals have sedative, antiseptic, anti- inflammatory, and parasite properties.
38-Solanaceae	*Solanum melongena* L.	Vataoo	December to January	Much branched herb	Fruit and leaves	Common in cultivated fields of the area	Dicot	This plant is used to make a delicious vegetable and has long been employed in Pakistan medicine. The plant's various components are used to treat inflammatory conditions, heart debility, neuralgia, nasal ulcers, and cholera.
	Withania somnifera (L.) Dunal	Asgand	December to onward	Herb	Root and fruit	present on the Himalayas area of mangrotha and sokar.	Dicot	*Withania somnifera* entire pharmacological characteristics make it a promising therapeutic treatment for cancer, microbial infection, and neurological illnesses. It is used for anti-snake venom. It is used to curing cough and rheumatism.
39-Salvadoraceae	*Salvadora oleoides* Decne.	Jaal plant	January to May	Tree	Root, leaves and fruit	Mngrotha	Dicot	The root of the plant Salvadora oleoides is used as a tooth brush, particularly before prayer. As a fuel, dry plant is used. The fruit was consumed by the locals. Its leaves have a purgative effect. It is also used to treat a variety of ailments such as spleen, rheumatism, and snake bite.

	Salvadora persica L.	Jall da darakht	March-April	Tree	Root leaves and seed	Mngrotha	icot	It is also used to treat a variety of ailments such as spleen, rheumatism, and snake bite.
40- Typhaceae	*Typha domingensis* Pers.	Kundr	June to July	Herb	Seed, stem and leaves	Mostly found on the banks of streams, lakes, irrigation	Dicot	Dried leaves are source of fodder. It is used to treat bleeding disorder and urine passage difficulty problems. Stem used to make the handicrafts, chairs, hats, and mats. And hairs of fruits used as a toys, pillows and mattresses.
						canals of Taunsa sharif.		
41- Tamaricaceae	*Tamarix aphylla* (L.) Karst.	Thola	March to September	Tree	bark and branching	Mostly found in excessively dry area of barthi.	Dicot	The bark is astringent and bitter. It is used for treating eczema and other skin diseases. Tamarix plant is used as a plant indicator for soil type in agricultural surveys. The branching is used in basket making, wheels, tool handles, carts and fruit boxes.
42- Zygophyllaceae	*Tribulus terrestris* L.	Chotaghkhru	July to August	Herb	Fruit, root and leaves	Dry places of sokar and Taunsa Sharif.	Dicot	It is used for kidney problems. People have traditionally utilized this plant for a number of purposes, including enhancing libido, maintaining urinary tract health, and reducing edema. Today, *Tribulus terrestris* is commonly utilized as a general health supplement, as well as in testosterone-boosting supplements.
	Fagonia indica burm. f.	Damanhan	April to June	Herb	Whole plant	Sokar	Dicot	Vomiting and in dysentery. Paste of leaves is applied von tumors and swellings of neck. The plant is also used as fodder for camels and goats.

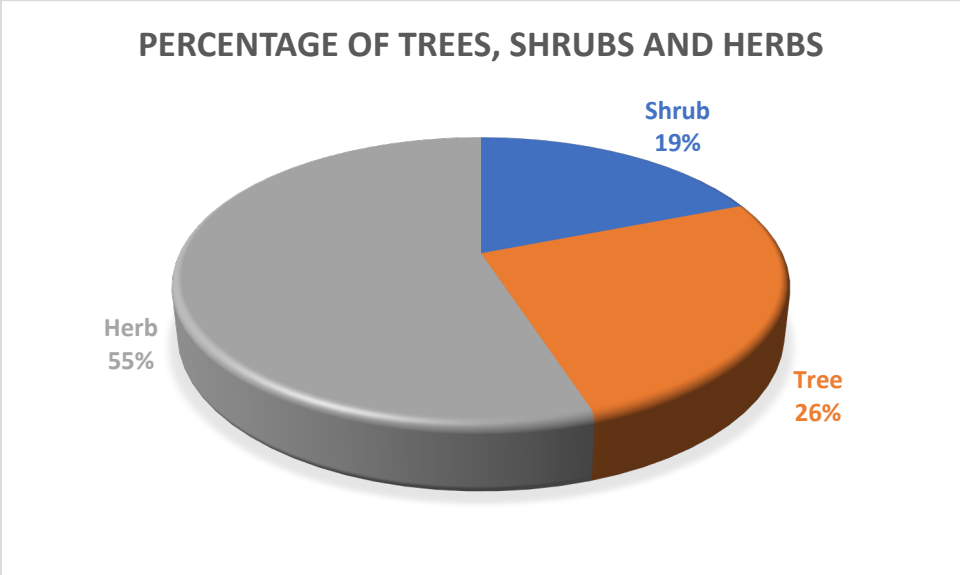

Figure 2. Percentage of life form of the collected medicinal plants

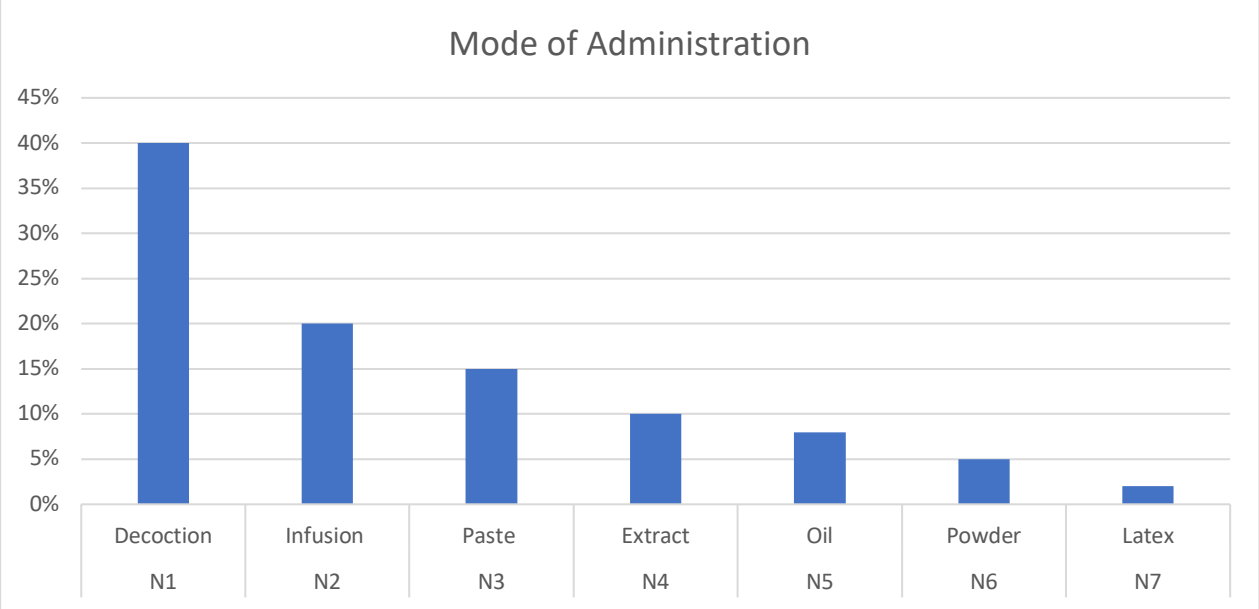

Figure 3. Mode of drug preparation from the medicinal plants by indigenous population

Most prominent medicinal plants on the basis of Relative Frequency of Citation (RFC)

In the current study we have calculated RFC for each and every medicinal plant (Table 3). Highest RFC value was reported for *Calotropis procera*, *Psidium guajava*, and *Salvadoera oleoides* having values 0.75, 0.50, 0.49 respectively, which corresponds to the fact that these medicinal plant species were reported by large number of informants, as RFC relies on the number of respondents that mention the use of a specific plant species, while the *Ajuga reptans* has the least RFC value 0.16.

Table 3. Quantitative assessment of the ethnomedicinal data the collected medicinal plants

Botanical name	Illness treated	Ip	Iu	Fidelity Level	N	Use Value
Chrysanthemum indicum L.	High blood pressure	7	17	41.17	12	0.25
Allium sativum L.	Cardiovascular diseases	17	19	89.47	19	0.52
Raphanus sativus L.	Abdominal bloating	21	25	84	23	0.60

Cycas revoluta Thunb.	High blood pressure	3	14	21.42	13	0.30
Euphorbia hirta L.	Respiratory illnesses	2	9	22.27	16	0.18
Ricinus communis L.	Abdominal disorders	17	19	89.47	26	0.42
Ficus palmata Forssk.	Gastrointestinal problems	3	9	33.33	13	0.30
Eugenia uniflora L.	Gastrointestinal illnesses	4	7	57.14	13	0.30
Psidium guajava L.	Gastrointestinal illnesses	11	11	100	16	0.5
Sonchus oleraceus L.	Diarrhea	19	21	90.47	9	0.22
Abutilon indicum (Link) Sweet	Anti-diabetics	3	7	42.45	10	0.3
Acacia nilotica (L.) Delile.	Anti-bacterial	19	21	90.47	25	0.44
Aerva javanica (burm. f.) Shult	Anthelmintic	3	11	27.27	12	0.33
Ajuga reptans L.	Liver	2	11	18.18	18	0.16
Albizia lebbeck (L.) Benth.	Cough	21	23	91.30	28	0.5
Calotropis procera (Aiton) W. T. Aiton	Snake bites	18	18	100	20	0.75
Capparis decidua (Forssk.) Edgew.	Cough	21	23	91.30	23	0.65
Capsella bursa-pastoris (L.) Medik.	Haemorrhages	2	9	22.22	12	0.25
Caryota mitis Lour.	Urinary disorders	3	11	27.27	11	0.27
Chenopodium album L.	Blood cleanser	3	11	27.27	13	0.30
Chrozophora tinctoria (L.) A. Juss.	Cough	11	13	84.61	13	0.23
Conocarpus eractus L.	Fever	5	11	45.45	19	0.36
Conyza canadensis L.	Dysentery	21	25	84	9	0.22
Coriandrum sativum L.	Analgesic	21	23	91.30	22	0.68
Cynodon dactylon (L.) pers.	Skin problems	2	7	28.57	15	0.26
Cyperus rotundus L.	Malaria	3	11	27.27	15	0.26
Dalbergia sissoo Roxb.	Diarrhoea	17	19	89.47	21	0.52
Ficus benghalensis L.	Liver	4	5	80	10	0.5
Ficus elastica Roxb. Ex Hornem.	Stomach problems	7	8	87.5	11	0.36
Ficus glomerata Roxb.	Skin problems	2	7	28.57	12	0.5
Fumaria indica L.	Blood purification	3	11	27.27	10	0.2
Helianthus annuus L.	Malaria	15	23	65.21	17	0.35
Jasminum officinale L.	Liver disease	4	9	44.44	14	0.35
Jatropha integerrima	Anti-cancer	5	11	45.45	17	0.17

Jacq.						
Lepidium didymum L.	Wounds	3	11	27.27	8	0.25
Mangifera indica L.	Diarrhea	21	23	91.30	22	0.63
Momordica charantia L.	Diabetes	17	19	89.47	22	0.5
Morus alba L.	Dizziness	5	6	83.33	12	0.33
Nelumbo nucifera Gaertn.	Diarrhea	1	5	20	12	0.25
Nerium oleander L.	Skin worms	6	15	40	15	0.33
Ocimum basilicum L.	Cough	15	17	88.23	25	0.48
Ocimum sanctum L.	Bronchial asthma	17	19	89.47	26	0.46
Oryza sativa L.	Indigestion.	4	5	80	23	0.52
Panicum repens L.	Cough	3	4	75	18	0.27
Peganum harmala L.	Stomach problems	5	7	71.42	13	0.23
Pinus roxburghii sarg.	Liver problems	3	8	37.5	16	0.37
Polyalthia longifolia (Sonn.) Thwaites	Skin disorders	17	19	89.47	20	0.45
Polygonum plebeium R.Br.	Stomach problems	4	9	44.44	24	0.20
Pongamia pinnata (L.) panigrahi	Cough	9	14	64.28	18	0.44
Prosopis juliflora (SW.) Dc.	Antimicrobial	7	13	53.84	22	0.45
Rosa indica L.	Antibacterial	7	11	63.63	21	0.33
Salvadora oleoides Decne.	Snake bite	17	17	100	25	0.48
Samanea saman (Jacq.) Merr.	Constipation	7	13	53.84	16	0.25
Sonchus asper (L.) Hill	Skin disorder	17	19	89.47	8	0.25
Suaeda fruticose Forssk. ex J.F. Gmel.	Treatment of wounds	11	13	84.61	16	0.56
Syzygium cumini (L.) Skeels.	Blood cleaner	9	12	75	17	0.41
Tamarix aphylla (L.) Karst.	Skin problems	13	15	86.66	24	0.54
Thuja orientalis (L.) Franco	Liver diseases	2	9	22.27	14	0.35
Withania somnifera (L.) Dunal	Cough	9	13	69.23	22	0.31
Xanthium strumarium L.	Arthritis	7	13	53.84	10	0.3
Zea mays L.	Malaria	13	15	86.66	22	0.54
Ziziphus mauritiana Lam.	Fever	17	19	89.47	26	0.57

Most prominent medicinal plants on the basis of Use Value (UV)

The value of a species' usage is determined by how frequently local people report using it. UV in this research falls between 0.16 and 0.75. It has been noted that species with more recorded human applications often have higher use values than plants

with fewer reported uses. *Calotropis procera* was determined to have the highest usage value (0.75) (Table 4). The highest fidelity level demonstrates the significance of this plant and the need for additional analysis using biological, phytochemical, and pharmacological activities. In addition, plants with low Fidelity percentages shouldn't be written off as declining in order to warn the next generation that doing so might raise the danger of knowledge gradually vanishing (Ahmad *et al.* 2021). The plant species with the highest usage value are probably more physiologically active (Heinrich *et al.* 1998). The medicinal plants having low UV have the same medicinal importance as the plant with high UV values therefore, we cannot ignore these plant species to document their medicinal uses because it may leads to the extension of the valuable knowledge (Jan *et al.* 2020). Furthermore, the therapeutic plants having low UV are of low value for local people however it shows that the indigenous knowledge about such medicinal plants is at risk or availability of the particular medicinal plant is less in the study area (Abdin *et al.* 2022). The high UV of medicinal plants in the study region is attributed to their common distribution in the area and the local people are well familiar of their medicinal uses (Jan *et al.* 2020; Mir *et al.* 2022). Therefore, the potential for a plant species to treat a certain ailment is indicated by high use value.

Informants Consensus Factor (ICF)

All the diseases were grouped into 16 categories of diseases based on the local people perception. ICF in the current study varied from 0.17 to 0.80. Digestive illnesses had the highest ICF value (0.80), which was followed by respiratory disorders with (0.75) (Table 4). The highest ICF score shows that the majority of individuals use medicinal plants to treat common health issues. The seeds of the *Plantago ciliata* were the most popular remedy for digestive disorder. According to the ICF results, digestive problems are the ailment that is most common in the study region. Because the locals were undernourished and unaware of a healthy diet, this sickness was widespread. Additionally, polluted water and poor hygiene might lead to stomach problems (Bibi *et al.* 2014). Gastrointestinal disorders are prevalent over the globe, for which numerous plants are being utilized by various societies across the world (Shah and Afzal, 2013; Alzaheb and Altemani, 2018). Respiratory illnesses ranked second in terms of disease prevalence in this region. Due to dust and pollen inhalation, this condition is widespread. Most people's respiratory systems are impacted by temperature variations as well (Ahmad *et al.* 2013).

Table 4. Disease categories, symptoms and informant consensus factors of medicinal plants

Categories	**Symptoms**	**Nur**	**Nt**	**ICF**	**Important plant of this categories**	**Number of citations for the plant**
Respiratory disorders	Bronchitis, sore throat, tuberculosis, common cold, cough, asthma, throat infections, diarrhea, constipation, vomiting and dysentery.	9	15	0.75	*Fagonia indica* Burm. f.	51
Digestive disorders	Biliousness, dyspepsia, stomachache, heartburn, ulcer, intestinal disorders.	11	19	0.80	*Plantago ciliate* Desf.	48
Renal and urinary tract infections	Kidney stone, kidney failure, urinary bladder stones.	3	4	0.50	*Salvadora oleoides* Decne.	47
Liver disorders	Jaundice, yellow fever, gall bladder stones	7	8	0.17	*Citrullus colocynthis* (L.) Schrad	54
Skin disorders	Cutaneous infections, boils scabies, leprosy, leukoderma, hair loss, eczema, insect repellent, antilice.	8	10	0.29	*Peganum harmala* L.	44
Male genital diseases	Loss of libido, impotence.	5	7	0.50	*Tribulus terrestris* L.	17
Cancer	Tumors, breast cancer, skin cancer and liver cancer.	4	6	0.66	*Chrysanthemum indicum* L.	16

Cardiovascular disorders	Hypertension, blood purifier, cardiac pains and hemorrhoids.	7	9	0.33	*Allium sativum* L.	22
Musculoskeletal disorders	joint pain and rheumatism.	5	7	0.5	*Capparis decidua* (Forssk.) Edgew.	42
Antimalarial	Fever, headache, muscle aches, nausea, vomiting and diarrhea.	6	7	0.2	*Helianthus annuus* L.	15
Eye disorders	Eyelid style, eye sores and cataract.	8	6	0.28	*Cotinus coggygria* Scop.	14
Anti-asthmatic	Shortness of breath, chest tightness, coughing.	7	5	0.33	*Mangifera indica* L.	33
Antidote	Snake bite and scorpion bite.	3	4	0.50	*Heliotropium europaeum* L.	21
Dermatitis	Dry skin, itchiness, rash.	4	5	0.33	*Nerium oleander* L.	12
Dysentery	Fever, nausea and vomiting.	5	6	0.5	*Conyza canadensis* L.	14
Treatment of wounds	Pain, swelling and bleeding.	7	4	0.5	*Suaeda fruticose* Forssk. ex J.F. Gmel.	35

Conclusion

The present study results showed that 104 plant species belonging to 42 families and 89 genera are used by the local inhabitants of study area for different purposes. Poaceae and Fabaceae were in abundance with 14 species each. It is hoped that the results of this research will be crucial in helping locals and concerned government agencies protect the areas natural resources and indigenous ethnobotanical flora, as well as serve as a useful guide to the traditional uses of regional plants for present and future generations. In order to preserve the indigenous and special information about the medicinal plants for current and future generations, an attempt was made to collect as much of it as possible throughout this investigation. It is intendant that this research would help in the widespread dissemination of this traditional wisdom. The Indigenous use of medicinal plants in Taunsa Sharif, Dera Ghazi Khan, Punjab, Pakistan, provides several socio-economic benefits to the local people, while also promoting sustainable agriculture, biodiversity conservation, and the preservation of traditional knowledge and practices.

Declarations

Ethical approval: This study has been conducted under the provisions of the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization of the Convention on Biological Diversity. Oral Prior consent was obtained from each participant.

This study does not contain any experiment(s) on humans and animals. Ethical clearance was obtained from the Ethical committee of the Department and Biodiversity action plan (2010-2020) for Pakistan. This study has been conducted under the provisions of the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity. During the ethnopharmacological data collection from informants a prior oral consent was taken.

Consent for publication: Not applicable –this manuscript has no personal data from the authors.

Data availability: The original data is presented in the article. There is no supplementary data. The raw data without the names of informants can be provided by authors.

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