INNSPUB

International Journal of Biosciences | IJB |
ISSN: 2220-6655 (Print) 2222-5234 (Online)
http://www.innspub.net
Vol. 12, No. 2, p. 290-297, 2018

RESEARCH PAPER OPEN ACCESS

Profile of medicinal plant resources in Maskini valley, Distt Dir (Lower) Khyber Pakhtunkhwa, Pakistan

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Key words: Diversity of medicinal plants, Phyto-medicine capability, Local uses, Endangered plants species.

http://dx.doi.org/10.12692/ijb/12.2.290-297 Article published on February 28, 2018

Abstract

The study deals with the medicinally important plants of the Maskini valley. The research area is enriched in medicinal plants. The study is carried out in the valley, in order to collect the information regarding local medicinal uses of plants and their potential to be used in international market. The profile is prepared of the indigenous knowledge and for this purpose a questionnaire containing 24 questions was developed and all the 52 villages of the area were visited. Local medicinal plants were observed, people were interviewed, and information collected and data is developed by questionnaire filling method. It is established that within the area about 71 plants belonging to different families are available which are used by the locals for medicinal purposes like Cough, Asthma, Jaundice, Stomach troubles, Constipation, abdominal pain and used as expectorant. The indigenous knowledge about local medicinal plants is documented. It is concluded that for documentation of traditional knowledge about medicinal plants, and their conservation, such research studies should be encouraged in future. Similarly it is also recommended that management measures should be taken by the concerned government departments, Education Research Institutions with the participation of local communities in order to conserve medicinal plants resources from becoming extinct. Therefore it is imperative to encourage and manage the conservation and regeneration of medicinal plants. The reported plants have significant role in primary healthcare of the area and are used for the treatment of different diseases.

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Introduction

We get ready-made food, medicines for curing of diseases, forage and fodder for animals, a source of fuel, flowers for beauty, and industrial raw materials. In addition to these, plants are also a source of timber for construction and many other domestic items. In some areas of the world these plants are used by human being very brutally. Hindu-Kush, Himalayas region is also included in such areas. In the Hindu-Kush, Himalayas these natural resources are deteriorating day by day at a faster rate than other areas of the world. Unfortunately this area has got little attention than other ecosystem. However, now it is voice of the day to know the traditional knowledge regarding the medicinal uses of plants and also to adopt the modern approaches for sustainable development and management of these natural resources in the Himalaya region (Abdillahi *et al* 2010; IUCN, 2003 and Aumeeruddy, 1996).

In all mountainous regions of northern Pakistan, besides the threat of improper collection, the medicinal plants under high biotic pressure, owing to increase in human population growth, unplanned forest cutting, over grazing, fuel wood extraction and encroachment for cultivation (Raziq *et al.,* 2010 and Sher *et al.,* 2010 b).

The main sources of medicinal plants such as forest and range lands are exploited commercially in Malakand Division (Sher *et al.,* 2010 a, b and Hussain and Sher 2005).

Proper attention has not been given by local communities or any other agency in the past for conservation of medicinal plants. Due to lack of knowledge about the uses of medicinal plants and their collection at proper time leads to loss of high valued medicinal plants. Currently so many hurdles are there for sustainable cultivation and use of medicinal plants including little knowledge about sustainable management parameters and poor knowledge of market requirement (Sher *et al.*, 2004). Besides health care, Medicinal plants collected for trade make an important contribution to household economies (Saganuwan, 2010).

For centuries the collection of Medicinal plants from the wild flora for healthcare has been possible without major negative effects. However, during the past few decades these resources have been highly exploited for trade, owing to increasing population pressure and demand from the expansion of international market for natural products (Azaizeh *et al.*, 2003). As a result a large number of species of Medicinal plants have been considered as highly threatened throughout the Hindukush Himalayas (Yazicioglu and Tuzlaci, 1996).

More than 33,000 plants species or 11.9% of the world flora are threatened with elimination. In most parts of the world the conservation status of plants could not be assessed properly, owing to unavailability of sufficient information. (IUCN, 2003). The present study area is one of the high altitudes Hindukush- Himalayan regions in the northern part of Pakistan. The area is known for its importance for biodiversity including Medicinal plants, which are of high value in traditional system of medicine. Some of the medicinal plants have high market value, traded and exported into national and international markets. The present study is an effort to determine the presence conservation status of medicinal plants' resources of the study area.

There are estimated 2000 medicinal plant species in Pakistan, though few are exploited, and 90% of the country's medicinal herb requirement is imported. Many of these medicinal plants occur in the northern mountain areas. The wild life department lists 6600 plant species for all Pakistan with 4500 species occurring in Khyber Pakhtunkhwa. (Dr. Hussain Ahmad *et al.*, 2009).

Un-planned and un-scientific collection of medicinal plants in the area has resulted in the decrease in population size of these renewable natural resources. If this undesired practice of medicinal plants collection by the local community continues, it may adversely affect natural plants heritage. Therefore a solid and effective mechanism of all the stack-holders is required for sustainable development of local medicinal plant resources to ensure the availability of high valued medicinal plants in the area for next generation.

The study is important for habitat protection, enlisting of indigenous knowledge, community feelings and possible conservation of endangered rare medicinal plants and their genetic diversity through community participation and is imperative to continue the evolutionary phenomenon in natural habitats. The study area has high potential of those plant species which are used as local medicines. The author belongs to and familiar with the study area. Besides the local medicinal uses of plants, Some of the plants have high market value and hence the marketability indicate that the area is enriched in medicinal plants. The local community should be educated regarding the sustainability and conservation of local medicinal plant resources.

In addition, local Hakims are using the existing plants for the treatment of ailments so that most of the inhabitants depend on local plants for medication. Moreover, the high dependency and unsustainable practices of the poor people of this rural area may result may result the exploitation of many plants. Therefore, an effective planning for medicinal plants conservation is essential. In this regard the authentic information will provide basis for further application of protective measures.

In the past different research workers conducted study work on the ethno-botany of easily approachable parts of Malakand Division, but no such specific reference exists regarding medicinal plants of Maskini valley, so the present study was carried out which will help for further research measurements. The aim of the study is to collect and document the information regarding local medicinal uses of plants at Maskini valley to be used as an easy reference for future studies.

Material and methods

Description of study area

The study area Maskini valley is located in the north western part of Pakistan between the Himalayan and the Hindukush foothills. It belongs to the district Dir, which is part of the Malakand division situated in the Khyber Pukhtunkhwa province.

The area lies at a distance of 50km from district headquarter Timargara, the capital of district Dir (L). It is bounded by Samar Bagh area and Mayar Union council in the North-East; Bajawar Agency in south-west and by Afghanistan in the West. The altitude of area ranges from 800-1000m at the valley entrance to 3000m at the highest peak of Inkal Mountain.

Anthropology of study area

Maskini; a green lush valley is located in the former princely state of Dir. There are 52 villages in the valley. Mashwani is the dominant tribe of the area. The area has sensitive features as 60% of the community is deprived of the basic facilities like education, electricity and proper health facilities.

The poverty level may be estimated from the fact that 97% of the people live in the un-cemented and improper houses. As no certified medical practitioner is available here, the people have to approach distantly located hospital at Timergara for which they travel more than 50 kilometers including by foot access due to lack of transport facilities and road infrastructure. Due to cultural limitations and lack of educational institutions, the female literacy rate is pathetic. The site valley has been divided into 5 Village Councils by local government department of Khyber Pakhtunkhwa which are listed below.

Table 1. Union councels with main villages of the area.

Sr. No	Name of village Council	Name of main villages
1	Qaziabad Sangipara	Zaray, Karborai, Qila, Naqay, Agheralay, Dherai payen, Halem sero, Sandalo, Mian banda bala, Mian banda payen, Ranedalay bala, Ranedalay payen, Rangul payen
2	Maskini	Maskini qilla, Sokai, Darbar, Shagai, Dherai bala, Tooti banda, Golo dherai, Sangerh, Garday
3	Kakas	Kakas khas, Karinoona, Manjafar, Skhawono, Ganjla, Daboona, Ado, Landai, Haji kalay, Rangul bala
4	Kharkay	Kharkay khas, Pandaray, Kandolo, Shekh patay, Kachal, Bosta, Mata, Charmal, Banai, Sadokai, Dhal
5	Kolalan	Kolalan, Sheno banda, Mandal, Prata, Jehan pasa, Moragai, Petao, Dherako, Toran

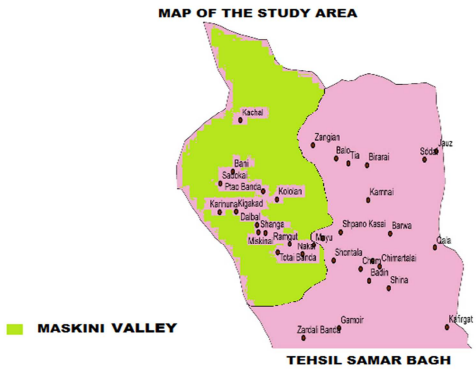

Fig. 1. Study area

Site selection for study

1. There is high potential of medicinal plants in the area.
2. The researcher is local resident and familiar with the study area.
3. There are well known Hakims[1] in the area using medicinal plants for treatment of ailments which is very effective and people come from far flung areas of the province.
4. The area is rural and people are poor, due to which most of the people have no access to the prevailing method of treatment, so depend on the traditional method of treatment by using medicinal plants.
5. Since no prior study of the type is carried out in this area, therefore it became one of the reasons for conducting the desired research

Preparation of Interview Schedule

In the light of specific objectives, a comprehensive interview schedule containing all the necessary details was developed. Questionnaire was prepared in English. To get the required information easily from the respondents and the locals were interviewed in Pashtu (the local language). In the light of suggestions given by respondents, necessary corrections were made in interview schedule. After pre-testing the interview schedule was improved and finalized.

Field survey and Data Collection

While collecting data in the field researcher faced some difficulties. Most of the villages are not connected by link roads, due to which the areas were approached mostly by foot. The site was visited in blooming season of the plants.

The area is hilly, so it was divided into different sections with the help of maps. Questionnaire was framed and devised to get the required data regarding the local uses of available medicinal plants, such as traditional uses, properties of the plants, procedures of medicinal plants collections, collection time, there distribution and abundance etc.

The respondents of 40 to 70 years old people were interviewed and important features of local medicinal plants were documented. In addition personal observations were also made in the fields to note any pertinent events for better understanding regarding the presence, availability and extinction of medicinal plants.

Specimens of locally available medicinal plants were collected and identified from flora of Pakistan and other available literature (Nasir and Ali 2007; Stewart, 1972). The nomenclature was confirmed from national herbarium. Voucher specimens of medicinal plants species were submitted in the herbarium of Botany Department Islamia College University Peshawar. The list of recorded medicinal plants is given as under.

Results and discussion

Medicinal plants potential in the Area:

The northern area of Pakistan is considered as a natural reservoir for highly valued medicinal plants. Being a part of northern area, Maskini valley has also high potential of medicinal plants. Lack of appropriate management, unawareness regarding collection procedures and lack of knowledge of market requirements, part used, and collection time are the main barriers for sustainable utilization of valuable medicinal plants which leads to misuse of species. It was observed that due to lack of knowledge regarding economic value of medicinal plants has led to mismanagement and exploitation of medicinal plant resources.

Diversity of medicinal plants

The conducted study reveals that the collected Medicinal plants existing in the area are 71 species belonging to 46 families. Among these plants one belongs to fungi (Morchella of family Helvilaceae). One belongs to Pterediophytes i.e. *Adiantim venustum*.

Two species, Pinus roxburghii, Pinus wallichiana belong to gymnosperm of family Pinaceae and majority of the Medicinal plants of the area are angiosperm. Among these mostly are dicots and few monocots. The angiosperm plants belong to forty three families. Five species of Monocots are, *Alium sativum, Alium cepa, Avena sativa, Cynodon dactylon, Zea mays*. The study also reveals that most of the Species are belonging to family Lamiaceae.

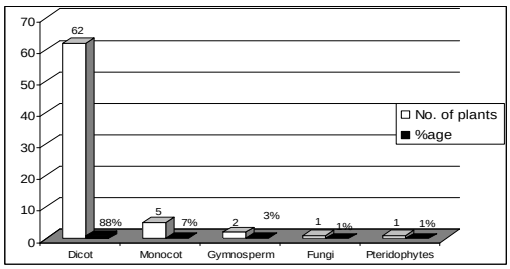

Fig. 2. Diversity of medicinal plants.

Table 2. Medicinal plants of Maskini Valley.

S. No	Botanical Name	Family	Local Name	Part Used	Habit	Indigenous Medicinal use
1	*Amaranthus Viridis* L.	Amaranthaceae	Chalwai	S, L	H	Cough, Asthma
2	*Coriandrum sativum* L.	Umbiliferae	Dhanya	Fr	H	Carminative, refrigerant, Jaundice.
3	*Foeniculum vulgare* Mill.	Umbiliferae	Cagey velanay	Fr, R	H	Purgative, Carminative, Dysuria, Laxative.
4	*Artimisia vulgaris* L.	Asteraceae	Tarkha	S	H	Antispasmodic, Stomachache
5	*Cichorium intybus* L.	Asteraceae	Han	R	H	Jaundice, Fever
6	*Taraxucum officirale* Weber.	Asteraceae	Zair Guley	L, R	H	Tonic, Kidney, Liver disorder
7	*Berberis lycium* DC.	Barberidaceae	Kwarey	R	Sh	Antispasmodic, Refrigerant, Pharyngitis.
8	*Nasturtium efficinale* R. Br.	Brasicaceae	Termira	S	H	Stomach troubles, vomiting, Diuretic, Laxative
9	*Capsella bursa pastoris* L.	Brasicaceae	*Bambesa*	*St, L*	H	Diarrhea
10	*Cannabis sativa* L.	Canabinaceae	Bhang	S, L	H	Narcotic, Pain relieving agent.
11	*Viburnum grandiflorium* Wall. Ex, *Dc.*	Caprifoliaceae	Ghazmeva	Fr	Sh	Stomach disorders
12	*Silene vulgaris* (D.Don) Muell. Arg.	Caryophylloceae	Bashka	L, S	H	Emollient, stomachache
13	*Stellaria media* (L.) Cyr.	Caryophylloceae	Oulalai	WP	H	Purgative
14	*Chenopodium album* L	Chenopodiaceae	Sarmay	WP	H	*Anthelmintic, Laxative*
15	*Cuscuta reflexa* Romb.	Cuscutaceae	Mechay	WP	Cl	Diabetes treatment
16	*Convolvulus arvensis* L	Convalvulaceae	Prewatai	WP	H	Epilepsy, Cough, Stomatitis, Measles, Dandruff.
17	*Diospyrus lotus* L	Ebenaceae	Toramlook	Fr	T	Dysentery, constipation.
18	*Euphorbia helioscopia* L	Euphorbiaceae	Mandano	R	H	Cholera, Purgative, Laxative.
19	*Quercus incana* (Hussken H.N)	Fagaceae	Serai	Fr	T	Dysentery, diarrhea, Dysuria, Cough.
20	*Hypericum perforatum* L	Hypericeae	Shin chai	L	H	Epilepsy.
21	*Juglans regia* L	Juglandaceae	Ghuz	Fr, Ba	T	Teeth cleaner, Tonic, Vermifuge.
22	*Ajuga brateosa* (Wall ex Bth)	Lamiaceae	Booti	WP	H	Blood purifier, epilepsy,abdominal pain.
23	*Mentha longifolia* L. Huds	Lamiaceae	Velanay	L, St	H	Vomiting, stomachic agent, Constipation.
24	*Mentha spicata* L	Lamiaceae	Podina	L, S	H	Stomach troubles, Menstruation, nausea, Carminative.
25	*Salvia Moorcroftiana* Wall Ex Benth	Lamiaceae	Khardag	L, S	H	Dysentery,Constipaion, abdominal pain, Aphrodisiac.
26	*Plectranthus rogosus* L	Lamiaceae	Sperkai	St, L	Sh	Toothache. Abortion
27	*Malva neglecta* L	Malvaceae	Panerak	L	H	Constipation, Diagesion.
28	*Melia azeairach* L	Meliaceae	Tora Shandai	L, Fr	T	Diabetes, Lumbago, Vermifuge, Carminative
29	*Ficus carica*	Moraceae	Inzar	Fr	T	Expectorant,Constipation,aphro diasic, Blood purifier.
30	*Morus alba* L	Moraceae	Toot	Fr	T	Dyspepsia,Tonic, Constipation, Cough, Cold.
31	*Olea ferruginea* L	Oleaceae	Khona	L, Ba, Fr	T	Rubefacient, Toothache, Dandruff, antiseptic, Antiseptic.
32	*Oxalis corniculata* L	Oxalidaceae	Garday Tarukay	WP	H	Stomach troubles, Blood clotting, vermifuge, refrigerant, Digestion.
33	*Peonia emodi* Wall.ex Hook	Peonaceae	Mamekh	Rh	H	Tonic.
34	*Indigofera heterantha* L	Papilionaceae	Ghorija	L, R	Sh	Scabies, Stomach disorder.
35	*Papaver somniferum* L	Papaveraceae	Qashqash	Cp, Sd	H	Anodyne, headache, dysentery, Tonic.
36	*Plantago lanceolata* L	Plantaginaceae	Jabai	L	H	Measles, dysentery, constipation, Rheumatic

S. No	Botanical Name	Family	Local Name	Part Used	Habit	Indigenous Medicinal use
						infection.
37	*Platanus orientalis* L	Platanaceae	Chinar	Ba	T	Gargle, vetilgio, diarrhea
38	*Polygonum aviculare* L	Polygonaceae	Pulpoolak	R	H	Tonic.
39	*Rheum webbianum* L	Polygonaceae	Shalkhey	L, Rh	H	HBV, HCV.
40	*Rumex hastatus* L	Polygonaceae	Tarukey	L, S	H	Blood clotting, abdominal pain, digestion, Blood pressure.
41	*Portulaca oleraceae* L	Portulaceae	Verkharay	S	H	Kidney, Liver diseases.
42	*Zizyphus vulgaris* L	Rhamnaceae	Markhanai	Fr	T	Nose bleeding, Cough, Cold.
43	*Rosa moschata* L	Rosaceae	Zangli gulab	Fl	Sh	Stomach disorder.
44	*Rubus fruticosus* L	Rosaceae	Baganrra	Fr	Sh	Stomachache, digestion.
45	*Skimmia laureola* (DC) sieb, Zucc	Rutaceae	Nameran	L	Sh	Dyspepsia, antiseptic.
46	*Zanthoxylum alatum stend*	Rutaceae	Dambara	Ba	Sh	Pepper, Stomachache.
47	*Solanum nigrum L*	Solanaceae	Karmachu	Sd	T	Itching, liver disease, fever.
48	*Alianthus altissima Mell*	Simarubaceae	Spina Shandai	L, Fr	H	Aurticaria.
49	*Datura stramonium* L	Simarubaceae	Bathura	R, Fl	H	Narcotic, Asthma, expectorant, Earache.
50	*Ricinus communis* L.	Ulmaceae	Arhanda	L, Sd	T	Amenorrhea, Aurticaria.
51	*Celtis australis* L	Eurphorbiaceae	Taghga	Fr	T	Laxative, Toothache.
52	*Urtica dioca* L	Urticaceae	Seezunkhey	WP	H	Constipation, Pulmonary diseases.
53	*Valeriana jatamansi* Jones	Valerianaceae	Mushkibala	Rh	H	Epilepsy, Antispasmodic.
54	*Verbena officinalis* L	Valerianaceae	Shamakey	WP	H	Expectorant, blood purifier, refrigerant.
55	*Viola serpens* Wall	Violaceae	Banafsha	Fl, L	H	Fever, expectorant, refrigerant, Carminative.
56	*Solanum surattense* Burn.f.	Solanaceae	Maraghuney	R, Fr	H	Cough abdominal pain, Blood purifier.
57	*Sonchus asper* L	Asteraceae	Shudapai	L, R	H	Antimalarial, fever, itching.
58	*Punica granatum* L	Peonaceae	Nangury	Fr, S	T	Diarrhea, headache, Cold, flu, Dysentery.
59	*Hedera nepalensis* K.Koch	Araliaceae	Parvata	L	Sh	Abdominal pain, Diuretic.
60	*Fumaria indica* Hussken H.N	Fumiriaceae	Krachey	WP	H	Blood purifier, diarrhea, fever, Jaundice.
61	*Chenopodium murale* L	Chenopodiaceae	Skhabutey	Fr, L	H	Vermifuge, gas troubles, abdominal pain.
62	*Allium sativum* L.	Aliaceae	Ooga	Bul	H	Tonic, Blood pressure.
63	*Allim cepa* L.	Aliaceae	Piaz	Bul	H	Cholera, nausea.
64	*Avena sativa* L.	Poaceae	Jawdar	Fr	H	Aphrodisiac.
65	*Cynodan dactylon* L.	Poaceae	Kabal	WP	H	Blood purifier, Control bleeding.
66	*Zea mays*	Poaceae	Jwar	Gr	H	Aurticaria.
67	*Pinus roxburghii* Roxb. Ex Lamb, *non Salisb;*	Pinaceae	*Nakhter*	Res	T	Blood purifier, Painkiller, refrigerant.
68	*Pinus wallichiana* L.	Pinaceae	Srup	Res	T	Healing agent.
69	*Adiantum venustum D.Don.*	Polypodiceceae	Sumbal	L	H	Blood purifier, fever.
70	*Morchella esculenta* L. pers ex Fr.	Helvilaceae	Khusey	Fun	Fr. Body	Tonic.
71	*Dodonea viscosa* L. Jacq.	Sapindaceae	Ghwaraskay	L	Sh	Rheumatism, gas troubles.

Key to the Table

CP	=	Capsule	Ba	=	Bark
Sd	=	Seed	WP	=	Whole plant
Sh	=	Shrub	Fl	=	Flower
S	=	Shoot	g	=	gum
L	=	Leaves	Bul	=	Bulb
R	=	Root	Gr	=	grain
Fr	=	Fruit	Res	=	Resin
St	=	Stem	Fun	=	Fungi

Fr body = Fruiting body

Cl = Climber Plant

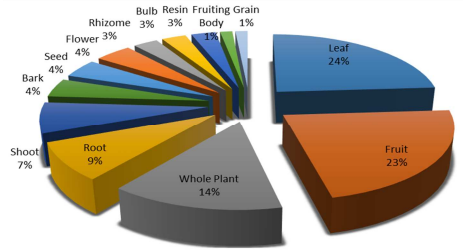

Fig. 3. % categorization of parts used of different species

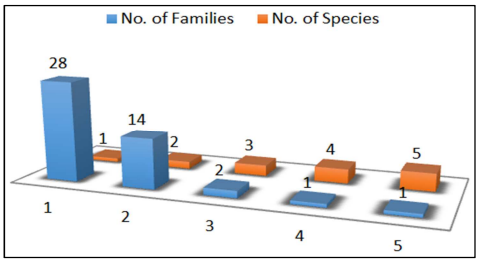

Fig. 4. Families along with their number of medicinal plants species**.**

Use and ratio of Medicinal plant species

Study data revealed that among the reported plants 8 species are used as tonic, 20 for gastrointestinal disorders, 12 as anti-tussives and antipyretics, 11 for dermatological diseases and 3 for the treatment of jaundice. Meanwhile each of the medicinal plant has multi-dimensional use in field of medicine rather than single confined use (Table 2). The geographic status of the valley reflects the habitat of local medicinal flora. The valley is situated in the temperature zone of the subcontinent, and has a diversity of medicinal plant, to be used by local people for various medical purposes.

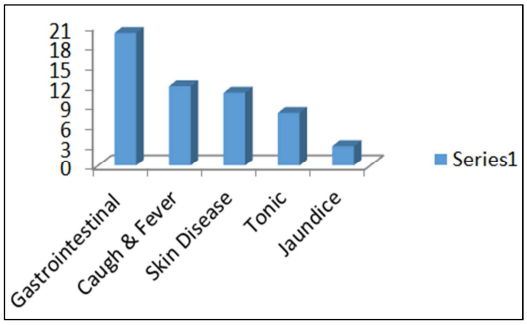

Fig. 5. Use /ratio of medicinal plant species.

With increasing human population, the livestock population is also increasing speedily, resulting pressure on wild medicinal plants and there graph of population size is decreasing. It is also added that collection of medicinal plants and there sale business is an obvious economic activity in northern part of Pakistan (Sher *et al.*, 2006).

The conversion of natural habitat for agricultural and residential purposes is resulting in the decline in the population of medicinal plants. As the medicinal plant collectors of the area are poor villagers and they cannot afford the expensive modern health care.

Moreover due to the lack of accessibility to the basic health care, the local community depends on medicinal plants as home remedy for the treatment different ailments in the said area. In order to conserve the Local medicinal plants of the area and the indigenous knowledge about these plants, the following suggestions and recommendations should be adopted.

Conclusions

In conclusion, the study site has a diversity of medical plants ranging from herbs to tress in the prevailing extreme climatic condition. Most of the available medicinal plants are used by the local people for the various medicinal purposes. Mostly leaves (24%) and fruits (23%) parts are used for medicinal purposes by the local people.

Recommendations

1. The concerned departments should introduced medicinal plants conservation clubs at school level in the area, for the awareness of new generations and to encourage the youth of the study area to learn about their medicinal plants resources and also to preserve their traditional knowledge.
2. Govt. should launch conservation projects for the conservation of medicinal plants in the area in Annual Development Program (ADP).
3. The collectors of medicinal plants should be educated about scientific method of collection of medicinal plants.
4. Laws and legislations should be made and implemented by the government in this regard.
5. The Local Hakims of the area should be encouraged and facilitated for effective utilization of the Medicinal plants.
6. It is suggested that management measures should be taken jointly with the participation of Local communities in order to conserve medicinal plants resources from becoming extent.
7. Overgrazing cause the destruction of medicinal plants due to trampling, therefore, it is imperative to manage the grazing system and encourage the regeneration of medicinal plants.

Acknowledgement

The authors are grateful to the local community for sharing their valuable and informative knowledge regarding the medicinal plants. The authors also extend special thanks to the Department of Botany Islamia College University Peshawar for providing necessary facilities and guidance in this endeavor.

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