

AN ETHNOMEDICINAL STUDY OF SOME WILD PLANTS GROWING NEAR MANGLA LAKE, DISTRICT MIRPUR, AJK

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ABSTRACT

An Ethnomedicinal survey (EM) of Mangla Lake and its adjoining areas, District Mirpur was conducted during the period of spring and summer, 2021. The purpose of survey was to investigate the significant uses of wild medicinal plants in the study area and explore its conservation perspectives. The emphasis was laid down collection of ethnomedicinal information bank (EMI) on the wild medicinal plants of this study area. A number of visits were made to collect the data on different trees and herbs. During study different plants species including herbs, shrubs and trees were recorded, belonging to different families. A whole number of 50 informants were interviewed by making a questionnaire to know the ethnomedicinal use of wild plants by common people in their daily life. Entire number of 70 plant species belongs to 40 different families were recorded and gathered plants preserved in form of herbarium. The plants with appropriate nomenclature were alphabetically sequenced by botanical name, family name, vernacular name, and ethno medicinal uses. For data validation different statistical tools were used including Informant Consensus Factor (ICF), Data Matrix Ranking (DMR), Fidelity level (FL), and Priority Ranking (PR). The result of collected data indicated that most frequently used part of plants are leaves. Maximum value of ICF was calculated for diarrhoea (0.75) and minimum value of ICF was calculated for Cardiac disorders (0.50). Significant FL was found to be 79% of *Azadirachta indica* whereas *Solanum nigrum* has minimum FL, i.e. 15%. While DMR showed that *Ziziphus mauritiana* was ranked first due to its multiple uses. Fuel, wood, Fodder and Agricultural expansion were among leading hazard to the diversity of the study area due to man-made activities. It has been also found that the study area has been blessed with huge range of biodiversity but with increase in human settling in the area, flora of the area is in danger and needs comprehensive efforts to protect.

INTRODUCTION

Plants has been playing a significant role in human's life, because the relationship of human being and plants is too old. Man has been totally depends on plants for his basic needs and requirements. In various areas of the world especially in rural areas, majority of the people used wild medicinal plants to use and eliminate different diseases and pandemic (Ishtiaq and Khan, 2008). Approximately 80 percent populations of the Current countries totally depends upon traditional ethno medicines (TEMs) or herbal medicines for treatment of various diseases. Ethno medicine deals with the study of the cultural analysis of infections, disease and health, recovery and outdated health maintenance (Ajaib *et al.*, 2021). Ethno medicine mean comparative study of different people, cultural treatment, method, medical belief and practice of indigenous culture (Ishtiaq *et al.*, 2021). The ethno botanical study of flora of a particular region remains incomplete till the time demographic feature, cultural of the people, their life styles, traditional use of plants in their day to day life is not studied. Weather of the region in focus for study is also important to know growth of plants, shrubs, and weeds in particular season. Plants play a vital role in functioning of environment, stabilizing of soil, photosynthesis, nutrients recycling and in protecting water drainage areas (Ajaib *et al.*, 2015). The indigenous plants of Azad Kashmir, especially of remote areas have been a foundation of food, shelter, forage for livestock and medicinal uses. Sharing of collected information about the efficient use ethno medicinal potential of plants is almost important. Due to lack of knowledge, especially in young generation, flora of area is shrinking (Harshberger, 1895). The use of plants for medicinal purpose is on decline because of availability of allopathic medicine and doctors, however few families associates with keeping cattle still use of local plants for treatment of themselves and their animals. All section of community utilizes medicinal plants either as tribe recipes of various indigenous schemes and economically the unable part of community gathered these plants for different commercial uses such as for earning livelihood (Mahmood *et al.*, 2011).

About six thousand species of ornamental plants have been described from both Pakistan and Kashmir and 2000 species out of them have medicinal value but very little portion is utilized on commercial scale. Many allopathic drugs have been extracted from wild plants and about 80% population of Pakistan depends on wild plants for the extracted medicine but due to lack of introduction these species are restricted to a particular area. The people use local plants for diverse purposes including treatment of various ailments, like headache, stomach

disorders, wounds from old times and this treasure of information has been shifted to next generation. And now in addition to certification of this information the conservation practices for these medicinal plants must be practiced to prevent their unending loss (Shinwari *et al.*, 2011). Ethno medicine play important role about custom and culture of different traditional groups. As these herbal products are cheap, effective and have no side effects that’s why importance of medicinal practices and its demand is increase at local and international level (Hussain *et al.*, 2018). Almost all over the world, for livelihood of poor communities medicinal plants are important About 258,655 species of maximum wild plants are present. Out of 258,655 approximately 10 percent are important for diseases. In 2002, 62 billion dollars and this value may reach up to 5 trillion dollars by 2050 (Farooq *et al.*, 2019).

Study Area

Azad Jammu and Kashmir is surrounded by plethora variety of wild medicinal plants, that is for different sorts of medicinal fields. The territory lies 73-77-degree E and latitude 33-36-degree C. As different altitude variations, vegetation, ecological zones, geographical conditions and wealth is not homogenous. The natural vegetations of investigated areas *Acacia neliotica*, *Carissa opaca*, *Cynodon dactylonsteud*, *Malvestrum coromandelium*, *Oxalis corniculata*, *Dalbergia sisso*, *Vachellia arabica*, *Fumaria indica* etc.

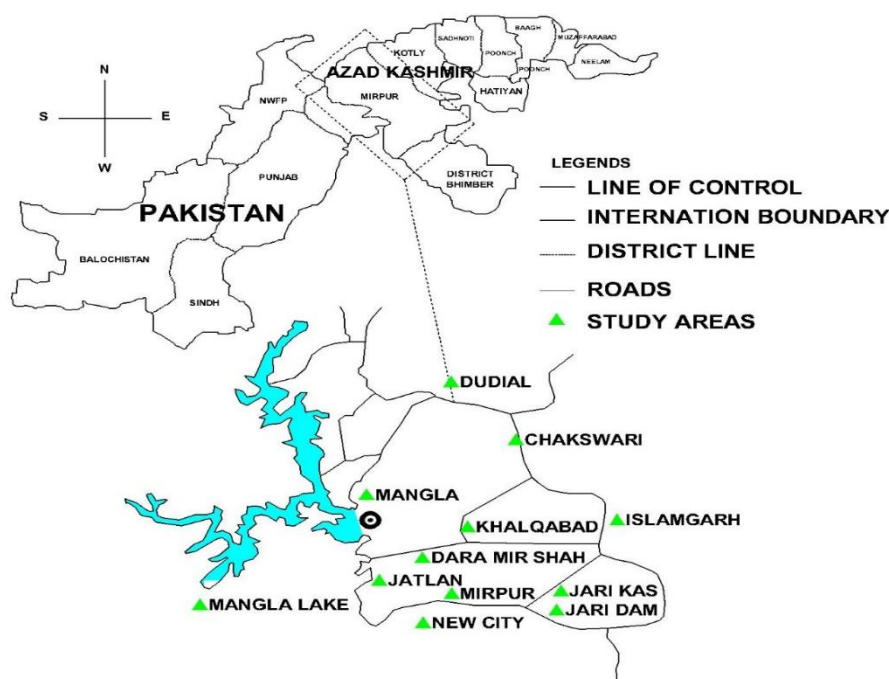


Fig. 1: Map of Study area Mangla lake Mirpur AK

MATERIALS AND METHODS

Area survey and plant collection

Ethno medicinal study was conducted during year 2020-2021 in Mangla Tehsil Mirpur, District Mirpur. Several visits were made in study area in various seasons round the year. The area is rich in different sort of vegetation. It has Trees, Shrubs, Herbs, Weeds and grasses etc. During survey of area under study a number of interviews were conducted to gather and evidence the ethno medicinal data of local people and use of plants.

Data collection and identification of plants

Plant specimen were collected from area of Mangla and data was recorded in a notebook. Information include plant local name, its usefulness in daily life, medicinal properties, use as forage, fuel, thatching, diseases control, other uses etc. Information was collected from local elder women and men of the area, shepherds, farmers, landholders, local pansaaris, hakeems, fuel wood sellers, local literate people by questionnaire. Main source of information were elder peoples, hakeems and livestock holders. While young generation possess very minute knowledge about plant uses. All the plants were submitted in Herbarium (MUH-), Department of botany, Mirpur University of Science and Technology (MUST), Bhimber campus.

Analysis of data

The data was analysed by using various statically tools and authentication data was rechecked by calculating fidelity level (FI), informant consensus factor (ICF), priority ranking (PR), and data matrix ranking (DMR) as also discussed by Maqbool *et al.* (2019).

Fidelity level (FL)

The fidelity level (FL), the percentage of informants claiming the use of a certain plant for the same major purpose was calculated for the most frequently reported usages or ailments as:

$$FL (\%) = N_p/N * 100 \text{ (Eq. 1)}$$

where N_p is the number of informants that claim a use of a plant species used for a particular purpose/disease and N is the number of informants that use the plants as a botanic/medicine to fill/treat any given demand/disease (Alexiades, 1996).

Informant consensus factor (ICF)

Informant consensus factor (ICF) was calculated for each category of ailments to identify the agreements of the informants on the reported ailments for the group of ICF was calculated as follows: number of use citations in each category (n_{ur}) minus the number of species used (n_t), divided by the number of use citations in each category minus one (Heinrich *et al.*, 1998).

$$ICF = \frac{n_{ur} - n_t}{n_{ur} - 1} \quad (\text{Eq. 2})$$

Data matrix ranking (DMR)

It is used to describe different uses of plants for many different purposes by residents of the study area which puts a biotic pressure on plant. The data was arranged in tabular form along with percentage of every use form ailment.

Priority Ranking (PR)

The priority Ranking describes the threat factors which effects flora of an area as told by residents of that area. PR shows which parameter is most destructive due to anthropogenic activities and it also help in calculation of conservation status of many plant species in study area.

RESULTS

Ethno botany deals with study of plants of a region as well as practical use of plant by traditional knowledge of local culture and inhabitants of that region. It is most importance as it gives basic knowledge on plants biodiversity, cultural diversity and the traditional medicinal knowledge of a particular area.

Demographic Characters of Participants

A whole of 50 informants including 30 mans and 20 women were questioned and depend on age, the informants were divided into six age groups 26-35 (11.42%), 36- 45 (18.57%), 46-55 (25.17%), 56-65 (27.41%), 66-75(11.42%), and 76-85(5.71%). Among

participants there were 20 farmers, 19 housewives, 8 shopkeepers, 5 healers, 4 teachers and 9 others. Regarding education 40% of people were illiterate, 14.28% were those who had attended primary, 14.28% middle school, 15.71% had secondary level of education, 15.71% were undergraduate, 5.71% were graduated and only 2.85% had attended university. (Table. 1)

Table 1: Showing demographic feature of informants, Parameters, Demographic categories, Informants No. and Percentage.

Parameters	Demographic categories	Informants No.	Percentage
Gender	Man	30	60%
	Women	20	40%
Age	26_35	8	11.42%
	36_45	13	18.57%
	46_55	18	25.71%
	56_65	19	27.14%
	66_75	8	11.42%
	76_85	4	5.71%
Qualification	Illiterate	28	40%
	Primary	10	14.28%
	Middle	11	15.71%
	Secondary	11	15.71%
	Undergraduate	4	5.71%
	Graduate	4	5.71%
	Masters	2	2.85%
Occupation	Farmers	20	30.76%
	Housewives	19	29.23%
	Shopkeepers	8	12.30%
	Teachers	4	6.15%
	Healers	5	7.69%
	Others	9	13.84%

Demonstration of Plants with Family wise Percentage contribution

The Ethno botanical data of wild plants collected from study area Mangla, Tehsil Mirpur, District Mirpur was documented which contained Voucher numbers, Botanical and Vernacular names, Family names, Habit, Season of collection, Habitat and traditional ethno botanical uses (Table.4). Total number of 70 plant species belonging to 40 families were

collected, pressed, dried and mounted on herbarium sheets. These were preserved later on, in herbarium of Mirpur University of science and technology MUST, Bhimber campus. Data of collected wild plants along collected plants with their family was arranged in tabular form and it was found that belonged to different families among which family Compositae having 10 plant specimen (12.5%) followed by Poaceae with 9 plants (11.25%), Amaranthaceae, Euphorbiaceae, Malvaceae and Lamiaceae with 5 plants each (6.25%) While number of plants belonging to Apocynaceae, Convolvulaceae, Solanaceae, Boraginaceae, Moraceae, Papaveraceae, Polygonaceae, Plantaginaceae contained 2(2.5%) plants each. Rest of all families including Acanthaceae, Celastraceae, Cannabaceae, Commelinaceae, Geraniaceae, Meliaceae, Oxalidaceae, Phrymaceae, Portulacaceae, Primulaceae, Meliaceae, Rubiaceae, Ranunculaceae, Sapindaceae, Zygophyllaceae, Cyperaceae and Xanthorrhoeaceae contain 1 (1.25%) plants each.

Table 2: Showing family wise contribution of plants, Name of Family No. of Species, Percentage.

Sr.no	Names of family	No of species	Percentage
1.	Amaranthaceae	5	6.25%
2.	Apicyanaceae	3	3.75%
3.	Acanthaceae	1	1.25%
4.	Brassicaceae	3	3.75%
5.	Boraginaceae	2	2.5%
6.	Commelinaceae	1	1.25%
7.	Compositae	10	12.5%
8.	Convolvulaceae	3	3.75%
9.	Caryophyllaceae	2	2.5%
10.	Cannabaceae	1	1.25%
11.	Cyperaceae	1	1.25%
12.	Euphorbiaceae	5	6.25%
13.	Geraniaceae	1	1.25%
14.	Lamiaceae	5	6.25%
15.	Martyniaceae	1	1.25%
16.	Moraceae	2	2.5%
18.	Meliaceae	1	1.25%
19.	Nyctaginaceae	1	1.25%
20.	Oxalidaceae	1	1.25%
21.	Papaveraceae	2	2.5%
22.	Poaceae	9	11.25%
23.	Phrymaceae	1	1.25%

24.	Polygonaceae	2	2.5%
25.	Portulacaceae	1	1.25%
26.	Plantaginaceae	2	2.5%
27.	Primulaceae	1	1.25%
28.	Rubiaceae	1	1.25%
29.	Ranunculaceae	1	1.25%
30.	Rhamnaceae	1	1.25%
31.	Solanaceae	3	3.75%
32.	Sapindaceae	1	1.25%
33.	Xanthorrhoeaceae	1	1.25%
34.	Zygophyllaceae	1	1.25%

Different usage of plants

Plants collected from study area had numerous traditional uses. These were used for different purpose like Medicines (76.92%), Paste (18.26%), Powder (60.57%), and Decoction (9.61%) and for other uses (11.53%) (Table. 3)

Table 3: Showing multiple purposes of plants collected from Mangla.

Sr. no.	Plant used for:	No of spp.	Percentage
1.	Medicines	80	76.92%
2.	Powder	63	60.57%
3.	Paste	19	18.26%
4.	Decoction	10	9.61%
5.	Other uses	12	11.53%

Percentage of parts used

Different parts of plant such as leaves, roots, stem, flowers, fruits are used for various purposes as mentioned below with leaves being most frequently used about (35.57%), stem is used about (26.92%), roots are used about (12.5%), fruit (10.57%), seeds about (8.65%) and flowers contributes about (5.76%). These parts are utilized in various forms for making medicines like powder, roasted form, tea, decoction, infusion, paste etc.

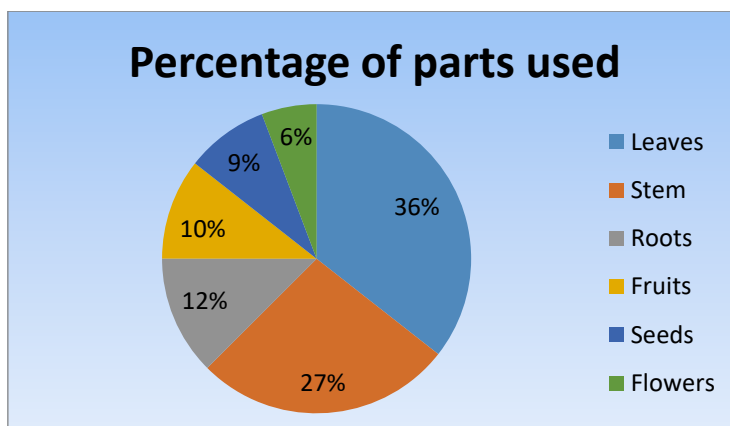


Fig. 2: Pie chart showing percentage contribution of different parts of wild plants for different purposes.

Habitat of plants

Out of collected plant species maximum plants belong to category of herbs (62.5%), following trees (15.38%), shrubs (11.53), grasses (8.65%) and climbers make (1.92%).(Fig. 3)

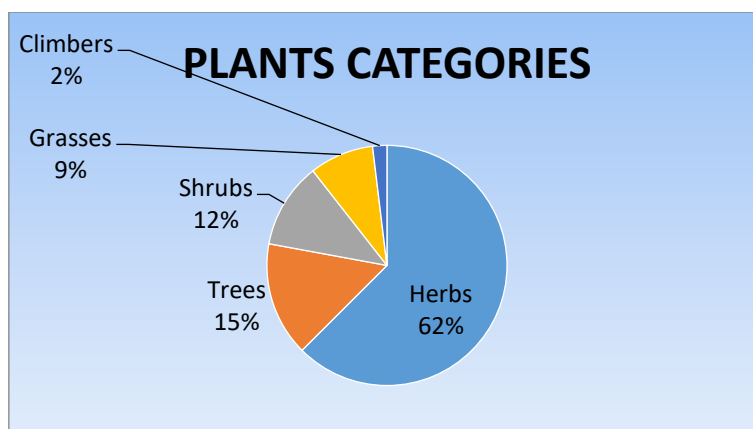


Fig. 3: Pie chart showing habit of collected plant species from study area

Table 4: Detailed Ethnomedicinal uses of wild plants of Mangla lake area District Mirpur AJK. Botanical name/Herbarium Voucher No., Family, Local name, Habit, Part used, Ethnomedicinal uses of wild plants

Sr. No	Botanical name/Herbarium Voucher No	Family	Local name	Habit	Part used	Ethnomedicinal uses of wild plants
1.	<i>Anagallis arvensis</i> L. MUH-973	Primulaceae	Neeli booti	Herb	Entire plant	It is used as fodder for animals.
2.	<i>Acacia nilotica</i> (L.) Delile MUH-974	Mimosaceae	Kiker	Tree	Whole parts	Toothache, kidney pains, furniture and fuels.
3.	<i>Achyranthes aspera</i> L. MUH-975	Amaranthaceae	Puth kand	Herb	Whole plant	Cough, snake bites and fodder.
4.	<i>Albizia lebeck</i> (L.) Benth. MUH-976	Mimosaceae	Saree	Tree and	Leaves, seeds and wood	Diabetes and blood purification. Bark used for diarrhoea. Wood used as fuel.
5.	<i>Argemone mexicana</i> L. MUH-977.	Papaveraceae	Kandiara	Herb	Leaves seeds	It is narcotic. Leaves cause skin irritation and seed used for blood purifies.
6.	<i>Alternanthera sessilis</i> (L.) R.Br. ex DC. MUH-978	Amaranthaceae	Kanda booti	Herb	Entire plant	Eye disorder, fodder.
7.	<i>Brachiaria reptans</i> (L.) MUH-979	Poaceae	Sairr ghas	Grass	Entire plant	Fodder for cattle.

8.	<i>Buteamonosperma</i> (Lam.) Taub. MUH-980	Papilionaceae	Chichra	Tree	Leaves, wood and flowers	Treat urinary disorder of animals. Flowers used as dyes and medicines. Wood used for fuels.
9.	<i>Cannabissativa</i> L. MUH-981	Cannabaceae	Bhang	Herb	Entire plant	It is narcotic scatters thoughts. Decoction of leaves is effective for diabetes and asthma.
10.	<i>Cyperusiria</i> L. MUH-982	Cyperaceae	Dila ghas	Grass	Entire plant	Wounds, asthma and allergy, Animals fodder.
11.	<i>Carthamus oxyacantha</i> M. Bieb. MUH-983	Compositae	Kandiari	Herb	Whole plant	Blood purification and fodder.
12.	<i>Cynodondactylon</i> (L.) Pers. MUH-984	Poaceae	Khabal ghas	Grass	Entire plant	Animals fodder, and treat piles.
13.	<i>Carissa spinarum</i> L. MUH-985	Apocyanaceae	Granda	Tree	Whole plant	Fruit is edible and good source of iron and remove deficiency of iron and blood. Used as fuels.
14.	<i>Chenopodium album</i> L. MUH-986	Amaranthaceae	Bathu	Herb	Leaves, stem	Leaves are antibacterial. It is edible herb and consumed which is laxative and animal fodders.
15.	<i>Calotropis procer</i> (Aiton) Dryand. MUH-987	Apocyanaceae	Desi Ak	Shrub	Leaves and fruit	Leaves and fruit are given to buffaloes to treat infection. Its latest used to cure asthma and ringworm.
16.	<i>Cuscutareflexa</i> Roxb. MUH-988	Convolvulaceae	Neeli dhari	Climber	Entire plant	It is eaten by goats. It is used to cure mental problems.
17.	<i>Cirsiumarvensis</i> (L.) Scop.	Compositae	Kandiyaa ra	Herb	Entire herb	Flower used as toothache. A paste

	MUH-989.					of whole plant used as skin boils, blisters.
18.	<i>Capsellabursa_patoris</i> (L.) Medik. MUH-989	Brassicaceae	Bun paincha	Herb	Entire plant	It is also effective for urinary disorders. Collected as animal fodders.
19.	<i>Commelina benghalensis</i> L. MUH-990	Commelinaceae	Churkara	Herb	Entire plant	Whole plant used as animal fodder. Leaves of plants are laxative.
20	<i>Dalbergia sisso</i> DC. MUH-991	Papilionaceae	Taali	Tree	Leaves and wood	Fresh leaves soaked in water are utilized as coolant. Wood used as furniture and firewood.
21.	<i>Dodonaea viscosa</i> (L.) Jacq. MUH-992	Sapindaceae	Snatha	Shrub	Whole plant	Blood purifies, making swab for cleaning and wood used for fuel.
22.	<i>Datura innoxia</i> Mill. MUH-993	Solanaceae	Datura	Herb	Leaves , seeds and fruit	Seed and fruits used in treating pneumonia in buffaloes. Seeds used as kidney disorders.
23.	<i>Euphorbia helioscopia</i> L. MUH-994	Euphorbiaceae	Dodak	Herb	Entire plants	Seeds used for discoloration and grazed by cattle.
24.	<i>Euphorbia hirta</i> L. MUH-995	Euphorbiaceae	Dudhal	Herb	Entire plant	Paste of whole herb used as ringworm. Animal fodder.
25.	<i>Euphorbia prostrata</i> Aiton MUH-996	Euphorbiaceae	Daddar booti	Herb	Entire plant	Milk of plant used as skin diseases. It is used against blood pressure and blood purifies.
26.	<i>Ficus palmata</i> Forssk. MUH-997	Moraceae	Pakwar	Tree	Fruit and wood	Fruit is edible, nutrients for body and strengthens to nervous system. Wood used as fuel.
27.	<i>Fumaria indica</i> (Hausskn.) Pugsl. MUH-998	Papaveraceae	Papra	Herb	Whole plant	Blood purification, and remove blood swelters. It is used as animal fodder.

28.	<i>Grewia optiva</i> J.R. Drumm. ex Burret MUH-999	Malvaceae	Dhamman	Tree	Leaves and wood	Joints pains, fodder, agricultural tool, ropes and fuels.
29.	<i>Geranium rotundifolium</i> L. MUH-991	Geraniaceae	Jandorunu	Herb	Whole plant	Urinary disorders, and used as fresh animal fodder.
30.	<i>Galium asparine</i> L. MUH-992	Rubiaceae	Booti	Herb	Whole plant	Paste of entire plant used as skin diseases. It is used as fodder.
31.	<i>Gymnosporiaroyl eana</i> Wall.ex MUH-993	Celastraceae	Pataki	Tree	Entire plant	Its leaves are aphrodisiac and palatable for goats.
32.	<i>Heteropogoncont ortus</i> (L.) P. Beauv. Ex Roem. & Shchult. MUH-994	Poaceae	Sariyala ghas	Grass	Entire plant	Roots of plant are diuretic and used as animal fodder. Wood use as fuel.
33.	<i>Imperata cylindrica</i> (L.) Raeushch MUH-994	Poaceae	Baroon ghas	Grass	Entire plant	Used for thatching purpose.
34.	<i>Ipomoea carnea</i> Jacq. MUH-995	Convolvulaceae	Vilyati Ak	Shrub	Entire plant	Prevent soil erosion and it is used for fencing around plants.
35.	<i>Justicia adhatod</i> L. MUH-996	Acanthaceae	Baiker	Shrub	Entire plant	Paste used to cure fever, diabetes, hypertension and cough. It is good for digestion and blood purification.
36.	<i>Lathyrus latifolius</i> L. MUH-997	Leguminosae	Jangli phalli	Shrub	Entire plant	Animal fodder.
37.	<i>Leucaena leucocephala</i> (La m.) de Wit MUH-998	Mimosaceae	Kareen	Tree	Leaves and seeds	Paste used as stomach disorders and leaves used as fodder.
38.	<i>Lathyrus asphaca</i> L. MUH-999	Papilionaceae	Jangli mater	Herb	Entire plant	Seeds are edible and fresh leaves used as animals fodders.
39.	<i>Lepidium didymum</i> L. MUH-1000.	Brassicaceae	Jangli haliyon	Herb	Entire plant	Powder of whole plant used as insect repellent. Leave use as fodder.

38.	<i>Medicago polymorpha</i> L. MUH-1001	Papilionaceae	Sariria	Herb	Entire herb	Decoction useful for stomach disorders. Leave are eaten as vegetables.
39.	<i>Portulaca oleracea</i> L. MUH-1002	Malvaceae	Hatami Khubazi	Herb	Whole plant	Whole plant used as fodder.
40.	<i>Malva parviflora</i> L. MUH-1003	Malvaceae	Sonchal	Herb	Leaves and stem	Used as body pain and fever. Soft leaves use as vegetables.
41	<i>Melilotus indicus</i> (L.) AII MUH-1004	Papilionaceae	Sareeri	Herb	Entire plant	Extract of whole plant is nutrimental for stomach and leaves use for animal fodder.
42.	<i>Medicago minantha</i> (C.A.M ey.) Trauty MUH-1005	Papilionaceae	Jangli methi	Herb	Entire herb	Herb collected for animal foddors.
43.	<i>Oxalis corniculata</i> L. MUH-1006	Oxalidaceae	Khati meti	Herb	Whole plant	Used as fodder.
44.	<i>Polypogon monspeliensis</i> (L.) Desf. MUH-1007	Poaceae	Sitti_ghas	Grass	Whole plant	Powder used in treatment of cardiovascular diseases. Also used as fodder.
45.	<i>Poa annua</i> L. MUH-1008	Poaceae	Phul_ghas	Grass	Entire plant	Used as fresh fodder for animals.
46	<i>Parthenium hysterophorus</i> L. MUH-1009.	Compositae	Allergy booti	Herb	Entire plant	It is harmful herb and source of allergic problems in humans and animals. It cause swelling when touch in body.
47.	<i>Polygonum plebeium</i> R.Br. MUH-1010	Polygonaceae	Knotweed	Herb	Whole plant	Fodder for cattle.
48.	<i>Panicum antidotale</i> Retz. MUH-1011	Poaceae	Gyrum	Grass	Entire plant	It is used as fodder purpose.
49.	<i>Portulaca oleracea</i> L. MUH-1012	Portulacaceae	Chota kulfa	Herb	Entire plant	Used for fieriness, nervousness and anxiety.

50.	<i>Physalis minima</i> MUH-1013	Solanaceae	Qawakonin	Herb	Leaves	Paste of leaves mixed with pepper and used for piles.
51.	<i>Ricinus communis</i> L. MUH-1014	Euphorbiaceae	Harnoli	Shrub	Leaves and seeds	Leaf paste used as inflammation and muscular pain, joints and abdominal pains.
52.	<i>Ranunculus muricatus</i> L. MUH-1015	Rannunculaceae	Gandoli	Herb	Whole plant	Treat fever and asthma. It is fatal for animals.
53.	<i>Rumex dentatus</i> L. MUH-1016	Polygonaceae	Jangli palak	Herb	Entire plant	Entire plant used as fodder.
54.	<i>Silene conoidea</i> L. MUH-1017	Caryophyllaceae	Dabri	Herb	Entire plant	Entire plant used as fodder. Fresh leaves cooked as vegetables.
55.	<i>Solanum nigrum</i> L. MUH-1018	Solanaceae	Kach mach	Herb	Leaves and fruit	Diarrhoea, liver disorder, liver weakness and stomach swelling.
56.	<i>Stellaria media</i> (L.) Vill. MUH-1019	Caryophyllaceae	Chachunba	Herb	Entire herb	Livers disorders and used as animal fodder.
57.	<i>Saccharum bengalense</i> Retz. MUH-1020	Poaceae	Saroot	Shrub	Entire plant	Fresh leaves use as animal forage. Stem and leaves harvested and dried to make brooms.
58.	<i>Sisymbrium irio</i> L. MUH-1021	Brassicaceae	Khub_kalan	Herb	Entire herb	Fever, cough, and cold. Whole herb treats asthma, digestion and blood purifies.
59.	<i>Senegalia modesta</i> (Wall.) P.J.H. Hurter MUH-1022	Mimosaceae	Phulai	Tree	Wood and leaves	Paste used for skin ailments and fodder.
60.	<i>Solanum surattense</i> Burm. f. MUH-1023.	Solanaceae	Mokri	Herb	Whole plant	Fresh leaves used as animal fodder.
61.	<i>Sonchus asper</i> (L.) Hill MUH-1024.	Compositae	Dandelion	Herb	Whole plant	Leaf used as skin ailments and animal fodder.
62.	<i>Tephrosia purpurea</i> (L.) Pers.	Papilionaceae	Sarmakh	Herb	Whole plant	Fuels, cleaning teeth and animals forages.

	MUH-1025					
63.	<i>Taraxacum officinale</i> (L.) Weber ex F.H. Wigg. MUH-1026	Compositae	Hund	Herb	Whole plant	Skin disorders and cattle forage.
64.	<i>Trichodesma indicum</i> (L.) Lehm. MUH-1027	Boraginaceae	Andhahawi	Herb	Whole plant	Fever, joints pain and inflammation.
65.	<i>Tribulus terrestris</i> L. MUH-1028.	Zygophyllaceae	Pakhra	Herb	Whole plant	Powder mixed with guru is effective for backache. It is useful for the bladder diseases.
66.	<i>Veronica polita</i> Fr. MUH-1029	Plantaginaceae	Choti sariri	Herb	Whole plant	Grazed by cattle.
67.	<i>Vicia sativa</i> L. MUH-1030	Leguminaceae	Common vetch	Herb	Whole plant	Collected from animal forages.
68.	<i>Vitex negundo</i> L. MUH-1031	Lamiaceae	Banna	Shrub	Whole plant	Reduce pain and swellings, useful for toothache, indigestion and blood purifies.
69.	<i>Veronica anagallis</i> L. MUH-1032	Plantaginaceae	Water speedwell	Herb	Whole plant	Grazed by animals.
70.	<i>Ziziphus mauritiana</i> Lam. MUH-1033	Rhamnaceae	Jand	Tree	Whole plant	Fruit is edible and leaves serve as fodder and braches used as fuel.

Calculation of Informants Consensus Factors (ICF)

Informant consensus factor (ICF) is calculated in order to describe frequent use of herb to cure a specific ailments. It gives an indication that how many people agree to use various species of plants for the cure of specific disorder. In my study, the maximum value were calculated for Diarrhea (0.75), then Fever (0.69), and Cough (0.63). Lowest value of ICF was calculated for Headache (0.1) which indicates that it is minimum diseases in study area. (Table 5)

Table 5: Informant Consensus Factor (ICF), Category, Species (nt), %age, Use Citation(nur), %age Use citation, ICF Nur= nt/nur-1

Sr. No.	Category	Species (nt)	All species %	Use citation (nur)	%use Citation	I.C.F Nur-nt/nur-1
1.	Arthritis	3	2.38%	6	3.94%	0.6
2	Dirrhoea	2	1.58%	5	3.28%	0.75
3.	Diabetes	5	3.96%	8	5.26%	0.42
4.	Constipation	11	8.73%	12	7.89%	0.09
5.	Fever	5	3.96%	14	9.21%	0.69
6.	Blood pressure	2	1.58%	6	3.94%	0.8
7.	Urinary disorder	4	3.17%	6	3.94%	0.4
8.	Sore throat	1	0.79%	2	1.31%	0.1
9.	Flue	6	4.76%	11	7.23%	0.5
10.	Vomiting	4	3.17%	5	3.28%	0.25
11.	Baldness	5	3.96%	6	3.94%	0.2
12.	Obesity	3	2.38%	3	1.97%	0
13.	Stomach problem	15	11.90%	7	4.60%	-1.3
14.	Epilepsy	2	1.58%	5	3.28%	0.75
15.	Skin infections	10	7.93%	6	3.94%	-0.8
16.	Jaundice	4	3.17%	11	7.23%	0.7
17.	Heart diseases	5	3.96%	8	5.26%	0.42
18.	Headache	3	2.38%	2	1.31%	0.1
19.	Gastric problem	6	4.76%	4	2.63%	0.6
20.	Joints pain	11	8.73%	1	0.65%	0

21.	Cough	5	3.96%	12	7.89%	0.63
22.	Migraines	3	2.38%	4	2.63%	0.3
23.	Eye irritation	2	1.58%	3	1.97%	0.5
24.	Ulcer	4	3.17%	2	1.31%	2
25.	Wounds	5	3.96%	3	1.97%	0.1

Fidelity Level Calculation

The fidelity level (FL) reports percentage of respondents who told use of plants to cure a certain. The collected plants were used by local people in different forms to cure different diseases. Fidelity level describe how people use any plant to cure specific diseases. The data analysis showed that the highest fidelity level was *Justicia adhotoda* (79%), and *solanum nigrum* lowest fidelity level of (15%) (Table. 6).

Table 6: Fidelity Level (FL), Species, Local Name, Therapeutic, F.L% value of plant species from study area Mangla lake District Mirpur, AJ&K.

S/N	Species	Local name	Therapeutic	F.L%
1.	<i>Datura alba</i>	Dhatura	Asthma, Cholera, Arthritis	16%
2.	<i>Ricinus communis</i>	Harnoli	Hair growth, Toothache, Pneumonia Cough	11%
3.	<i>Tribulus terrestris</i>	Pakhra	Epilepsy, Hair growth Migraines	10%
4.	<i>Justicia adhotoda</i>	Baker	Sore-throat, Obesity Flu, Fever	79%
5.	<i>Taraxacum officinale</i>	Dandelion	Constipation, Skin irritation, Eye irritation	12%
6.	<i>Spinacea oleraceae</i>	Palak	Fever, Stomach Problem, Jaundice	11%
7.	<i>Melia azadarch</i>	Daraik	Diabetes, Jaundice, Wounds, Pimples, Inflammation.	6%
8.	<i>Vachellia arabica</i>	Palai	B.P, Cholesterol Asthma, Heart problem.	12%
9.	<i>Calotropis procera</i>	Ak	Cholera, Heart attack	6%
10.	<i>Solanum nigrum</i>	Kach mach	Paralysis, Diabetes Jaundice	15%

DATA MATRIX RANKING (DMR) CALCULATION

Data matrix ranking (DMR) is used to measure popularity of plant species in local community, its multiple usage, biotic pressure on it and conservation level and it also measure usage pressure on a plant species which are being exploited for numerous purpose in daily life of local people. According to the calculation *Ziziphus mauritiana* has highest DMR value it is ranked first while *Acacia neliotica* is ranked second, and *carica opaccumis* lowest. (Table 7)

Table 7: Data Matrix Ranking (DMR) of ethnomedicinal Plants with different uses other than medicinal value (total score of 10 informants) in the study area Mangla Lake.

S/N	Plant species	Fencing & hedging	Timber	Fuel	Fodder	Food	Furniture	Total	Rank
1.	<i>Ziziphus mauritiana</i>	08	18	13	2	10	16	67	1 st
2.	<i>Acacia neliotica</i>	14	14	12	10	12	3	65	2 nd
3.	<i>Azadirachta indica</i>	14	00	16	30	04	00	64	3 rd
4.	<i>Ficus palmata</i>	03	00	11	06	42	00	62	3 rd
5.	<i>Euclptus citricoda</i>	02	03	13	02	40	00	60	4 th
6.	<i>Dalbergia sisso</i>	00	08	08	04	42	03	55	5 th
7.	<i>Butea monosperema</i>	04	33	10	00	06	00	53	6 th
8.	<i>Albizzia lebbeck</i>	04	06	12	13	13	00	48	7 th
9.	<i>Melia azadarh</i>	00	00	10	3	42	00	55	8 th
10.	<i>Carica. opaccum</i>	04	06	12	13	13	00	48	9 th

Priority Ranking (PR)

The Priority Ranking (PR) of data collected from study area Mangla District Mirpur, AJ&K was determined. Priority Ranking illustrate which parameter is must destructive for plants of area as declared by respondents of that area. For calculation of PR the threats were categorized into 6 ranks. PR data shows the anthropogenic threat Fuel wood is at first number, Medicinal uses at ranked second, Urbanization with third rank. Construction is given Rank 6. The local people used tress for construction of cottages for livestock earlier, but nowadays it has become less common in study area and now they mostly depend on wood for burning as fuel. Amongst the studied threating factors Hedging & Thatching has least threat & causes little impact on flora of area. (Table 8)

Table 8: Priority Ranking of factors perceived as threats to medicinal plants based on their level of destructive effects in the study area, Mangla Azad Kashmir (destructive threat order is 6<5<4<3<2<1; where 1st value is most destructive one).

S/N	Threat factors	Respondents R1, R2 ,R3, R4, R5	Total	Percentage	Rank
1.	Grazing	7, 5, 6, 6, 4, 5	33	16.01	1 st
2.	Firewood	5, 4, 5, 3, 5, 3	25	12.13	5 th
3.	Hedging & Thatching	6, 4, 5, 6, 4, 4	29	14.07	3 rd
4.	Urbanization	5, 5, 4, 4, 5, 3	26	12.62	4 th
5.	Medicinal uses	4, 3, 4, 2, 2, 3	18	8.73	6 th
6.	Construction	6, 7, 4, 3, 3, 5	28	13.59	2 nd

DISCUSSION

The study area Mangla Mirpur Azad Kashmir is rich in biodiversity. Though the study was restricted only to a specific area, yet 70 plant species were recorded. The inhabitants of study area are generally poor and lack basic facilities of life so they depend on plants for the basic needs like food, fuel, and fodder for cattle, shelters, hedging and fencing, medicines and source of earnings in many ways. Local inhabitants are associated with cattle and livestock raising and farming.

Traditional knowledge is a treasure which offers valuable leads for scientific research to find elements from plants with pharmacological value that is intended for international markets and definitely, such traditional knowledge is very value able according to Laird and Kate, (2002). According to the World Health Organization (WHO) round about 80% of people in the world are dependent on traditional medicines for health care requirements. Ethno medicinal study is a current approach which studies natural resources management with involvement of residents of area and provide provision for conservation of cultural and traditional knowledge of local people.

Human beings have a great impact on local vegetation as they exploit local plants in many ways to meet their needs, such as illegal cutting of trees has become a common feature to meet the demands of firewood. Moreover, people also cut down wild trees and shrubs to expand the

cultivated land. In this area the most threatened tree is *Ziziphus mauritiana* also indicated in study of WNP. The graveyard is eventual harmless place for both human beings as well as plants because plants remain protected and undamaged in these areas and that's why now maximum plants occur just inside graveyards and inhabitants of study area possessed a great deal of information about that flora as compared to the exotic plants as also discussed by Meza and Villagran, (1991) in china.

During study it was revealed that old people are fully equipped with indigenous medicinal knowledge & traditional rituals were followed by them and definitely they seek someone to share their knowledge but presents generation is not giving any attention to preserve this knowledge. That's probably a big reasons that indigenous medicinal information is at risk of extinction according to Aumeeruddy and Shengji, (2003). It was found that medicinal potential of the flora is not known to local people, but restricted to only Hakeems, Pansaaries and traditional healers etc. They do not communicate their knowledge with local people to make optimum uses of medicinal plants. *Justicia adhatoda* is used to cure Fever, Cough, Joints pain and pneumonia. (Table.4). Similarly, flowers of *Butea monosperma* are used to cure urinary problems in cattle but local people have sketchy knowledge about plants and proper time of collection and forms a lowermost link in the trade of medicinally important plants as reported by Ajaib *et al.*, (2016) during the study of wild plants of Tehsil Jatlan Azad Jammu & Kashmir. It also indicated by Shinwari and Khan, (1998) during ethnobotanical studies in Pakistan.

The present findings are in accordance with earlier research studies of plants of Pakistan and Azad Kashmir. Medicinal herbs are important for development of drugs and health care but exploitation of local plants for making medicines is on increase by local folk gatherers and herbal drugs dealers with growing demand of medicinal industry which has caused a drastic decrease in medicinal flora. It was examined that leaves of *Justicia adhatoda* and flowers of *Butea monosperma* were collected in large quantities during their seasons and sold out to drugs dealers at very cheap price.

The study indicated that inhabitants of area used plants for more than one purpose as they are mostly depend on local vegetation for variety of daily needs. The multiple uses of recorded

plant species from Mangla Azad Kashmir is given in Table (4). Different wild plants were being used for medicinal purpose to cure different ailments as indicated by their fidelity level in table (5). Fidelity level describe how people use any plant to cure specific diseases. The data analysis showed that the highest fidelity level was *Azadirachta indica* (79%), and *solanum nigrum* lowest fidelity level of (15%). The ICF analysis of recorded data indicated that hardworking and simple lifestyle of people prevent them from suffering cardiovascular disorders as also discussed by Maqbool *et al.* (2019). While In my study, the highest value were calculated for Diarrhoea (0.75), then Fever (0.69), and Cough (0.63). Lowest value of ICF was calculated for cardiac disorders (0.25) which indicates that it is minimum diseases in study area. (Table. 5). These ailments were being treated by use of local flora.

The biotic pressure on flora could be assessed by Direct Ranking Matrix (DMR). The calculation for DMR indicated that there are many plants which were used in various forms by people to fulfil requirements of life. According to the calculation *Ziziphus mauritiana* has highest DMR value it is ranked first while *Acacia neliotica* is ranked second, and *Carica opaccum* is lowest. (Table 7). This multiple use of plants puts biotic pressure and also creates conservation threats for the plant of the area. The threat like Fuel wood & Fodder, clearing of land for agricultural purposes and human settlements puts severe biotic pressure on plants which must not be ignored also discussed by Maqbool *et al.*,(2019). Collective efforts are necessary for conservation of biodiversity of study area.

CONCLUSION

The study of Mangla area is quite significant one in a way that very less work has been carried out in these remote area of Tehsil Mirpur, District Mirpur. During the study, it was revealed that coming generation is getting away in preserving and exercising the optimum use of flora in this region. During survey it was found that these medicinally important as well as ethno botanically important plants are in danger due to deforestation, grazing, urbanization. So there is need to keep balance between them. In order to make the studies more beneficial, ethno medicinal knowledge especially wild potential of plants of particular area should be shared with locals and close coordination must be ensured. Indigenous knowledge is not properly being started. It is necessary to provide valuable information to next generation.

Suggestions

Applied system of plantation. They must control overgrazing. Protect the forest from fires that is mostly due to human activity man has become natural killer of plants. People should take part in forest preservation policies.

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