A SURVEY OF ETHNOBOTANICALLY IMPORTANT PLANTS OF DISTRICT GHIZER, GILGIT-BALTISTAN

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Abstract

An ethnobotanical survey was carried out in District Ghizer, Gilgit Baltistan, during 2013-2014 in order to document the importance and local usage of plants through interviews and questionnaire. Plant species were arranged with their botanical names, family names, vernacular names, parts used, flowering and fruiting periods, and their ethnobotanical uses. Plant species were identified mainly with the help of flora of Pakistan, mounted on herbarium sheets and submitted to Dr. Sultan Ahmad herbarium GCU Lahore. Voucher numbers were allotted to all collected plant species. A total of 49 plants species were collected from the study area which belonged to 26 families. Among these, 46 belong to Angiosperms and 3 belong to Gymnosperms. Among Angiosperms, dicots were 44 and monocots were 2. Family Asteraceae was the dominant family and comprised of 10 species. Plants were categorized according to their usage into single, double and multiple usages. The single usage plants were 28 in number, out of which 24 had medicinal use. Double usage plants were 6 and all were medicinally important while, multiple-usage plants were 15 in number out of which 12 had medicinal use. The collected plants species included 29 herbs, 10 trees and 10 shrubs. It was also observed that cutting of trees for earning and daily usage is common in the study area which is a threat for biodiversity.

Introduction

Living and non-living components of environment always influence human beings directly or indirectly (Nair, 2011). The human and plant relationship is as old as the history of plants and human civilization because man has always been dependent on plants for food, shelter, household tools, fuel, etc. Therefore, human behavior also has a pronounced influence on all the communities of plants and vice versa (Pei, 1992; Coe, 2008).

Due to the easy availability, cheaper prices and minimal side effects, herbal medicines have always been preferred by people throughout the world (Ekka and Dixit, 2007). The knowledge of medicinal plants was gained by local people after many trials and errors and that knowledge was passed on to the new generations either as family secrets, i.e. in case of many hakeem or herbalist families or in the form of written records. Ancient sacred texts such as the holly Quran, the Vedas and the Bible etc. also refer the knowledge of plant usage as herbal remedies which reveal that plants have been used as a source of medicine in all cultures for public health since the beginning of civilizations (Singh and Dubey, 2012). Rural residents of Pakistan also have most of the indigenous knowledge of plants which is essential for treatment of various diseases (Dwivedi, 1999). Much of this knowledge is less prevalent among people as it is confined to few older people and Hakeems or herbalists. It is, therefore, important to preserve indigenous knowledge in written form and ethnobotanists are playing this important role (Rao and Henry, 1997).

Keeping in view the importance of natural resources of Pakistan, the present work was planned and conducted for the purpose of collection of plants to study floristic distribution and extraction of knowledge of different uses regarding flora of district Ghizer, Gilgit Baltistan. Ghizer valley is present between 35°S, 36° N, 72°W and 74°E, at an elevation of 7,000 to 22,000 feet above sea level. It is located between Karakarum and Hindukush mountain ranges. The district Ghizer is North most part of the Gilgit Baltistan therefore it is the extreme North of the country. Wakhan strip is towards North-West, China on its Northern borders, Chitral District of NWFP on its West, Gilgit is situated on its East and Diamer District is on its south (Mughal, 2013). Ghizer comprises of four Tehsils; Gupis, Ishkoman, Punial and Yasin. Average annual temperature is 13.09°C ranging from -2.95˚C in winters to 32°C in summers. Average annual rainfall is 12.87 mm.

The main objectives of the study were:

1) To develop a floristic inventory with emphasis on medicinal plants.
2) To prepare a taxonomical checklist of the species with their scientific, vernacular and local names.
3) To document the indigenous knowledge and uses of plants in the study area.

Materials and Methods

Random questionnaire interview was undertaken in the study area. Beside the questionnaire surveys, group discussion, personal observations were also source of information during field survey and available literature was also consulted.

Hakeems and some other older inhabitants (who have traditional knowledge of plants and their uses) were interviewed through informed semi-structured questionnaire. The questions were focused mainly on the local names of the plants, knowledge of the uses of plant in the past and present, parts used, form of use, knowledge of the growing season, etc. The plants were collected from the study area and let to dry in many layers of blotting paper sheets. To remove all traces of moisture from plants, blotting paper was periodically replaced with dry new sheets. After that, plants were pressed by the plant presser. After drying and pressing the plants were mounted on the standard herbarium sheets and submitted in Dr. Sultan Ahmad Herbarium, Department of Botany GC University Lahore, Pakistan with voucher specimen numbers.

Results and Discussion

Forty nine plant species were collected belonging to 26 families. Twenty four families belonged to angiosperms (Table 1). Among these, 23 families were dicots included 22 plant species i.e. Asteraceae having 10 species; Papilionaceae having 5 species; Lamiaceae having 3 species; Berberidaceae, Elaeagnaceae, Salicaceae, Rosaceae, Zygophyllaceae, Plantaginaceae having 2 species each and Juglandaceae, Moraceae, Betulaceae, Tamaricaceae, Anacardiaceae, Saxifragaceae, Scrophulariaceae, Utricaceae, Capparidaceae, Polygonaceae, Solanaceae, Poaceae, Rutaceae, Cannabaceae, Cuscutaceae having 1 species each. Only monocot family was Poaceae, including 2 plant species. Two families of Gymnosperms included Cupressaceae with 2 species and Ephedraceae with 1 species (Table 1).

Out of forty nine plant species 57% plants were single usage, 12% plants were double usage and 31% plants were multiple usage. Single usage plants were divided into three categories; first being medicinal and 86% of single usage plants (24 out of 28 plant species) belonged to this category e.g. *Taraxacum campylodes* G.E. Haglund, *Cichorium intybus* L., *Carthamus tinctorious* L., *Echinops cornigerus* DC., *Artemisia annua* L., *Artemisia scoperia* Waldst. & Kit., *Sonchus arvensis* L., *Sonchus asper* (L.) Hill., *Cirisium arvensis* (L.) Scop., *Verbescum Thapsus* L., *Mentha sylvestris* L., *Fragaria vesca* L., *Datura stramonium* L., *Ribes alpestre* Decne., *Tribulus terristris* L., *Trifolium resupinatum* L., *Trifolium pratense* L., *Cannabis sativa* L., *Artemisia meretima* L., *Cuscuta reflexa* Roxb., *Setaria viridis* L., *Epherdra intermedia* Schrenk & Meyer., *Rumex hastatus* D. Don., *Plantago major* L. Second category was fodder plants and they comprised of 7% (2 out of 28 plant species) plants e.g. *Trifolium repens* L., *Cynodon dactylon* (L.) Pers. Remaining 7% plants (2 out of 28 plant species) belonged to other usage category, e.g. *Berginia stracheyi* Hook.f. & Thorns., *Haplophyllum gilesii* Hemsl. Among 24 species used for medicinal purposes, 23 were dicot and 1 monocot. Fodder plants included 1 species from dicot and monocot, each.

From 49 plant species, 6 species (12%) were observed to have dual usage. Two-usage plants are further divided into four different categories. All the plants in this category (n=6) had medicinal usage (100%) e.g. *Thymus serpyllum* L., *Mentha arvensis* L., *Urtica dioica* L., *Berberis lyceum* Royle., *Peganum harmala* L., *Plantago Lanceolata* L., 50% (n=3) plants e.g. *Thymus serpyllum* L., *Mentha arvensis* L., *Urtica dioica* L. had food value, *Berberis lyceum* Royle and *Peganum harmala* L. which were 17% (n=1) each in fence and other usage plants categories respectively. Among Two-usage plants; medicinal species, food, fences and other usage plants all species belonged Dicot families.

Among the 49 collected plant species, 15 were multiple usage plants (31%). These 15 multiple-usage plants belonged to Angiosperms (13 dicot species) as well as Gymnosperms (2 species). These plants were categorized into 7 different uses, i.e., food, timber, fuel, medicinal, fodder, tools and other. Pants, e.g *Capparis spinosa* L., *Juglans regia* L., *Elaeagnus angustifolia* L., *Hippophae rhamnoides* L., *Morus alba* L., *Rosa webbiana* Wall. ex Royle, *Medicago sativa* L., *Juniperus communis* L. used as food were 8 (53%). Medicinal plants were 12 (80%) e.g. *Morus alba* L., *Rosa webbiana* Wall.exRoyle., *Betula utilis* D. Don., *Pistacia khinjuk* J.D.Hooker, *Juniperus communis* L., *Juglans regia* L., *Sophora mollis* Royle., *Hippophae rhamnoides* L., *Elaeagnus angustifolia* L., *Capparis spinosa* L., *Medicago sativa* L., *Juniperus excelsa* M. Bieb. Fodder plants were 7 (47%) e.g. *Populus alba* L., *Salix tetrasperma* Roxb., *Morus alba* L., *Tamarix galica* L., *Medicago sativa* L., *Sophora mollis* Royle, *Pistacia khinjuk* Hooker. Plants like *Populus alba* L., *Salix tetra sperma* Roxb., *Juglans regia* L., *Elaeagnus angustifolia* L., *Hippophae rhamnoides* L., *Tamarix galica* L., *Pistacia khinjuk* Hooker., *Juniperus communis* L., *Juniperus excelsa* M. Bieb. used as fuel were 9 (60%). Plants used for timber were 2 (13%) e.g. *Juglans regia* L, *Juniperus excelsa* M. Bieb. Plants e.g. *Populus alba* L., *Juglans regia* L., *Morus alba* L., *Betula utilis* D. Don., *Rosa webbiana* Wall. ex Royle used of tool making were 5 (33%) and 8 plants had other uses (53%) e.g.*Capparis spinosa* L., *Juglans regia* L., *Elaeagnus angustifolia* L., *Betula utilis* D.Don, *Morus alba* L., *Tamarix galica* L., *Pistacia khinjuk* Hooker., *Sophora mollis* Royle.

Table 1. List of Ethnobotanically important plants of District Ghizer, Gilgit Baltistan

Species name and Voucher No.	**Local name (Shina)**	**Family**	**Traditional local Uses and Recipies of plants along with Flowering (F*l*) and Fruiting (F*r*) periods**
1.Salix tetrasperma Roxb. GC.Herb.Bot.2425	Chitter beyu	Salicaceae	L: used as fodder for cattle. Sh: used as fences and fuel. F*l*. Per.: April-May; F*r*. Per.: Sep.
2.Populus alba L. GC.Herb.Bot.2426	Fulshoo	Salicaceae	L: used as fodder for cattle. Sh: Wood of these plants is used as timber for making houses and other domestic items as well as it is used as fuel.
3. Juglans regia L. GC.Herb.Bot.2427	Khakie	Juglandaceae	R: are mostly used as tooth brush (miswak) Unripe fruit is used for dyeing hairs. S: oil is used for brain problems and considered as general tonic. Sh: Wood is a source of fuel and is also used for making domestic items and handles. Timber is hard and heavy and is much valued for making furniture and gun-stocks. F: for edible nuts (Walnuts). F*l*. Per.: March to April; F*r*. Per.: Sept- Oct.
4.Elaeagnus angustifolia L. GC.Herb.Bot.2428	Ghonair	Elaeagnaceae	F: are edible and medicinally used in liver problems and dysentery in humans as well as cattle. They are also used to cover deficiency of vitamin C in children. R: are very useful for cure of jaundice and hepatitis A, B and C. L: are chief source of fodder. Sh: Wood is used as fuel. Gum is used as shampoo and as a tonic for long, healthy and silky hairs. F*l*. Per.: March-April; F*r*. Per.: Sept- Oct.
5.Morus alba L. GC.Herb.Bot.2429	Marooch	Moraceae	L: used for washing hairs and clothes. These are also best fodder for livestock. Sh: used for making handles of agricultural tools. R: used as a remedy for diabetes. F: used as a general tonic and as a remedy for sore throat. F*l*. Per.: April-May; F*r*. Per.: July-August.
6.Betula utilis D.Don. GC.Herb.Bot.2430	Jogee	Betulaceae	Sh: Periderm from bark was used in former days as writing material, and as packing wrapping paper. The bark paper is extensively used for packing Ghee, for making binding ropes and also used in roofs for protection of wood from soil. Some people also use the bark paper in rheumatism. The extract of bark paper is used in ear pains and its related problems. Wood used for making different agricultural tools such as plough and also for making local spoons. Wp: is also a chief source of fuel. F*l*. Per.: May- July; Fr. Per: late August.
7.Juniperus communis L. GC.Herb.Bot.2431	Mathare	Cupressaceae	F: used in beverages. They are also used against kidney stone, urine problems, leucorrhoea and tuberculosis. Sh: used for fuel. F*r*. Aug-October.

Species name and Voucher No.	**Local name (Shina)**	**Family**	**Traditional local Uses and Recipies of plants along with Flowering (F*l*) and Fruiting (F*r*) periods**
8.Hippophae rhamnoides L. GC.Herb.Bot.2432	Buroh	Elaeagnaceae	Fruits are used in cough syrup. It is believed to be very useful for problems of heart, kidney, stomach and brain. They are also effective against cancer and are given in high blood pressure and are supposed to reduce cholesterol, irregular palpitation and to cure reproductive disorders like infertility in women. R: ash is useful to cure toothache. Sh: used as fuel. Wp: used as barbed fences around fields and along paths to fend off cattle. F*l*. Per.: April-May; F*r*. Per: August-Sep.
9.Berberis lyceum Royle. GC.Herb.Bot.2433	Ishkeen	Berberidaceae	R: used against gonorrhea, chronic diarrhea, piles. They are also a remedy for swollen and sore eyes, wounds, ulcers, acute conjunctivitis ointment is made from root powder mixed with oil and applied to heal fractured bones. Also used as bitter tonic. Wp: used for making fences and hedges. L, F and R: taken as remedy for backache. L: extract is given to relieve urinary tract infections and to cure jaundice. F*l*. Per.: Mar- June; F*r*. Per.: August- Sep.
10.Tamarix gallica L. GC.Herb.Bot.2434	Hookaro	Tamaricaceae	Wh: Fresh form is used as fodder and dried form is used as fuel and thatching. F*l*. Per.: April-May; F*r*. Per.: Aug-Sep.
11. Rosa webbiana Wall.exRoyle. GC.Herb.Bot.2435	Shinghaye	Rosaceae	Sh: is used for making tea, which is useful for treating fever, cough and sore throat and also used for making handles of different agricultural tools and also as fuel. F: used also as digestives. S: are given to treat veterinary diseases. F*l*. Per.: May-June; F*r*. Per.: August-Sep.
12. Ribes alpestre Decne. GC.Herb.Bot.2436	Shumloo	Berberidaceae	R: The powder is used for treating backache and joint pain. F: is a remedy for Jaundice. F*l*. Per.: June-July; F*r*. Per.: Aug-Sep.
13.Trifolium repens L. GC.Herb.Bot.2437	Shaftal	Fabaceae	Wp: used as a fodder. F*l*. Per.: Vary from year to year (mostly May-June).
14.Taraxacum campylodes G.E.Haglund GC.Herb.Bot.2438	Ishkeen	Asteraceae	L: Decoction of dried formis used as a remedy of gastric disorder and liver problems. R and L: Decoction of dried forms are used for the treatment of jaundice and pneumonia. F*l*. Per.: March- April; F*r*. Per.: May-June.
15.Thymus serpyllum L. GC.Herb.Bot.2439	Tumroo	Lamiaceae/ Labiatae	Fl and L: Dried and used to make herbal tea which is highly effective for cold, fever and cough. F*l*. Per.: June- July; F*r*. Per.: Aug-Sep.
16.Berginia stracheyi Hook & Thorns. GC.Herb.Bot.2440	Suspur	Saxifragaceae	L: used as a hair tonic.

Species name and Voucher No.	**Local name (Shina)**	**Family**	**Traditional local Uses and Recipies of plants along with Flowering (F*l*) and Fruiting (F*r*) periods**
17.Verbescum thapsus Linn. GC.Herb.Bot.2441	Jungali tamakoo	Scrophulariaceae	L: used to cure fever, cough and bleeding of lungs. F*l*. Per.: July-Aug.
18.Fragaria vesca L. GC.Herb.Bot.2442	Jungali mawa	Rosaceae	R and Pods: used as a remedy for diarrhea and urinary infections. F*l*. Per.: June- July; F*r*. Per.: Aug-Sep.
19.Epherdra intermedia Schrenk & Meyer. GC.Herb.Bot.2443	Som	Ephederaceae	Sand R: extract is used in wounds, gouts, rheumatism, asthma and cough. S: Extract is used externally against swellings. F*l*. Per.: May-June; F*r*. Per.: Aug-Sep.
20.Artemisia maritima L. GC.Herb.Bot.2444	Afsanteen	Asteraceae	L and S: used against stomach pain and fever. F*l*. Per.: June-July; F*r*. Per.: Aug-Sep.
21.Urtica dioica L. GC.Herb.Bot.2445	Jomi	Utricaceae	L: used to cure skin diseases. They are also used as Vegetable. F*l*. Per.: May; F*r*. Per.: July-August.
22.Capparis spinosa L. GC.Herb.Bot.2446	Kavir	Capparidaceae	F and Fl: are cooked as vegetable and also given to patients with typhoid and malaria. F: boiled to make herbal tea given in flu and fever. The pulp of ripened fruit is applied on skin to protect face against sun burn. Fruits are also used to cure jaundice, rheumatism and gouts. F: used as a cure of itching. S: oil is used for cooking and also for massaging painful joints. R: used in joints pains, paralysis, diabetes, asthma, nervous disorders and brain problems. F*l*. Per.: mid-April-May; F*r*.: July-August.
23.Carthamus tinctorious L. GC.Herb.Bot.2447	Pung	Asteraceae	F: used as a medicine for typhoid. F*l*. Per.: June; F*r*. Per.: Aug-Sep.
24.Peganum harmala L. GC.Herb.Bot.2448	Ispundur	Zygophyllaceae	Wp: dried and its smoke is used to cure sore eyes, as fragrance and also as an insect repellant. R: The extracted juice is given in jaundice. The same mixing with rice water is given to treat menorrhagia. L, S and R: The paste is applied on snake bite as antivenom. F*l*. Per.: May-June; F*r*. Per.: August-Sep.
25.Rumex hastatus D.Don. GC.Herb.Bot.2449	Churki	Polygonaceae	R: used against skin disease, piles and bleeding of lungs. F*l*. Per.: April- May; F*r*. Per.: August.
26. Tribulus terrestris L. GC.Herb.Bot.2450	Khurkuzal	Zygophyllaceae	F: used as aphrodisiac for men. It is also used as medicine for kidney stone and is applied for wound healing. F*l*. Per.: Late May -mid-June; F*r*. Per.: Sep-October.

Species name and Voucher No.	**Local name (Shina)**	**Family**	**Traditional local Uses and Recipies of plants along with Flowering (F*l*) and Fruiting (F*r*) periods**
27.Datura stramonium L.GC.Herb.Bot.2451	Datura	Solanaceae	S and L: used for making a medicine for asthma. F*l*. Per.: April-May; F*r*. Per.: August-Sep.
28.Mentha sylvestris L. GC.Herb.Bot.2452	Faleel	Lamiaceae/ Labiatae	Fl: extract is used to cure typhoid, malaria and stomach troubles. F*l*. Per.: April-May; F*r*. Per.: July-august.
29.Cichorium intybus L. GC.Herb.Bot.2453	Ishkenagee.	Asteraceae	Fl and R: The decoction is given to cure typhoid, malaria, abdominal pain, obstructions, headache and stomach indigestion. F*l*. Per.: May-June: F*r*. Per.: August.
30. Haplophyllum gilesii Hemsl. GC.Herb.Bot.2454	Sabonchar	Rutaceae	Arial parts are used as a detergent.
31. Echinops cornigerus DC. GC.Herb.Bot.2455	Gachir	Asteraceae	R: used for removal of kidney stone.
32.Cuscuta reflexa Roxb. GC.Herb.Bot.2456	Mayoonbasi	Cuscutaceae	Wp: used as antiseptic.
33.Pistacia khinjuk Hooker. GC.Herb.Bot.2457	Kakavown	Anacardiaceae	L: used to cure dysentery, diarrhea, fever, inflammations and leucorrhoea. It is also used at the time of teething in children and best fodder for goats. The resin of this plant is known as "Gulgul" mostly used in eye redness and inflammations. The resin is widely used in Taveez. Sh: used as fuel. F*l*. Per.: March-April.
34. Sophora mollis Royle. GC.Herb.Bot.2458	Popshing	Papilionaceae	Wp: Being less palatable sometimes kill animals if foraged excessively. L and Sh: Paste is used externally for skin allergies and as antiseptic material. It is commonly used as an insecticide and pesticide. F*l*. Per.: April-Sep.
35.Plantago major L. GC.Herb.Bot.2459	Ispagol	Plantaginaceae	L: used in treatment of inflammation of the skin, malignant ulcer and intermittent fever. S: used in chronic dysentery, diarrhea, constipation, kidney disorder and gonorrhea.
36.Artemisia annua L. GC.Herb.Bot.2460	Moyeng	Asteraceae	Aerial parts of the plant are used to cure diabetes, blood pressure, dysentery and cough.

Species name and Voucher No.	**Local name (Shina)**	**Family**	**Traditional local Uses and Recipies of plants along with Flowering (F*l*) and Fruiting (F*r*) periods**
37.Sonchus arvensis L. GC.Herb.Bot.2461	Targut	Asteraceae	F and L: used to cure blood pressure, as sexual stimulant and wound healer.
38.Sonchus asper (L.) Hill GC.Herb.Bot.2462	Targut	Asteraceae	Fand L: used to cure blood pressure, as sexual stimulant and wound healer.
39.Mentha arvensis L. GC.Herb.Bot. 2463	Pudina	Lamiaceae/ Labiatae	L: used as salad. In dried form used for the treatment of stomach problems, allergies and are also used as carminative. Its powder is used for birth control.
40.Medicago sativa L. GC.Herb.Bot.2464	Ishpith	Papilionaceae	Wp: chief source of fodder and some people use it as vegetable. S: used for treatment of joints pain, gout and indigestion and also used as a general tonic.
41.Trifolium resupinatum L. GC.Herb.Bot.2465	Ishpith	Papilionaceae	L: used to purify blood.
42.Trifolium pretense L. GC.Herb.Bot.2466	ChupattiPhunnar	Papilionaceae	L: used to cure sore throat, fever, pneumonia and meningitis.
43.Cannabis sativa L. GC.Herb.Bot.2467	Bung	Cannabaceae	Wp: dried and its powder is used against cough, bronchitis and chest problems. F*l*. Per.: April-Sep.
44. Artemisia scoperia Waldst. & Kit. GC.Herb.Bot.2468	Jaanh	Asteraceae	S and R: used against diabetes, blood pressure, joint pains including gout and rheumatism.
45. Plantago lanceolata L. GC.Herb.Bot.2469	KayayKhapay	Plantaginaceae	L: extract is used for healing wounds. S: used against constipation, abdominal problems, eye redness and also for washing hairs.
46.Cirisium arvensis (L.) Scop. GC.Herb.Bot.2470	Jachir	Asteraceae	L: extract is used for the removal of kidney stone.
47. Juniperus excels M.Bieb. GC.Herb.Bot.2471	Cheleh	Cupressaceae	F: are given in urine problems, kidney stone and weakness of urinary bladder. Sh and L: Ash is applied in certain skin infection. The wood is chief source of fuel as well as timber. F*r*. Per.: Aug-October.
48. Setaria viridis L. GC.Herb.Bot.2472	Xhika	Poaceae	Wp: It is crushed and mixed with water and is used as an external application in the treatment of bruises. F*l*. F*r*. Per.: June-September.
49.Cynodon dactylon (L.) Pers. GC.Herb.Bot.2473	Xhika	Poaceae	Wp: Used as fodder.

F: Fruit, Fl: Flower, L: Leaf, R: Root, S: Seed, Sh: Shoot/Stem, Wp: Whole plant.

In a similar study, Khan and Khatoon (2007) reported 48 species of trees and shrubs of Haramosh and Bugrote valleys in Gilgit of the Northern Areas of Pakistan which are used in everyday life such as for medicine, shelter, agricultural tools and fuel. These findings are also in line with many other studies such as that of Ibrar (2007) who reported four species including *Juglans regia, Dalbergia sissoo, Pinus roxburghii* and *P. wallichiana* commonly being used for wood and many other purposes in Ranyal hills, district Shangla, Pakistan. Plants of great economical and medicinal value such as *Elaeagnus angustifolia* (Russian olive) and *Hippophae rhamnoides* (Sea buck thorn) observed in this study were previously reported by Awan *et al.* (2013) who studied economically important plants from mountainous region of Gilgit-Baltistan, Pakistan.

Recommendations: The main objective of this study was to record the floristic data of District Ghizer and to use this documentation to impart awareness in the local communities in order to protect these valuable plants in-situ.
On the basis of our study, the following suggestions are made;

- Medicinal plants are over grazed, so Goat grazing should be restricted.
- Stop grazing during flowering/seedling period.
- Whole plant should not be harvested for any purpose.
- Medicinal plants should be analyzed chemically.
- Established nurseries for germplasm protection.
- Young people of these localities know very little about the importance of these plants. Governmental can play a vital role to educate people of these localities. Universities and NGOs as well can contribute to a huge extent by publishing and distributing broachers and booklets to spread awareness in local communities.
- Community participation will not only educate the local masses about the importance of the floristic wealth but it will also enable them to culture few of these plant species for better financial returns.
- Out of many plants found in the study area, local populations do know some of their uses in traditional medicine system. But there is need to further explore their uses and utilities.

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