Ethno Pharmacological Profile of Weed Flora of Thanda Paani Village, Islamabad Pakistan

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Citation | Mumtaz. I., Ahmad. U., "Ethno Pharmacological Profile of Weed Flora of Thanda Paani Village, Islamabad Pakistan.", IJASD, Vol. 06 Issue. 04 pp 189-207, Dec 2024
Received | Nov 17, 2024 **Revised |** Dec 08, 2024 **Accepted |** Dec 11, 2024 **Published |** Dec 15, 2024.

A study was conducted in Thanda Paani to enlist the wild plant species. The people of the area have to use these plants for various purposes and have for a long time been dependent on surrounding plant resources for their food, shelter, fodder, health, care, and other cultural purposes. The present study reported 66 plant species belonging to 59 genera and 29 families. The detailed inventory includes botanical names, vernacular names, part used, specimen No, medicinal, and other uses. To determine the biodiversity of plant species, there were six habits of flora and out of which were herbs (43 spp., 65%), grasses (7 spp., 11%), shrubs (6 spp., 9%), trees (5 spp., 8%), climbers (4 spp., 6%), and sedge (1 spp., 2%). Furthermore, the One-Way ANOVA Test was used to determine the significance of plant species. The P value of 5.57E-31 which is less than 0.05 indicated that plant species have a positive relationship between them. The ecological relationship between different plant species was determined using Tukey's HSD test. This test was used to determine the relationship between the groups of the samples. The results of the wild plant species in this area showed that they have a strong correlation between them and they support each other in this environment naturally. Herbs used both in traditional and allopathic medicine are now being commercially exploited for various compounds; therefore, more research is warranted and its conservation has become necessary.

Keywords: Ethno-Botany, Most Common Families, Predominant Medicinal Plants, Thanda Pani, Islamabad

Introduction:

The biodiversity of plant species is crucial to everyday life, as people rely on these plants for a wide range of purposes. Biodiversity refers to the variety of species on Earth's surface, offering insights into the distribution patterns, composition, and diversity of plant species [1][2] It helps to classify the different plant habitat types, providing information about the properties of plant species including physiognomic parameters, and synthetic, analytic, and quantitative characterizations in a definite way. Biotic and abiotic factors play important roles in influencing the biodiversity of an area, with plant species richness and soil relationships being dependent on these factors [3]. In the field of plant ecology, the physical and chemical condition of soil has determined the distribution of plant species in that region. The micronutrients as well as macronutrients are important for significant contributions in the biodiversity of plants and their ecological habitat [4]. The ecological factors of soil have different reactions towards the biodiversity of the particular area. The distribution of species usually depends upon the availability of resources in which water has an important position [5][6]. Different statistical software has been used to determine the correlation between environmental and biodiversity data in ecology. It helps the ecologists to reduce the complexity of the data set and organizing structure. However, such studies on relationship between the biodiversity and ecological factors are important for different interactions between plant resources.

The present study has the following aims:

- To determine the biodiversity and ethnobotanical applications of the plants in Thanda Paani, Islamabad
- To determine the ecological relationship between the different plant species with the help of the Tukey Kramer Multiple Comparisons Test.

Material And Methodology:

Study Site:

Thanda Pani is situated in Islamabad, Pakistan, at latitude 33.65° N and longitude 73.22° E, with an elevation of 795 meters above sea level. The surrounding localities include Jhang Sayedan, which is 1.85 km south, Punjgran 3.12 km west, and Kirpa 4 km to the southeast. The plant specimens were collected from different places in the study site. The fresh specimens were dried, pressed, and mounted on herbarium sheets after collection. Information regarding traditional uses of these plants was recorded through interviews with the local people, comprising predominantly elderly individuals between 50-70 years of age, along with herbalists (Hakeems) and midwives.

Data Collection:

Ethnobotanical data was also collected during various field visits. Photographs of some plants were also taken to facilitate quick identification by botanists. All the collected plant specimens were pressed dried and mounted on herbarium sheets. All the plant specimens were identified with the help of available literature [7][8]. Further identification was done by comparing them with the standard herbarium of Quaid-E-Azam University, Islamabad. Then these identified plant specimens were deposited in the herbarium of Pir Mehr Ali Shah, Arid Agriculture University, Rawalpindi for record.

Statistical Analysis:

The statistical significance of obtained data was determined by One Way ANOVA Test (α significance at 0.05) and the ecological correlation between different plant species was determined by Tukey's HSD Test.

Result And Discussion:

The map of the study area of Islamabad, Pakistan is shown in Figure 1A reported by [9] and the map of the study area of Thanda Pani, Islamabad is shown in Figure 1B.

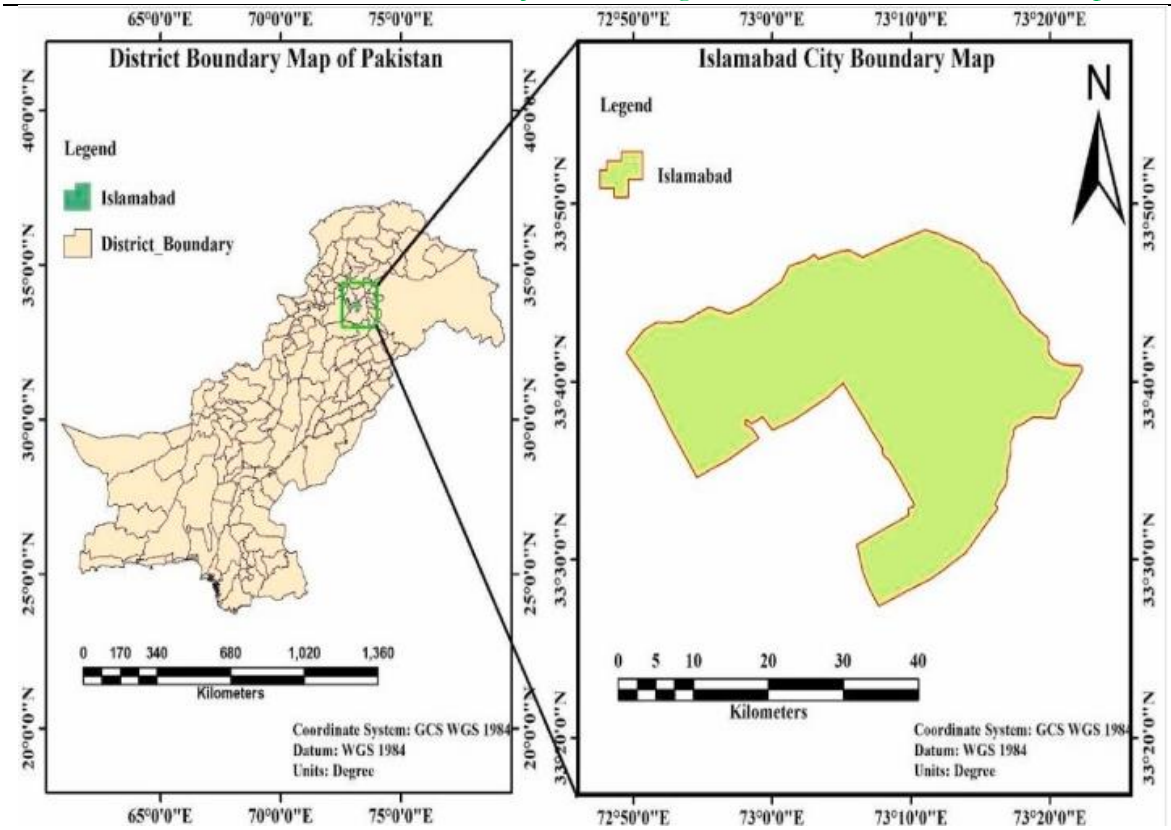

Figure 1: A-Map of the study area in Islamabad, Pakistan [9]

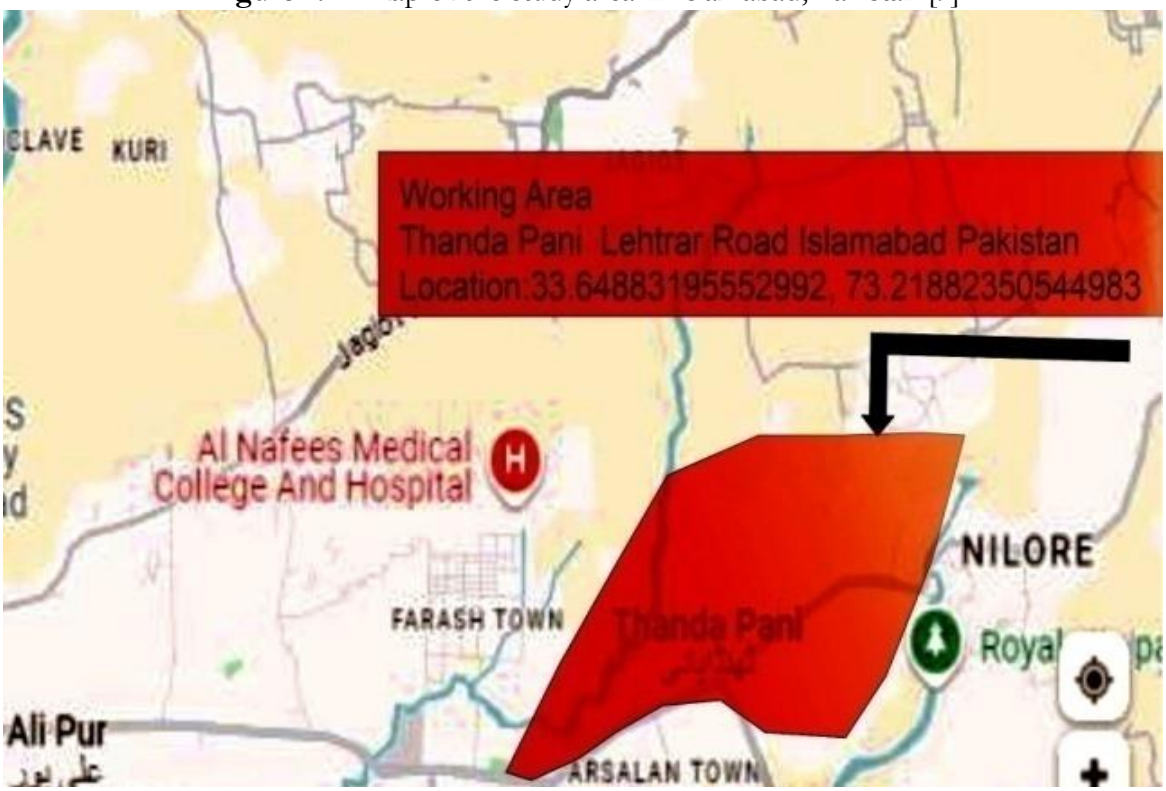

Figure 1: B-Map of Thanda Panni, Islamabad

The present study reported 66 plant species belonging to 59 genera and 29 families. The detailed inventory including botanical names, vernacular names, part used, specimen No, medicinal, and other uses are reported in Table 1.

Table 1: Ethno Pharmacological Profile of Weed Flora of Thanda Paani Village, Islamabad Pakistan

Family: Amaranthaceae **Botanical name:** Alternanthera pungens Kunth. **Vernacular name:** Phut Kanda **Part used:** Whole plant **Habit:** Herb **Specimen No:** 43 **Medicinal use:** Decoction of roots is used in jaundice. Leaves are crushed and paste is formed, which is used for body pain. **Multifarious uses:** Plant leaves are grazed by goats and sheep. When a plant is dried then also used as fuel.	**Family:** Amaranthaceae **Botanical name:** Amaranthus viridus L. **Vernacular name:** Ghaniar **Part used:** Leaves **Habit:** Herb **Specimen No:** 56 **Medicinal use:** Leaves are used in scorpion stings and snake bites. **Multifarious uses:** Leaves are cooked to make a delicious traditional recipe known as saag. Also used as fodder for cattle.
Family: Amaranthaceae **Botanical name:** Digera muricata (L.) Mart. **Vernacular name:** Tandula **Part used:** Arial parts, Leaves **Habit:** Herb **Specimen No:** 6 **Medicinal use:** The leaves of the plant are cooked and used to cure constipation. **Multifarious uses:** Leaves are cooked as a traditional recipe saag. Also used as fodder	**Family:** Apiaceae **Botanical name:** Anethum graveolens L. **Vernacular name: -----** **Part used:** Whole plant **Habit:** Herb **Specimen No:** 7 **Medicinal use:** Seeds are used as carminative and diuretic. **Multifarious uses:** Used in spices.
Family: Apocynaceae **Botanical name:** Thevetia peruviana (Pers.) **Vernacular name:** Peela kanair **Part used:** All parts are toxic **Habit:** Tree **Specimen No:** 47 **Medicinal use:** Not known **Multifarious uses:** All parts are poisonous, and ingestion leads to death. Cultivated as an ornamental plant.	**Family:** Apocynaceae **Botanical name:** Vinca Major L. **Vernacular name: -----** **Part used:** Leaves **Habit:** Herb **Specimen No:** 27 **Medicinal use:** The extract of leaves is used to relieve muscle pain. It is also used against bleeding gums and sore throats. Leaves are used for wasp sting.
Family: Asteraceae **Botanical name:** *Bidens biternata* (Lour.). **Vernacular name:** Gumar booty **Part used:** Whole plant **Habit:** Herb **Specimen No:** 9	**Family:** Asteraceae **Botanical name:** Echinops echinatus Roxb. **Vernacular name:** Bram dandi **Part used:** Roots **Habit:** Herb **Specimen No:** 38

Medicinal use: Fruit is used as an appetizer. Leaves are used in cough, headache, wounds, and snake bile. Whole plant is also used in ulcers and skin diseases.	**Medicinal use:** Roots are used as diuretic and carminative. Roots are also dried, and power is formed which is mixed with Acacia and used to kill the lice in hair.
Family: Asteraceae **Botanical name:** *Eclipta alba* (L.) Hassak. **Vernacular name:** Bhangra **Part used:** Leaves **Habit:** Herb **Specimen No:** 20 **Medicinal use:** Leaves juice is boiled with coconut oil and used to render the hair black. Oil is also extracted which is believed to blacken the hair. **Multifarious uses:** Used as fodder.	**Family:** Asteraceae **Botanical name:** *Eclipta prostrate* L. **Vernacular name: -----** **Part used:** Roots **Habit:** Herb **Specimen No:** 1 **Medicinal use:** Root extract is used to reduce toothache.
Family: Asteraceae **Botanical name:** *Inula vestita* Wall. Ex DC. **Vernacular name: -----** **Part used:** Whole plant **Habit:** Herb **Specimen No:** 37 **Medicinal use:** Not known **Multifarious uses:** Used as fodder for cattle. The dried plant is used as fuel.	**Family:** Asteraceae **Botanical name:** *Parthenium hysterophrous* L. **Vernacular name:** Gandi boti **Part used:** Leaves and flowers **Habit:** Shrub **Specimen No:** 39 **Medicinal use:** Leaves juice gives strength to the stomach and relief from constipation. Also used for fever. **Multifarious uses:** Used as fodder and fuel.
Family: Asteraceae **Botanical name:** *Saussurea heteromalla* (D.Don) Hand.- Mazz. **Vernacular name:** Kali Siri **Part used:** Seeds **Habit:** Herb **Specimen No:** 10 **Medicinal use:** Extract from plants is used in inflammation. It is also used for cough, cold, and stomach pain.	**Family:** Asteraceae **Botanical name:** *Silybum marianum* L. (Gaertner). **Vernacular name:** Kandiali **Part used:** Seeds **Habit:** Herb **Specimen No:** 51 **Medicinal use:** Leaves of plants are used to cure liver diseases and hemorrhage. **Multifarious uses:** Not used by castles. Also causes itching.
Family: Asteraceae **Botanical name:** *Taraxicum officinale* Weber. **Vernacular name:** Hand, Dudal **Part used:** Leaves, roots **Habit:** Herb **Specimen No:** 12	**Family:** Brassicaceae **Botanical name:** *Brassica album* L. **Vernacular name:** Chitti Saryan **Part used:** Whole plant **Habit:** Herb **Specimen No:** 61

Medicinal use: Leaves are used as a remedy for kidney and liver diseases. Also used to cure ulcers. **Multifarious uses:** Plant is used as fodder.	**Medicinal use:** Leaves are used to make ointment. **Multifarious uses:** Oil is extracted from the seeds of plants, which is edible and used in cooking. Also good for hair growth. Leaves are given to the baffles as fodder which results increase in milk production. Leaves are cooked to make saag.
Family: Brassicaceae **Botanical name:** *Brassica campestris* L. **Vernacular name:** Saryan **Part used:** Whole plant **Habit:** Herb **Specimen No:** 42 **Medicinal use:** Leaves of plants are used as potherb to expel abdominal worms and to treat constipation. The oil is obtained from the seeds and is applied to the body as an antimicrobial and anti-lice agent. The oil is poured into a brass pot and kept on the heads of jaundiced patients. **Multifarious uses:** The plant is used as fodder for cattle. The dried plant is used as fuel. Leaves are cooked as vegetables.	**Family:** Brassicaceae **Botanical name:** Capsella bursa_pastoris (L.) Medic. **Vernacular name:** Shepherd's purse **Part used:** Whole plant **Habit:** Herb **Specimen No:** 34 **Medicinal use: -----** **Multifarious uses:** Plant leaves are grazed by goats and sheep. Dried plants are also used as fuel.
Family: Brassicaceae **Botanical name:** *Coronopus didymus* L.Smith) **Vernacular name:** Chir ganga **Part used:** Whole plant **Habit:** Herb **Specimen No:** 23 **Medicinal use:** Plant extract is used for bone disorders and open locks among joints.	**Family:** Canabinaceae **Botanical name:** *Cannabis sativa* **Vernacular name:** Bhang **Part used:** Leaves, Flowering tips **Habit:** Shrub **Specimen No:** 13 **Medicinal use:** Plant extract is used in Pneumonia. Also used for the treatment of disease in animals locally known as "Chichra". **Multifarious uses:** Leaves are dried and crushed then taken as a drink for their narcotic action. Extract of plants is cold in nature.
Family: Brassicaceae **Botanical name**: *Raphanus sativus* L. **Vernacular name:** Jangli mooli **Part used:** Whole plant **Habit:** Herb **Specimen No:** 49 **Medicinal use:** Root is hanged with salt at night and eaten early in the morning for the treatment of jaundice. It helps in digestion; salt is also extracted from it which is also useful for digestion.	**Family:** Caryophyllaceae **Botanical name:** *Stellaria media* (L.) Vill. **Vernacular name: -----** **Part used:** Leaves **Habit:** Herb **Specimen No:** 45 **Medicinal use:** The plant is used for skin diseases, period pain, and rheumatic pain. Paste of plant is applied to burns or cuts on the skin.

Multifarious uses: Used as raw in salad, also cooked and eaten.	
Family: Chenopodiaceae **Botanical name:** *Chenopodia murale* L. **Vernacular name:** Bathu **Part used:** Leaves **Habit:** Herb **Specimen No:** 35 **Medicinal use:** Leaves are cooked together with spinach and *Brassica* leaves as vegetables to treat constipation. **Multifarious uses:** Aerial parts are used as fodder.	**Family:** Chenopodiaceae **Botanical name:** *Chenopodium album* L. **Vernacular name:** Makhan saag **Part used:** Whole plant **Habit:** Herb **Specimen No:**53 **Medicinal use:** Plant used as laxative. Roots are used to treat jaundice and urinary diseases. Fruit and roots are used for snake bites. **Multifarious uses:** Used as fodder for castles. Also used to cook saag. A delicious traditional recipe is made known as "Koftay".
Family: Chenopodiaceae **Botanical name:** *Chenopodium botrytis* L. **Vernacular name:** Bathu **Part used:** Aerial parts **Habit:** Herb **Specimen No:**8 **Medicinal use:** Leaves are cooked together with spinach and *Brassica* leaves as vegetables to treat constipation. **Multifarious uses:** Plant is used as fodder for castles.	**Family:** Compositae **Botanical name:** *Sonchus asper* (L.) Hill. **Vernacular name: -----** **Part used:** Whole plant **Habit:** Herb **Specimen No:**59 **Medicinal use:** All parts of the plant even its latex are used to treat wounds, boils, asthma, and gastrointestinal infections.
Family: Convolvulaceae **Botanical name:** *Convolvulus arvensis* L. **Vernacular name:** Lehli **Part used:** Whole plant **Habit:** Climber **Specimen No:**21 **Medicinal use:** The whole plant is used to cure skin diseases. **Multifarious uses:** Used as fodder for castles. Improve milk production in goats. Leaves are cooked and eaten by humans.	**Family:** Cucurbitaceae **Botanical name:** *Mimordica balsamica* L. **Vernacular name:** Jangli karela **Part used:** Fruit **Habit:** Climber **Specimen No:**41 **Medicinal use:** The juice of fruit is given to treat diabetes. The same is given to treat constipation and gas trouble. The fruit juice is also used as a blood purifier to treat boils and pimples. It is also said that using its extract or as a vegetable improves liver functioning and kills abdominal worms. **Multifarious uses:** The local people used it as a vegetable. The fruit is salted and then dried in sunlight and used to make pickles.
Family: Cyperaceae **Botanical name:** *Cyperus rotundus* L. **Vernacular name:** Deela or Motha	**Family:** Euphorbiaceae **Botanical name:** *Euphorbia helioscopia* L. **Vernacular name:** Chhatri today

Part used: Whole plant **Habit:** Sedge **Specimen No:**16 **Medicinal use:** The plant is used in medicine, treating fever and digestive problems. It is also used for pain reduction and appetizers. Also used for the treatment of thirst.	**Part used:** Seeds **Habit:** Herb **Specimen No:**52 **Medicinal use:** Seeds of plant with roasted peppers given in cholera. Also used in anesthetizing. **Multifarious uses:** Not known, the plant is known to be poisonous and cause swelling on the skin.
Family: Euphorbiaceae **Botanical name:** *Euphorbia hirta* L. **Vernacular name:** Dhodhe **Part used:** Whole plant **Habit:** Herb **Specimen No:**2 **Medicinal use:** The whole plant is grind and mixed with water and used to treat diarrhea. It is a blood purifier and is used to cure piles. It is also used as a laxative. **Multifarious uses:** Leaves are used as fodder.	**Family:** Euphorbiaceae **Botanical name:** *Ricinus communis* L. **Vernacular name:** Erand, Hawari **Part used:** Whole plant **Habit:** Shrub **Specimen No:**58 **Medicinal use:** Castor oil is obtained from this plant, which is used for the treatment of constipation, epilepsy, and liver disorders. Leaves of plants are poisonous but they are steamed and directly applied on injuries externally, also applied on infected skin because they have anti-inflammatory activities. Castor oil is purgative, oil is given for constipation before and after childbirth to the mother. **Multifarious uses:** Castor oil is obtained from the edible plant.
Family: Fumariaceae **Botanical name:** *Fumaria indica* Hussk. Pugsely. **Vernacular name:** Papra **Part used:** Leaves **Habit:** Herb **Specimen No:**55 **Medicinal use:** Juice of plant leaves is given in fever. Also used in removing worms from the abdomen. Plants are used as blood purifiers so, also used to treat goiter. Extract of the plant is taken early in the morning for diabetes.	**Family:** Lamiaceae **Botanical name:** *Mentha longifolia* (L.) Huds. **Vernacular name:** Jungli podina **Part used:** Leaves **Habit:** Herb **Specimen No:**46 **Medicinal use:** Tea made from leaves, traditionally used for fever, digestive disorders, and headaches. It also has antiseptic properties. **Multifarious uses:** Leaves are raw as salad or cooked. Domestic recipe chutney is also made by crushing the leaves.
Family: Lamiaceae **Botanical name:** *Lamium amplexicaule* L. **Vernacular name: -----** **Part used:** Leaves **Habit:** Herb **Specimen No:**60	**Family:** Lamiaceae **Botanical name:** *Ocimum basilicum* L. **Vernacular name:** Niazbo **Part used:** Whole plant **Habit:** Shrub **Specimen No:**54

Medicinal use: Used as laxative, fever-reducing. It has an agent that induces sweating. **Multifarious uses:** Leaves are eaten raw or cooked.	**Medicinal use:** Plants are good for digestion. Traditionally used for supplementary treatment of diabetes and asthma. Rich in vitamin C and minerals. **Multifarious uses:** Leaves are crushed with green chillis and a traditional recipe is formed known as chatni. Mostly cultivated to use as spices in cooking. Some people believed that no snake would be found in the home in which this plant is planted. Also used as fodder.
Family: Malvaceae **Botanical name:** *Malva parviflora* Wall. **Vernacular name:** Katori saag **Part used:** Whole plant **Habit:** Herb **Specimen No:**63 **Medicinal use:** Leaf extract of plants contains anti-inflammatory activities. The decoction of roots is used to soften hair. **Multifarious uses:** Leaves are cooked to make traditional recipe saag.	**Family:** Meliaceae **Botanical name:** *Melia azadirachta* L. **Vernacular name:** Draik **Part used:** Mostly bark, seed, and leaves, and less frequently root and fruit of the plant are used. **Habit:** Tree **Specimen No:**22 **Medicinal use:** Fruit of plant is taken, dried under sunlight, and powder is formed, which is used to cure diabetes and various skin infections. Fruit is also used to remove intestinal worms. Some people directly apply leaves to treat head lice. **Multifarious uses:** Cattle used the plant as fodder. The fruit of the plant is taken and boiled, peeled-off copper paper is wrapped around its seeds, and mala is formed. Some people also used its seeds to make abscesses.
Family: Moraceae **Botanical name:** *Brosunatia pyperifera* (L.) Vent. **Vernacular name:** Jungli Shahtoot **Part used:** Bark, leaves, stem **Habit:** Tree **Specimen No:**64 **Medicinal use:** Not known **Multifarious uses:** Used as fodder and fuel. Wood is used as a building material. And making furniture. Fruit is also eaten.	**Family:** Moraceae **Botanical name:** *Morus alba* L. **Vernacular name:** Shehtoot **Part used:** Whole plant **Habit:** Tree **Specimen No:**25 **Medicinal use:** Fruit is given to treat sour throat. The decoction of the fruit is coughed due to throat infection. The leaves are boiled in water (Joshanda) given for the same purpose. **Multifarious uses:** The wood is used as a building material. The plant provides shade to the people. Leaves are used as forage. Fruit is eaten by humans.
Family: Nyctaginaceae **Botanical name:** *Boerhavia procumbent*	**Family:** Onagraceae **Botanical name:** *Oenothera rosea* Lher. Ex Aiton.

Banks ex Roxb. **Vernacular name:** Itsit **Part used:** Whole plant **Habit:** Herb **Specimen No:**4 **Medicinal use:** Decoction of roots is used as a liver tonic. Roots of plants are made into pieces and hung on the neck as necklaces to cure jaundice. The paste of plant leaves is externally applied to treat paralysis. **Multifarious uses:** The whole plant is the favorite fodder for sheep and goats.	**Vernacular name:** Makhna saag **Part used:** Whole plant **Habit:** Herb **Specimen No:**44 **Medicinal use:** Used to treat inflammation, also relieve muscle pain. **Multifarious uses:** Used as fodder. Leaves are cooked to make saag.
Family: Papilionaceae **Botanical name:** *Trifolium rupens* L. **Vernacular name:** Boti **Part used:** Whole plant **Habit:** Herb **Specimen No:**66 **Medicinal use:** Extract of leaves is used in the treatment of cough, cold, and fever. **Multifarious uses:** Plant is used as fodder for cattle.	**Family:** Papilionaceae **Botanical name:** *Vicia faba* L. **Vernacular name:** Mattri **Part used:** Whole plant **Habit:** Climber **Specimen No:**3 **Medicinal use:** Not known **Multifarious uses:** Seeds are cooked, also eaten raw (salad). Soup is also prepared from seeds. Used as fodder.
Family: Papilionaceae **Botanical name:** *Vicia sativa* L. **Vernacular name:** Jangli both **Part used:** Fruit **Habit:** Climber **Specimen No:**5 **Medicinal use:** Not known **Multifarious uses:** Fruit (pod) is used as a vegetable. Also used as fodder.	**Family:** Poaceae **Botanical name:** *Brachiaria ramose* (L.) Stapf. **Vernacular name:** ----- **Part used:** Whole plant **Habit:** Grass **Specimen No:**15 **Medicinal use:** Not known **Multifarious uses:** Used as fodder for castles.
Family: Poaceae **Botanical name:** *Cenchrus ciliaris* L. **Vernacular name:** Ghaah **Part used:** Whole plant **Habit:** Grass **Specimen No:**31	**Family:** Poaceae **Botanical name:** *Eleusine indica* L. **Vernacular name:** Ghaah **Part used:** Leaves, seeds and stem **Habit:** Grass **Specimen No:**11

Medicinal use: Plant is used as a folk remedy for kidney pain. It is used as a diuretic and to treat wounds. **Multifarious uses:** Used as fodder.	**Medicinal use:** Seeds are edible and are used in diuretic and starvation conditions. **Multifarious uses:** Stem is used for making baskets, mats, hats, and for making paper. Also used as fodder.
Family: Poaceae **Botanical name:** *Polypogon monspeliensis* (L.) Desf. **Vernacular name: -----** **Part used:** Seeds **Habit:** Grass **Specimen No:**32 **Medicinal use:** Plant ashes are used in the treatment of heart problems. **Multifarious uses:** Seeds are eaten.	**Family:** Poaceae **Botanical name:** *Setaria glauca* (L.) P.Beauv. **Vernacular name: -----** **Part used:** Whole plant **Herb:** Grass **Specimen No:**28 **Medicinal use:** Help to cure chicken pox and skin diseases. **Multifarious uses:** Used as fodder.
Family: Poaceae **Botanical name:** *Sorghum halepense* (L.) Pers. **Vernacular name:** Baru gas, Jangli jawar **Part used:** Leaves **Habit:** Grass **Specimen No:**18 **Medicinal use:** The decoction of plants is used as a diuretic. **Multifarious uses:** Leaves are used as fodder.	**Family:** Poaceae **Botanical name:** *Zea mays* L. **Vernacular name:** Makai **Part used:** Leaves and Fruit **Habit:** Grass **Specimen No:**62 **Medicinal use:** Maize oil is good for the digestive system and helps to cure cardiac diseases because it has less quantity of cholesterol. Sugar and corn flour are mixed and used to prepare tablets in homeopathy. Decoction of maize hair used in pain of appendix, and overcome kidney diseases. **Multifarious uses:** Fruit of plant is eaten (Challi) after boiling or cooking. Sweet bread is also made with corn flour. Biscuits are also prepared by it. The plant is also used by cattle as fodder.
Family: Polygonaceae **Botanical name:** *Polygonum plebejum* R. Br. **Vernacular name:** ------ **Part used:** Leaves **Habit:** Herb **Specimen No:**17 **Medicinal use:** Powered is formed from dried leaves which is used in pneumonia.	**Family:** Polygonaceae **Botanical name:** *Rumex cheliparsus* Mill. **Vernacular name:** Hula **Part used:** Whole plant **Habit:** Herb **Specimen No:**33 **Medicinal use:** Roots paste with salt is used to cure diarrhea, and to kill intestinal worms in castles.

Multifarious uses: The leaves are used as fodder for castles.	**Multifarious uses:** Dried plants are used as fuel.
Family: Polygonaceae **Botanical name:** *Rumex dentatus* L. **Vernacular name:** Jungle sag **Part used:** Leaves **Habit:** Herb **Specimen No:** 14 **Medicinal use:** The plant is a rich source of vitamins A and C. **Multifarious uses:** The leaves are cooked as vegetables.	**Family:** Ranunculaceae **Botanical name:** *Ranunculus muricatus* L. **Vernacular name:** Boti **Part used:** Leaves **Habit:** Herb **Specimen No:**24 **Medicinal use:** Juice of leaves used in fever. **Multifarious uses:** Used as an ornamental plant.
Family: Rosaceae **Botanical name:** *Rosa canina* L. **Vernacular name:** Jungali Gulab **Part used:** Fruit, Flower, Leaf **Habit:** Shrub **Specimen No:** 29 **Medicinal use:** The plant has laxative properties. It is useful for heart problems, cough, cold, eye inflammation, and for the skin. **Multifarious uses:** Cultivated as an ornamental plant.	**Family:** Rubiaceae **Botanical name:** *Galium aparine* L. **Vernacular name:** Puth Kanda **Part used:** Whole plant **Habit:** Herb **Specimen No:**19 **Medicinal use:** Traditionally used for skin diseases. Herbalists said that it helps with low blood pressure and body temperature. **Multifarious uses:** Fruit of plant when dried, roasted, and used to make tea.
Family: Solanaceae **Botanical name:** *Solanum villosum* L. **Vernacular name:** Katch Match **Part used:** Whole plant **Habit:** Herb **Specimen No:**36 **Medicinal use:** Fruit of plants is used to treat jaundice. The plant extract is used to remove obesity and jaundice. **Multifarious uses:** Plant is grazed by goats and buffalos. Also used as fodder.	**Family:** Solanaceae **Botanical name:** *Withania somnifera* (L.) Dunal. **Vernacular name:** Ashwagandha **Part used:** Whole plant **Habit:** Herb **Specimen No:**57 **Medicinal use:** Leaves of plants are applied to tumors and ulcers. The plant is used to control colds, coughs, and diabetes. Also increases the production of bone marrow, and acts as an anti-aging and anti-inflammatory.
Family: Urticaceae **Botanical name:** *Urtica pilulifera* L. **Vernacular name:** Kharish wali both **Part used:** ---- **Habit:** Herb **Specimen No:**30	**Family:** Verbenaceae **Botanical name:** *Lantana camara* L. **Vernacular name:** Punch Puli **Part used:** Whole plant **Habit:** Shrub **Specimen No:**48

Medicinal use: Not known **Multifarious uses:** Cause severe itching on the skin when touched. It is not grazed by cattle.	**Medicinal use:** Oil is used to treat skin itches, antiseptic for wounds, and externally used for scabies. Leaf extract is anti-microbial. **Multifarious uses:** Stems are used for making baskets, and fuel for cooking and heating. Also used as fodder.
Family: Verbenaceae **Botanical name:***Verbena officinalis* L. **Vernacular name: -----** **Part used:** Leaves, Flower, Stem **Habit:** Herb **Specimen No:**40 **Medicinal use:** Leaves extract is used to stimulate digestion and treat liver diseases and jaundice. The plant is also useful for cough and cold. **Multifarious uses:** Used as fodder for castles.	**Family:** Verbenaceae **Botanical name:** *Verbena tenuiserta* Briq. **Vernacular name:** Pamukh **Part used:** Whole plant **Habit:** Herb **Specimen No:**26 **Medicinal use:** No medicinal use found. **Multifarious uses:** Used as an ornamental plant.
Family: Zygophyllaceae **Botanical name:** *Tribulus terrestis* L. **Vernacular name:** B hakra **Part used:** Whole plant **Habit:** Herb **Specimen No:**50 **Medicinal use:** Seeds of plants are used for kidney stones and urinary bladder diseases. Fruit is used for cough and heart diseases. Extract of the plant is used in balancing sex hormones in males. **Multifarious uses:** Used to make a traditional recipe known as "Panjiri", which increases the strength of the body.	

In the present study to determine the biodiversity of plant species, there were six habitats of flora, out of which 43 plant spp. Were herbs (65%), grasses (7 spp., 11%), shrubs (6 spp., 9%), trees (5 spp., 8%), climbers (4 spp., 6%), and sedge (1 spp., 2%) as shown in Table 2 and Figure 2

Table 2: Biodiversity of Plants in Thanda Paani Islamabad.

Sr.#	NAME OF PLANT SPECIES	HABITAT						ANOVA Test (P < 0.05)
		Herb	Shrub	Tree	Grass	Climber	Sedge	5.57E-31
1	Albizzia lebbek (L.) Bth.	0	0	1	0	0	0	5.57E-31
2	Alternanthera pungens Kunth.	1	0	0	0	0	0	5.57E-31
3	Amaranthus viridus L.	1	0	0	0	0	0	5.57E-31
4	Anethum graveolens L.	1	0	0	0	0	0	5.57E-31
5	Bidens biternata (Lour.)	1	0	0	0	0	0	5.57E-31
6	Boerhavia procumbense	1	0	0	0	0	0	5.57E-31
7	Brachiaria ramose (L.)	0	0	0	1	0	0	5.57E-31
8	Brassica album L.	1	0	0	0	0	0	5.57E-31
9	Brassica campestris L.	1	0	0	0	0	0	5.57E-31
10	Brosunatia pyperifera (L.) Vent.	0	0	1	0	0	0	5.57E-31
11	Cannabis sativa L.	0	1	0	0	0	0	5.57E-31
12	Capsella bursa_pastoris (L.) Medic.	1	0	0	0	0	0	5.57E-31
13	Cenchrus ciliaris L.	0	0	0	1	0	0	5.57E-31
14	Chenopodia murale L.	1	0	0	0	0	0	5.57E-31
15	Chenopodium album L.	1	0	0	0	0	0	5.57E-31
16	Chenopodium botrytis L.	1	0	0	0	0	0	5.57E-31
17	Convolvulus arvensis L.	0	0	0	0	1	0	5.57E-31
18	Coronopus didymus L. (Smith)	1	0	0	0	0	0	5.57E-31
19	Cyperus rotundus L.	0	0	0	0	0	1	5.57E-31
21	Echinops echinatus Roxb.	1	0	0	0	0	0	5.57E-31
22	Eclipta alba (L.) Hassak.	1	0	0	0	0	0	5.57E-31
23	Eclipta prostrate L.	1	0	0	0	0	0	5.57E-31
24	Eleusine indica L.	0	0	0	1	0	0	5.57E-31
25	Euphorbia helioscopia L.	1	0	0	0	0	0	5.57E-31
26	Euphorbia hirta L.	1	0	0	0	0	0	5.57E-31
27	Fumaria indica Hussk. Pugsely.	1	0	0	0	0	0	5.57E-31
28	Galium aparine L.	1	0	0	0	0	0	5.57E-31
29	Inula vestita Wall. ex DC.	1	0	0	0	0	0	5.57E-31
30	Lamium amplexicaule L.	1	0	0	0	0	0	5.57E-31
31	Lantana camara L.	0	1	0	0	0	0	5.57E-31

32	Malva parviflora Wall.	1	0	0	0	0	0	5.57E-31
33	Mentha longifolia (L.) Huds.	1	0	0	0	0	0	5.57E-31
34	Melia azadirachta L.	0	0	1	0	0	0	5.57E-31
35	Momordica balsamica L.	0	0	0	0	1	0	5.57E-31
36	Morus alba L.	0	0	1	0	0	0	5.57E-31
37	Ocimum basilicum L.	0	1	0	0	0	0	5.57E-31
38	Oenothera rosea Lher. ex Aiton.	1	0	0	0	0	0	5.57E-31
39	Parthenium hysterophrous L.	0	1	0	0	0	0	5.57E-31
40	Polygonum plebejum R. Br.	1	0	0	0	0	0	5.57E-31
41	Polypogon monspeliensis (L.) Desf.	0	0	0	1	0	0	5.57E-31
42	Ranunculus muricatus L.	1	0	0	0	0	0	5.57E-31
43	Raphanus sativus L.	1	0	0	0	0	0	5.57E-31
44	Ricinus communis L.	0	1	0	0	0	0	5.57E-31
45	Rosa canina L.	0	1	0	0	0	0	5.57E-31
46	Rumex cheliparsus Mill.	1	0	0	0	0	0	5.57E-31
47	Rumex dentatus L.	1	0	0	0	0	0	5.57E-31
48	Saussuria heteromala (D.Don)	1	0	0	0	0	0	5.57E-31
49	Setaria glauca (L.) P.Beauv.	0	0	0	1	0	0	5.57E-31
50	Silybum marianum L. (Gaertner).	1	0	0	0	0	0	5.57E-31
52	Sonchus asper (L.) Hill.	1	0	0	0	0	0	5.57E-31
53	Sorghum halepense (L.) Pers.	0	0	0	1	0	0	5.57E-31
54	Stellaria media (L.) Vill.	1	0	0	0	0	0	5.57E-31
55	Taraxicum officinale Weber.	1	0	0	0	0	0	5.57E-31
56	Thevetia peruviana (Pers.) K. Schum.	0	0	1	0	0	0	5.57E-31
57	Tribulus terrestis L.	1	0	0	0	0	0	5.57E-31
58	Trifolium rupens L.	1	0	0	0	0	0	5.57E-31
59	Urtica pilulifera L.	1	0	0	0	0	0	5.57E-31
60	Verbena officinalis L.	1	0	0	0	0	0	5.57E-31
61	Verbenia tenuiserta Briq.	1	0	0	0	0	0	5.57E-31
62	Vicia faba L.	0	0	0	0	1	0	5.57E-31
63	Vicia sativa L.	0	0	0	0	1	0	5.57E-31
64	Vinca major L.	1	0	0	0	0	0	5.57E-31
65	Withania somnifera (L.) Dunal.	1	0	0	0	0	0	5.57E-31
66	Zea Mays L.	0	0	0	1	0	0	5.57E-31

	Total	**43**	**6**	**5**	**7**	**4**	**1**	**66**
	%age	**65.15**	**9.09**	**7.58**	**10.61**	**6.06**	**1.52**	**100.00**

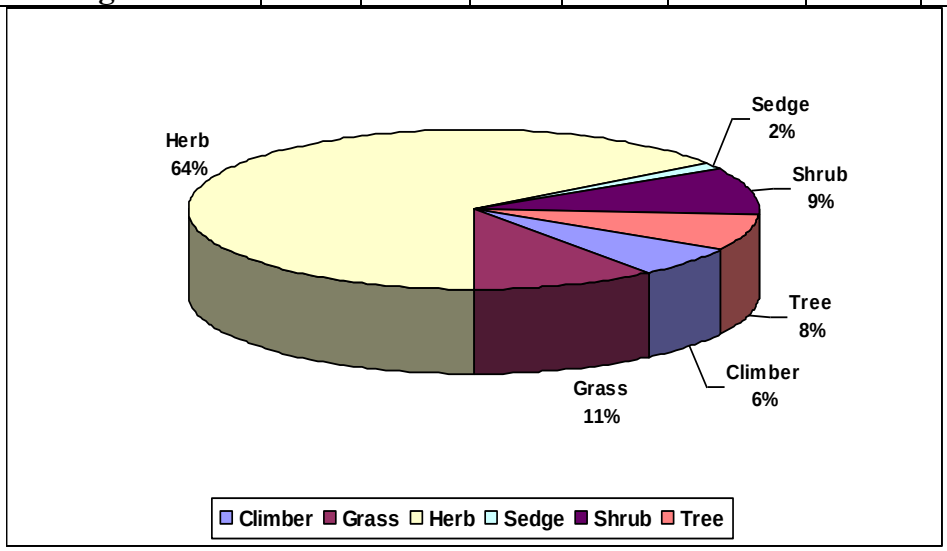

Figure 2: Shows the habit of ethnoflora of the study area. (n=66)

Furthermore, the one-way ANOVA Test was used to determine the significance of plant species. The P value was less than 0.05 which indicates that plant species have a positive relationship between habitat and medicinal properties. To determine the ecological relationship between different plant species after the One-Way ANOVA Test, Tukey's HSD was performed. This test was used to determine the relationship between the groups of the samples. If the Absolute Difference value is greater than the critical value then the plant species have a strong co-relationship between them and If the Absolute Difference value is less than the critical value then the plant species have a weak co-relationship between them as reported in Table 3. The results of the wild plant species in this area showed that they have a strong ecological relationship between different parameters and they support each other in the environment naturally.

Table 3: Ecological relationship between different wild plant species in the Thanda Paani, Islamabad

Tukey's HSD Test (STATISTICS)					
Comparisons between different parameters (In Columns)	**Absolute Difference**	**Critical Value**	**Result**	**One-Way ANOVA Test (P-value) P < 0.05**	**Ecological relationship**
Herb vs Shrub	0.013	> 0.003	Mean Significantly difference	5.57E-31	Strong relation
Shrub vs Tree	0.015	> 0.003	Mean Significantly difference	5.57E-31	Strong relation
Tree vs Grass	0.039	> 0.003	Mean Significantly difference	5.57E-31	Strong relation
Grass vs Climber	0.043	> 0.003	Mean Significantly difference	5.57E-31	Strong relation
Climber Vs Sedge	0.015	> 0.003	Mean Significantly difference	5.57E-31	Strong relation

Some of the pictures of wild plant species were also taken for their quick identification in this area as shown in Figure 3.

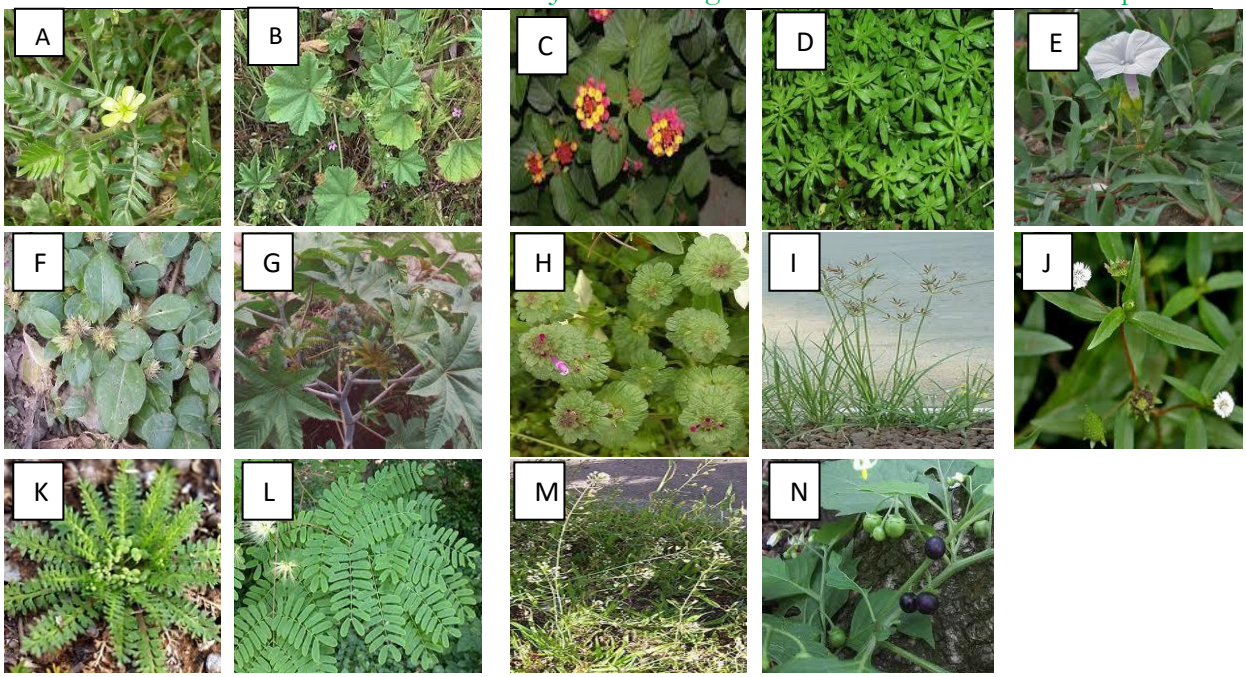

Figure 3: A few pictures of wild plant species for Identification in Thanda Paani, Islamabad. **A-** (Tribulus terrestis L), **B-** (Malva parviflora Wall.), **C-** (Lantana camara L.), **D-** (Galium aparine L.), **E-** (Convolvulus arvensis L.), **F-** (Alternanthera pungens Kunth.), **G-** (Ricinus communis L.), **H-** (Lamium amplexicaule), **I-** (Cyperus rotundus L.), **J-** (Eclipta alba L.), **K-** (Coronopus didymus L.), **L-** (Albizzia lebbek L.) , **M-** (Capsella bursa_pastoris L.) and **N-** (Solanum villosum L.).

Discussion:

Herbal medicine is largely based on traditional knowledge passed down through generations and uses local plants in the form of extracts, decoctions, and powders. In Thanda Pani, medicinal plants are used by people to manage various conditions. Plants were found to serve basic human needs: food, shelter, clothes, and medication. The current research is the maiden ethnobotanical study from Thanda Pani, reporting a total of 66 plant species from 59 families. The biodiversity of plant species in this area includes six types of flora, out of which 43 plant spp. Were herbs (65%), grasses (7 spp., 11%), shrubs (6 spp., 9%), trees (5 spp., 8%), climbers (4 spp., 6%), and sedge (1 spp., 2%). Furthermore, the One-Way ANOVA Test was used to determine the significance of plant species. The P value is 5.57E-31 which was less than 0.05 which indicates that plant species have a positive relationship between them. To determine the ecological relationship between different plant species performed by Tukey's HSD. This test was used to determine the relationship between the groups of the samples. The results of the wild plant species in this area showed that they have a strong correlation between them and they support each other in this environment naturally. Ethnobotanical uses of the plants are indispensable in several ways in the community. Ethnobotanical studies in Pakistan are extensive, with a total of 56 medicinal plants reported from the sub-Himalayan region [10][11][4]. Similar studies carried out in Pakistan at Bongaigaon and Buner reported medicinal uses of 65 species of plants and traditional remedies against 30 common diseases, respectively [12][13][1]. Other works conducted in Kahuta, Chakwal, Swat Valley, Marden, and Menshera Valley noted that plants form a source of treatment against various diseases and are of cultural importance [14].

Conclusion:

According to this survey, most people depended on agriculture for a living, and current services were deficient in the area. A few things directly affected the local flora, mainly the medicinal weeds. Both immediate conservation efforts and local public awareness campaigns are

urgently needed. Seminars and conferences are a couple of examples of these programs. The people of the area are ignorant about the importance of biodiversity and the conservation status of the area. They also show poor selection of fuel wood species. As a result, valuable indigenous flora is used as fuel wood species. Awareness programs at the grassroots level should be introduced in the area to solve the problems. Future research should focus on using and conserving indigenous weed flora to preserve traditional knowledge and promote sustainable use of these medicinal plants.

Acknowledgement:

We are thankful to the participants of the study area for their cooperation.

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