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Ethnobotanical Study of District Karak

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Abstract : *The study was conducted for ethnobotanical study of district Karak for a period of one year during 2014-2015. The study indicated that the inhabitants of District Karak utilized 45 plant species, 21 herbs, 12 shrubs and 12 trees, for four ethnobotanical categories including fuel, fodder, medicinal and mechanical uses. Some useful species were collected near human settlements regardless the diversity of species at distant area. The main threats to plant are anthropogenic activities. The general presence of herbs and shrubs species in semi-arid zone reduces the mechanical uses of the plants. Otherwise, most of the trees would have been mostly used as a mechanical source such as timber purpose. However, increasing education, awareness of the people due to the service in Government institutions, the notion of the sustainable use of resources is rising among the people of the area. This sustainable uses will conserve and preserve natural resources and biodiversity. Over grazing, commercial timber cutting and in some cases lack of individual ownership were the reasons of unsustainable exploitation of natural resources while pluralism in medicinal system, partial decrease in timber exploitation as income or household source due to more reliability on bricks, concretes and T-Iron for the roof of the houses etc. were the positive signals for preservation and distribution of the local flora which were observed in the area.*
Keywords*: Ethnobotany, District Karak, Uses of plant, anthropological activity*

INTRODUCTION

The present project was based on ethnobotanical study of District Karak. It is located in the south of Kohat and on the West Side District Bannu and Laki Marwat. It is about 123 km away from Peshawar on the main Indus Highway towards Karachi. It is located at 33 7'12N latitude and 71 5 '41E longitude and spreads over an area of 3,372 square kilometers with a population of approximately 5,36,000. The climate is hot during the summers, with temperature touching 40-45 degree and sand storms are common in tehsil Takht-e-Nasratti. However, Lakkara (Shamshaki) regions are the coolest part in summer where peoples use blankets at night. The average rainfall is from 30 to 110 inches in which the major precipitation time is summer monsoon.

Karak is said to be a single District in Pakistan which is inhabited by only one tribe of Pushtuns known as Khattak. There are three tehsils in the district. These include Karak, Banda Daud Shah and Takht-e-Nasrati. There is one electoral constituency for National Assembly and two constituencies for Provincial Assembly. The predominant language of Karak is Pashto; the dialect is the softer 'Kandahari' Pashto as opposed to the harder 'Peshawari' dialect. District Karak has highest literacy rate after Islamabad and Wah. Since both Islamabad and Wah are mainly composed of temporarily migrated people, therefore, Karak is ranked as the highest educated

district. Diverse wildlife across the district with annual hunting season of quails, cranes, black and brown pheasants. It is a well-known place for hunting quails (Batair) and fowl. There are several natural resources that have been discovered in Karak. The salt mines were well known in antiquity and a major source of salt for the Indian sub-continent into British imperial times. More recently oil, gas and uranium all have been discovered. Oil and gas reservoirs have been found in the town of Makori, Noshpa Banda and Gurguri .

Glimpse of District Karak

Reasons for the selection of the Area

This area was selected due to following reasons;

- The area is isolated and remote, has high endemism, full of natural resources and indigenous lifestyle. Also, no previous research work has been conducted so far. But due to increasing acculturation pressure, especially after 2008 when a road was built to these foot hills villages which make the area more accessible, it became essential to preserve the indigenous knowledge before it become vanished.
- As local depend on livestock, besides this they have flexible and diverse livelihood activities including timber cutting for sell and recently increasing trend on commercial wild food plants. Due to increased market pressure and lack of individual ownership of resources especially the wild plant resources are harvesting and depleting unsustainably. So, there was a need to look at these factors for better management of these precious natural resources.

Ethnobotany deals with the study and evaluation of plant human relations in all phases of life such as food, shelter, clothes, economy etc. and the effect of plant environment on human society. The term ethnobotany was first introduced by the North American botanist John Hershberger in 1895 [1]. Ethnobotany became a separate branch of botany in 18th century for providing a new tool in various fields of science. Current definitions still fluctuate prominently, but in conclusion, it is about the study of native people's understanding and associations with plants [Balick, 1994].

Medicinal plants are an important element of aboriginal curative system. This knowledge is considered as a part of cultural assets [Heinrich et al, 1998]. However, many indigenous groups fail to sustain and preserve this communal knowledge that is why the systematic evaluation of this knowledge to contribute to health care in marginalized has been sited on programs of national and international organizations [Heinrich, 2000]. Ethnobotanical research helps in drugs discovery but the drugs which are not marketable as modern pharmaceuticals are acceptable in the country. Out of the total flowering plants reported from the world, more than 50,000 are used for medicinal purposes [Govaerts, 2001]. Pakistan has about 6,000 species of higher plants, among them 600-700 species has been reported for medicinal purposes [Shinwari, 2010]. Per a survey by Pakistan Forest Institute, 75 crude herbal drugs are extensively exported and more than 200 are locally traded in Pakistan. Crude medicinal plants material worth more than Rs.150 million per year are used in Pakistan, among which most of these plants are obtained from the wild habitat [Choudhary , 2003]. After 1980s, there had been an increased focus on ethnobotanical studies in Pakistan with focus on medicinal plants with some other aspects but on documentation level and conducted mainly in universities only which continued up till 2000 but couldn't cope with the recent advancement in this fields which result in avoiding its importance in recent research activities.

The climatic condition and topography of Pakistan offer favorable conditions for the growth and proliferation of diverse medicinal plants which constitute major part of ethno veterinary medicine (but no database of veterinary medicinal plants has been compiled so far). Pakistan has the 3rd largest herd size in the world and this sector alone contributes 11% of Pakistan's GDP and involved 35 million people.

Materials and Method

1.1 Sampling Areas

A field work was conducted for one year during 2014-2015. Several informants were interviewed for four different ethnobotanical categories (Fuel, Fodder, Medicinal and Mechanical uses). The informants were from five different villages of Karak i.e. Ambeer-kala, Tangori-chowk, Dubli-lawaghar, Tharkhako and Sarachkhel. The villages are also different in the uses of plants because former two of them are pseudo villages or towns of

the city and the later three are pure villages. Therefore, we expected different uses of plants among these different regions.

1.2 Collection and Identification

The plants specimen was collected according to standard botanical and ethnobotanical protocols, during the field work, at the occasion of walk in the wood with key informants, which were then properly dried, processed and identified. The plants were identified from the Department of Botany at University of Science and Technology Bannu, according to APGIII system of classification. The voucher specimens were deposited for future reference work.

1.3 Sampling

A detailed unstructured methodology (a methodology in which questions are not pre-arranged although some questions are arranged in advance and it is opposite to structured methodology), semi-structured (it is an open, allowing new ideas to be brought during the interview because of what the interviewer says. The interviewer in a semi-structured interview generally has a framework of themes to be explored), formal (this type of methodology is based on a fixed list of questions. The formal methodology is quicker and cheaper to complete) and informal interviews (it is not based on list of questions nor do they use fixed response categories) **(**Ganesh Kumar, 2014**)**, were performed with key informants including walking in the wood and group discussion were made during the study to get about the general concepts of locals about the natural phenomena to get familiar with ethnographic terms and their emic definitions and specifically to know about their dependence on local flora **(**Berlin , 2005**)**. When locally important ethnobotanical categories were confirmed, we used the research data to design a strategy. Successive oral free listing (it is used to collect data related to categorization or taxonomy) **(**Weller & Romney, 1998**)**, were performed to obtain more salient species of those specific ethnobotanical categories and to check the variations in individual and village's wise knowledge. Ages of interviewer were from 15-80. Free listing methodology was selected due to following reasons; emic perspective exploration, citation of species in order of familiarity, good for determining the effect of variables on individual knowledge and it is easy and quantifiable method **(**Quinlan, 2005**)**. Consent was taken from each informant before every interview and discussion and the objectives and procedure of project were explained. Local language (Pashto) was used as communication source with informants. As interviewing females were contradictory with cultural paradigm, so we only relied on male informants.

1.4 Classification of Diseases

All the human diseases were grouped. These diseases were categorized as described by the informants according to the symptoms they cause, the organs they effect and for some of them they have some local names which were an exact alternative of its English/medicinal names which were latter on reconfirmed from the regional doctors having familiarity which such local medicinal terms.

Analysis

We used simple sum total number of informants to calculate the maximum used reports for all (Fuel, Fodder, Medicinal and Mechanical) categories.

Table 1. Total Ethnobotanical uses of plant species for different categories in the studied areas of District Karak**.**

Species	Medicinal Uses	Fodder Uses	Fuel Uses	Mechanical Uses

Acacia modesta (Wall.)P.J.Hurter	11	19	38	25
Acacia nilotica(L.) P.J.Hurter&Mabb	13	18	25	30
Acacia senegal(L.)Willd		9	6	
*Alhagi maurorum*Medik.	9		12	
Aloe vera(L.) Burm.	15			
*Astragalus adscendens*Fisch.				
Boerhaavia diffusa L.	8	16	7	
*Borago officinalis*L.	2			
Calotropis procera(Aiton)W.T.Aiton.	12	18	25	
Capparis aphylla(Forssk.) Edgew.	5		10	2
Cenchrus ciliaris L.	2	23	28	
Cenchrus spinifex Cav.	7		16	
Cymbopogon jwarancusa(Jones)Schult.	6	23	24	
Cynodon dactylon(L.) Pers.	2	15	15	
*Dalbergia sissoo*Roxb.	12	9	32	28
*Datura alba*L.	2			4
Dodonaea viscosa L.	15		8	3
Eleusine tristachya(Lam.)Lam.	14	3		
*Eucalyptus alba*Reinw. Ex Blume.	5	2	7	21
Fagonia cretica L.	26	14		
Heliotropium europaeum Linn.	12	10		
*Lactuca virosa*L.	2	5		
*Medicago denticulata*Willd.	8	15	19	
*Nannorrhops ritchieana*Griff.	2			5
Rhazya stricta Decne.	8	6	31	
*Parthenium hysterophorus*L.	2	5	6	
Peganum harmala L.				

*Phoenix dactylifera*L.	3	8	2	5
Phoenix sylvestris(L.) Roxb.	6	10	5	
Phragmites karka (Retz) Trin.Ex.Steud.	8	3	10	4
Ricinus communis Linn.	3		16	
Saccharum arundinaceae Hook.	4	10	22	4
Saccharum spontaneum L.	5	7	13	
*Solanum incanum*L.	10	5	5	
*Solanum surattense*Burm.f.	20	20		
Tamarix aphylla(L.) Karst.	8		13	15
*Tribulus terrestris*L.				
*Typha angustata*Bory.	13			
*Pinus wallichiana*A. B. Jacks.	3		9	
Withania coagulans(Stocks) Dunal*s.*	19	4	18	
Withania somnifera(L.) Dunal.	5	6		
Xanthium strumarium L.	2			
Ziziphus jujuba Mill.	18	32	25	24
Ziziphus nummularia(Burm.f.)Wight&Arn.	2	15	10	5

Table2. Medicinal plants and their traditional uses against different diseases in the studied areas of District Karak.

Species	Diseases	Part used
Acacia moesta(Wall.)P.J.Hurter	Pain Killer	
	Emollient	Leaves and Bark
	Demucient	
	Diarrhea	
	Tooth Cleaner	
Acacia nilotica(L.)P.J.Hurter&Mabb	Tonic	Seeds and Bark
	Tooth Cleaner	
	Diarrhea	

	Stomach Pain	
*Alhagi maurorum*Medik.	Cooling agent	Leaves and Stem
*Borago officinalis*L.	Cough	Leaves
Calotropis procera(Aiton)W.T.Aiton	Stomach Ulcer	Whole plant
	Pain Killer	
	Fever	
	Wound Healer	
	Snake Bite	
	Burn	
	Expectorant	
Cymbopogon jwarancusa(Jones)Schult.	Kidney Problem and stone	Whole plant
*Dalbergia sissoo*Roxb.	Tooth Cleaner	Leaves and Branches
Datura alba L.	Wound Healer	Leaves
*Dodonaea viscosa*L.	Tooth Cleaner	Leaves and Branches
	Cough	
Eucalyptus alba Reinw. ex Blume	Tooth Cleaner	Branches and Leaves
*Fagonia cretica*L.	Stomach Ulcer	Whole plant
	Antidiabetic	
*Lactuca virosa*L.	Sedative	Leaves
*Medicago denticulata*Willd.	Tonic	Young stem
	Laxative	
*Nannorrhops ritchieana*Griff.	Diarrhea	Leaves
*Peganum harmala*L.	Skin	Root and Fruits
Phragmites karka(Retz) Trin.Ex.Steud.	Hepatitis A	Young stem
*Ricinus communis*Linn.	Pain Killer	Leves, Seeds and Bark
*Rhazya stricta*Decne.	Cooling agent	Root and Leaves
	Hepatitis A	
	Hepatitis B	
*Saccharum arundinaceae*Hook.	Obesity	Leaves

*Saccharum spontaneum*L.	Urinary Problem	Leaves
Solanum incanum L.	Stomach Pain	Leaves
	Anti- diabetic	
	Antimicrobial	
*Solanum surattense*Burm.f.	Stomach Ulcer	Leaves and Root
Tamarix aphylla(L.) Karst.	Pain Killer	Leaves and Bark
	Laxative	
*Pinus wallichiana*A. B. Jacks.	Tooth Cleaner	Branches
Withania coagulans(Stocks) Dunals.	Stomach Pain	Fruit
Withania somnifera(L) Dunal.	Stomach Ulcer	Leaves and Fruit
*Ziziphus jujuba*Mill.	Constipation	Fruit
	Laxative	
	Wound Healer	
Ziziphus nummularia(Burm.f.)Wight&Arn	Digestion	Fruit and Leaves

Table3. Habit wise classification of the plant species in the studied areas of District Karak.

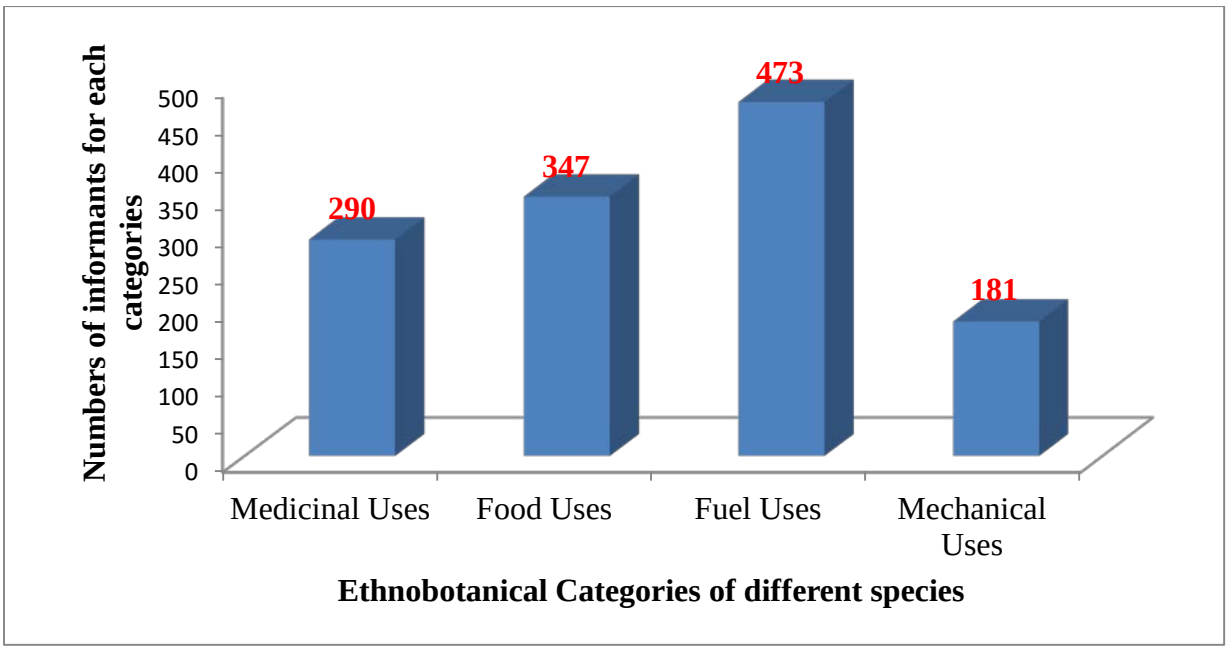
Herbs	**Shrubs**	**Trees**
Aloe vera (L.) Burm	*Alhagi maurorum*Medik.	*Acacia modesta*(Wall.)P.J.Hurter
Boerhaavia diffusa(L.)nom.cons.	*Astragalus adscendens*Fisch.	*Acacia nilotica*(L.)P.J.Hurter&Mabb
Borago officinalis L.	*Calotropis procera*(Aiton)W.T.Aiton	*Acacia senegal*(L.)Willd
*Cenchrus ciliaris*L.	*Dodonaea viscosa*L.	*Capparis aphylla*(Forssk.) Edgew
*Cenchrus spinifex*Cav.	*Nannorrhops ritchieana*Griff.	*Dalbergia sissoo*Roxb.
	*Ricinus communis*Linn.	*Eucalyptus alba*Reinw. ex Blume. .
Cymbopogon jwarancusa(Jones)Schult.	*Rhazya stricta*Decne.	*Phoenix* dactyliferaL.
Cynodon dactylon (L.) Pers.	*Saccharum*	*Phoenix sylvestris*(L.) Roxb.

	*arundinaceae*Hook.	
Datura alba L.	*Saccharum spontaneum*L.	*Tamarix aphylla*(L.) Karst.
Eleusine tristachya(Lam.)Lam.	*Typha angustata*Bory.	*Pinus wallichiana* A. B. Jacks.
*Fagonia cretica*L.	*Withania coagulans*(Stocks) Dunal*s.*	*Ziziphus jujuba*Mill.
Heliotropium europaeumLinn.	*Withania somnifera*(L.) Dunal.	*Ziziphus nummularia*(Burm.f.) Wight &Arn.
*Lactuca virosa*L.		
Launaea procumbens (Roxb.)Ramayya& Rajgopal		
*Medicago denticulata*Willd.		
*Parthenium hysterophorus*L.		
Peganum harmala L.		
Phragmites karka (Retz) Trin. Ex.Steud.		
Solanum incanum L.		
*Solanum surattense*Burm.f.		
Tribulus terrestris L.		
Xanthium strumarium L.		

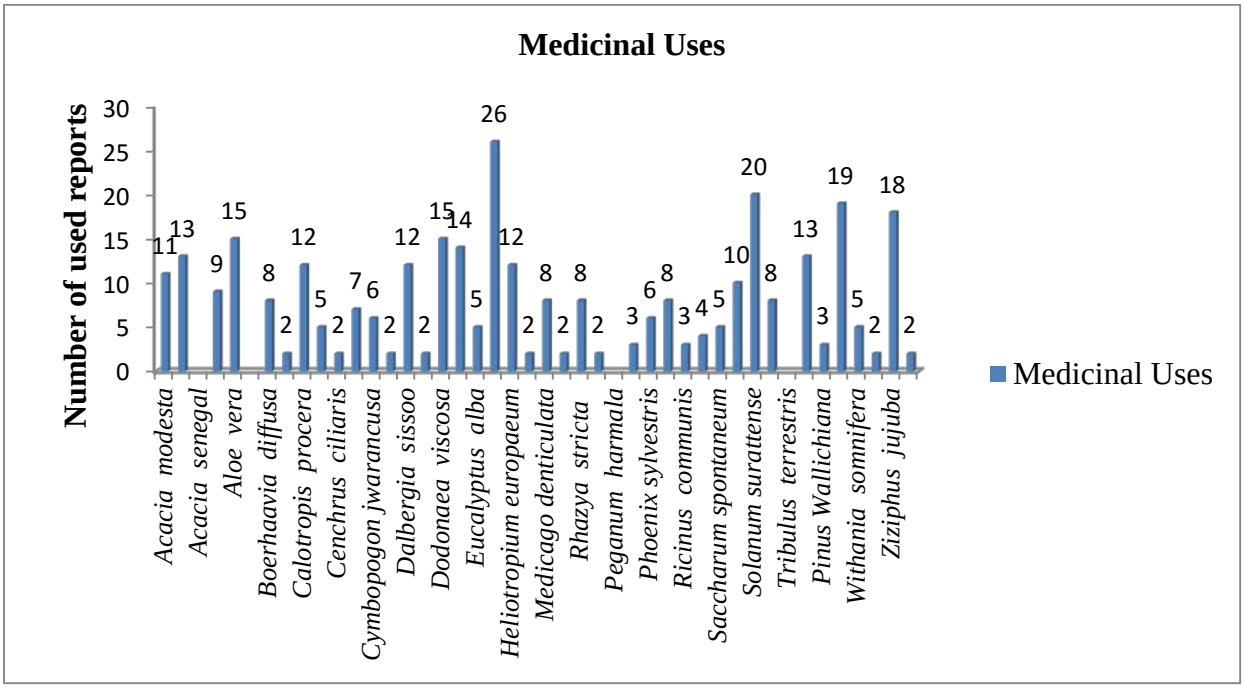
Results and Discussion

A total 45 species were obtained for four different ethnobotical categories i.e. Fuel uses, Fodder uses, Medicinal and Mechanical uses (Table 1 and Graph 1). We observed that most of the plants are used for the fuel purposes and fodder purposes. The number of used reports for the medicinal and mechanical categories were less than the fuel and fodder categories. The overall ethnobotanical findings in the area are the signs of the particular culture indicating the dependency of people on the local flora.

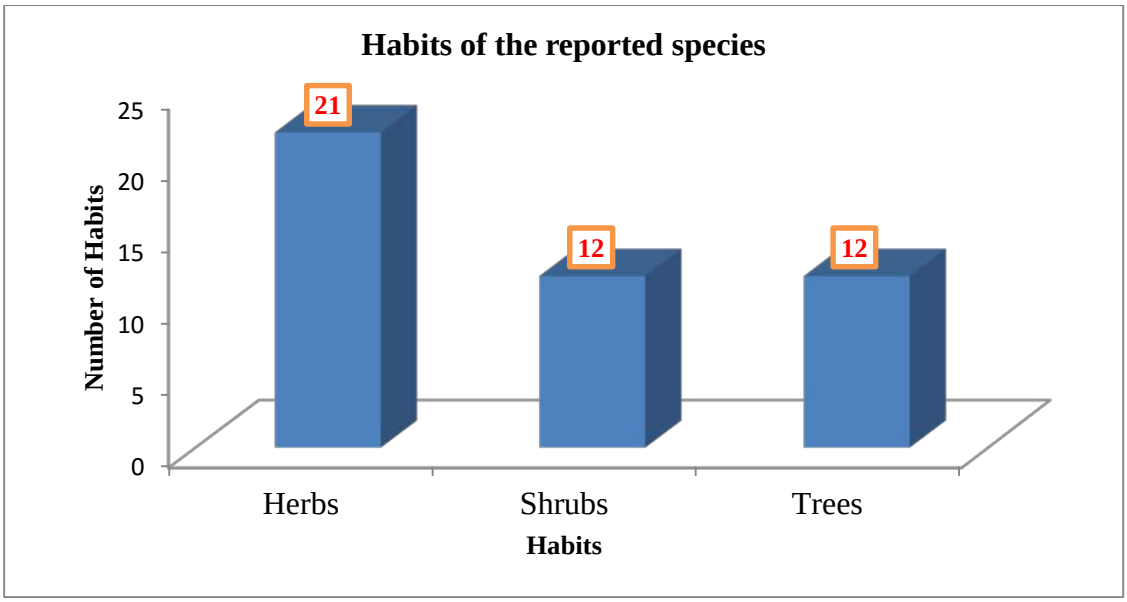
Graph1. Ethnobotanical values of different plant species for four different categories in the studied area of District Karak.



Graph2. Number of the medicinal used reports of different species for different diseases from District Karak.



Graph3. Habits of ethnobotanical plant species in the studied area of District Karak.



Fuel Uses

The fuel uses of the species were greater as compared to the other categories. In Pakistan, 90% and 60% household use fuel wood energy in rural and urban areas respectively [FAO, 2004]. They also use the plants as fuel for cooking purposes due to the non-availability of other energy resources. Nevertheless, oil and gas have been discovered in district Karak, but the gas supply is not adequate to fulfill the requirements of the people of area. Therefore, the use of plants as a fuel has been widely reported in the present study. Approximately, 90% energy for heating and cooking derives from trees **(**WWF, IUCN, 2004; - Kirubi et al., 2001**)**. In the present study, there are many plant species which are used as the source of fuel more frequently, for example, *Acacia modesta, Dalbergia sissoo, Rhazya stricta* D is used as a fuel because according to informants, it can be cut and brought easily. *Cenchrus ciliaris* L.is also abundantly present and used as fuel upon drying.

Fodder Uses

The area is economically poor so local communities depend on farming and livestock rearing with supplementation. Livestock rearing requires fodder. In the summer season, livestock graze upper lands. The lush green pastures are thus subjected to intensive overgrazing and are converted to barren lands at the end of the season. where overgrazing results in great loss to vegetation cover and wide occurrence of unpalatable weedy species of *Sambucus*, *Stipa*, *Cymbopogon jwarancusa* (Jones)Schult, *Cenchrus ciliaris* L, Ziziphus *jujuba* Mill and *Viburnum* are used as fodder and *Solanum surattense* Burm.f upon drying the animals eat it with interest and the people of the area also stored for winter.

Medicinal Uses

Medicinal plants are often the focus of ethnobotanical studies. Pas. Present study reported useful traditional medicinal uses of the plants (Table 2 and Graph 2). The traditional healers and local herbalists of the region usually make use of every part of the plant. However, it needs biochemical analysis and pharmaceutical screening to cross-check the local information. The area is not well developed and advanced therefore people use plants directly for medicinal purposes and the most frequently used plant species for medicinal uses is *Fagonia cretica* L. which is used for stomach ulcer and it is also antidiabetic due to its bitter taste. The root

and leaves extract of Solanum *surattense* Burm.f., is used for stomach ulcer in cow. The hunting is also common in district Karak, therefore according to informants sometime during hunting, they eat more, as a result, stomach pain arises, for this purpose they use the fruit of *Withania coagulans* (Stocks) Dunal*s.* The fruit of *Ziziphus jujuba* Mill., is used for constipation, laxative and wound healer by the local people because according to them it is easily available and also effective. According to them, the latex of *Aloe vera* (L.) Burm. is used more frequently for the burns, cuts (dermatitis purpose) and it has also healing properties. The leaves are dried and powdered and then mixed with oil or salt or eggs and used as antiarthritis and backache. According to some communities, it is also used for urine problems in males and females, hepatitis and hair dandruff.

Mechanical Uses

Pakistan is forest poor country as having per capita of 0.5 ha forest against world average of 1.0 ha. Only 4.8% of overall land remains covered with forest, with an annual deforestation rate of more than 3% among this a considerable part is used by the locals for self-purposes [FAO , 2002; Cronin & Pandya, 2009; Kharwal & Rawat, 2009]. Mechanical uses are generally the use of plants as timber or supporting purpose. In the present area, the frequently used plants for mechanical purposes are, *Acacia nilotica* (L.) P. J. Hurter & Mabb is well distributed in the area, the people use for making low quality doors. Wood of *Dalbergia sissoo* Roxb is considered as very tough and hard; therefore, the people of the area prefer this wood for ceiling the roof of the room. Similarly, people use the wood of *Acacia modesta* (Wall.)P.J.Hurter for making shelter rooms for domestic animals. The wood of *Ziziphus jujuba* Mill is considered of good quality by the people; therefore, it is used in making local beds, bats and sometime in ceiling of roof. The present study reported mostly herbs and shrub species (Table 3 and Graph 3); therefore, mechanical used reports were found to be less than the other categories. However, people also make few goods from the leaves and trunk of the trees, which are an important source of their income.

Conclusion

It is concluded from the present study that the natives of the region are very much dependent on plant species for their health care needs, fuel wood, and food and mechanical. Due to financial constraints, changing life styles and unavailability of resources, the local medicinal flora is facing overexploitation from the local inhabitants. Over grazing, fodder collection, logging and medicinal plants collection are major threats to the vegetation of the studied area. Such practices have resulted in the vulnerability of multipurpose species such as *Acacia modesta* (Wall.)P.J.Hurter., and *Dalbergia sissoo* Roxb.Hence., certain precautionary measures need to be addressed for the protection of threatened species. Moreover, in-situ and ex-situ conservation methods should be practiced as long-term conservation program. Conservation education may be extended to the local communities and their local technologies may be incorporated in developing plant. Alternative resources should be explored to reduce indiscriminate use and cutting for fuel purposes. Horticulture crops especially fruits, off season vegetable and mushrooms culture may be extended for the economic uplift of the area and reducing pressure of fuel wood on the forests. Moreover, there is an urgent need to document the traditional knowledge of the area, which is another step towards the conservation of local flora. The local community may be educated and trained for the collection and sustainable use of medicinal flora. Additionally, the native healers may also be encouraged to accurately inculcate their traditional knowledge to local community.

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