

ETHNOBOTANY AND CONSERVATION STATUS OF FLORAL DIVERSITY OF HIMALAYAN RANGE OF AZAD JAMMU AND KASHMIR – PAKISTAN

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Abstract

The objective of the study was to determine the ethnobotanical uses and conservation status of the flora of Azad Jammu and Kashmir and its allied areas (Fig. 1). Among 168 species studied 140 plant species have medicinal value, 60 species were used as food, 109 species were used as fodder, 116 species were used for fuel purpose and 150 species were used for miscellaneous uses. Most of the plants are used for multiple purposes. A statistical formula was used to calculate the use values (UVs) of some selected species and the relationship between people's age and extent of their knowledge about plants so as to develop a valuation hierarchy of the selected flora. Conservation status of threatened flora has also been determined according to IUCN criteria. Among 33 species, 12 species were vulnerable, 4 were endangered, 7 were critically endangered, 8 were rare and 2 species were extinct in the area. Rapid decline of plant resources needs in-situ and ex-situ conservation and training of the community regarding collection of medicinal plants and their marketing.

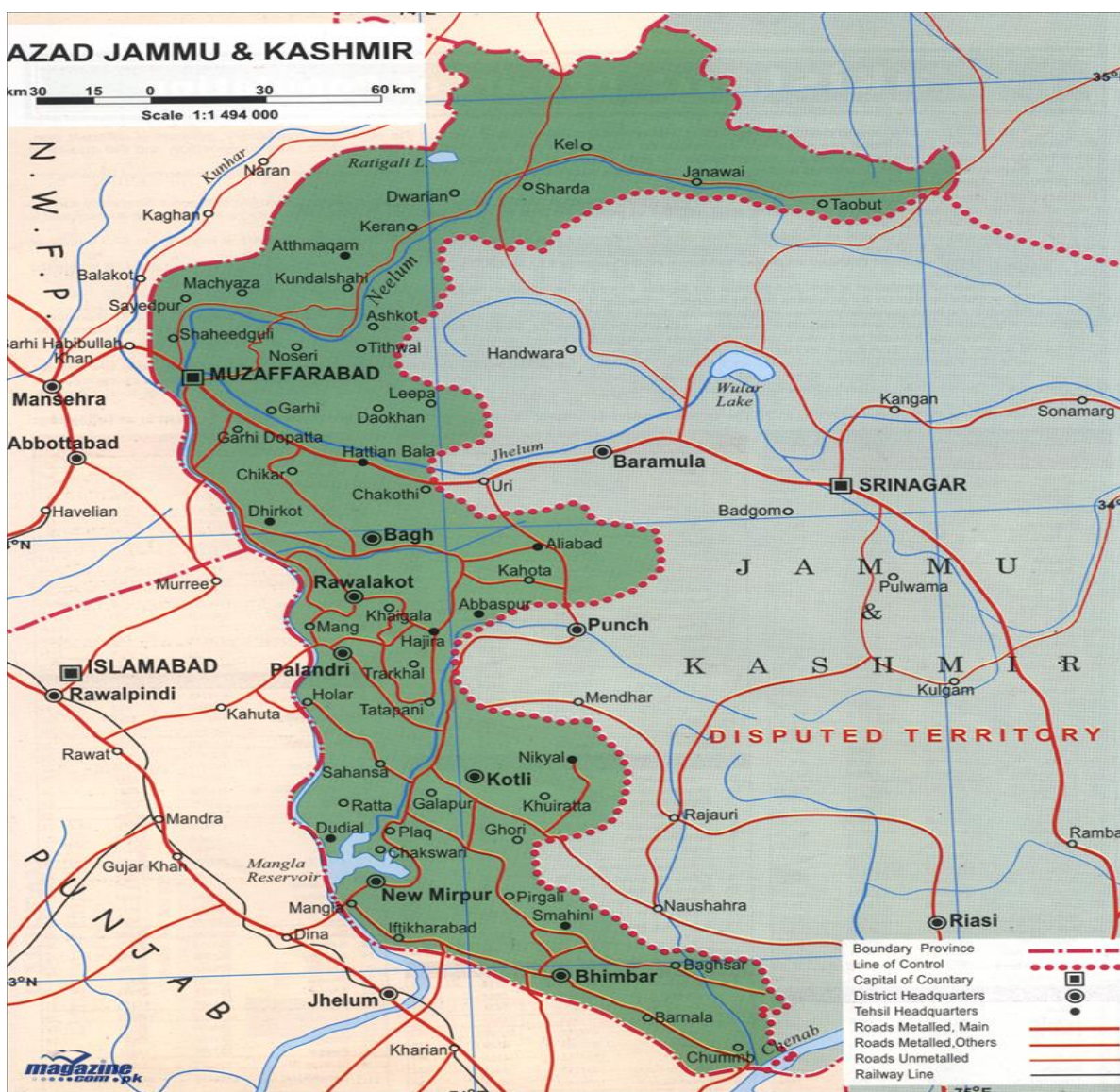


Fig. 1. Map of study area.

Introduction

Azad Jammu and Kashmir (AJK) is located in the foothills of the Himalayas between 73 to 75° east longitude and 33 to 35° north latitude. It borders the present-day Indian-controlled state of Jammu and Kashmir to the east (separated from it by the Line of Control), Khyber Pakhtunkhwa to the west, Gilgit Baltistan to the north, and the Punjab Province of Pakistan to the south. With its capital at Muzaffarabad, largest city Mirpur, Azad Kashmir covers an area of 13,297 square kilometers and has an estimated population of about four million. The northern part of AJK encompasses the lower area of the Himalayas, including Jamgarh Peak 4,734 meters. The topography of the area is mainly hilly and mountainous with valleys and stretches of plains. The climate is sub-tropical highland type with an average yearly rainfall of 1300 mm.

About 400-600 medicinal plant species out of a total 5700 are estimated to exist in Pakistan (Shinwari & Qaisar, 2011). In early 1950 up to 84% of Pakistan population was dependent on traditional medicines for all or most of their medicinal use (Hocking, 1958). Mountainous regions provide a naturally conducive environment for the growth of medicinal flora. In Himalayan ranges at least 70% of the medicinal plants and animals in the region consist of wild species, 70-80% of the population depend on traditional medicines health care (Pie & Manadhar, 1987; Shaheen *et al.*, 2011; Shaheen & Shinwari, 2012).

Stewart, (1972) conducted vegetation surveys of Poonch valley including comprehensive collections of ferns and flowering plants. The ethnobotany of Chikar and allied areas of District Muzaffarabad was investigated by Saghir *et al.*, (2001) and 53 plant species belonging to 48 genera of 33 families were found useful mostly as medicinal, fuel, fodder, fruit, timber and vegetables. Bukhari, (1996) carried out an ethnobotanical exploration during 1995 to 1996 in Machiara National Park, Muzaffarabad, Azad Kashmir. Bukhari reported 69 plant species were being used as crude drugs by the tribal people and folklore for treating various ailments. Haq & Hussain, (1995) conducted a survey of medicinal plants of Palandri District, Poonch, Azad Kashmir. The survey revealed that there were 47 medicinal plants in the area. Sadiq, (1996) described 37 medicinal plants from Azad Kashmir and determined their quantitative availability. He also described methods of propagation of medicinal plants in the area. Khan, (1996) recorded more than 202 plant species from the Machyara National Park area, Azad Kashmir. He reported that local people are dependent on these plant resources for different requirements. It was found that about 80 plant species are used extensively in the area. Sheikh, (1996) while describing medicinal plants from Pakistan, listed 25 medicinal plants from Azad Kashmir. Recently, Shaheen *et al.*, (2011 & 2012) documented indigenous knowledge of Bagh and other parts of Kashmir.

Gorsi & Shahzad, (2002) documented the ethno medicinal importance of plants in Dirkot. They forced to start regeneration work to save the traditional knowledge about plants. Ishtiaq *et al.*, (2006) stated that plants are indirectly associated to the culture and tradition of the

people. They stated 36 plant species used for the treatment of various diseases in Samahni valley. The data shows the dependent of people on plants for their daily life needs and can provide the basis for further research. Khan *et al.*, (2010) indicated that the inhabitants of Poonch Valley utilized 169 plant species for more than 30 domestic needs. Ajaib *et al.*, (2010) provided ethnobotanical data on 38 species of shrubs belonging to 36 genera and 25 families of District Kotli, Azad Jammu and Kashmir. Khan *et al.*, (2011) reported that 72% of folk medicinal knowledge comes from people above the age of 50 years, while 28% of it comes from people between the ages of 30 and 50. Mehmood *et al.*, (2011) worked on ethnobotany of plants from Neelum valley, Azad Jammu and Kashmir. He reported that 40 plant species belonging to 31 families were found to be valuable for medicinal, food, fodder/forage, fuel, timber, shelter and agricultural purposes. The existing ethnobotanical knowledge of the area will not remain intact long because of the fact that the people are shifting their dependence from medicinal plants to allopathic and other hi-tech drugs. The folk recipes used for curing common diseases in the area need to be documented. There are several other reports from the adjoining mountainous areas of Kashmir (Shinwari & Gilani, 2003; Saqib *et al.*, 2011).

Material and Methods

Ethnobotanical information was collected following the procedure of Martin (1995). Purposive questionnaires were devised to identify the indigenous knowledge of plant-based remedies from local people. Information was gathered through semi-structured interviews that were held with selected knowledgeable elders in local language. Repeated queries were made to get the data confirmed. The outcome of the results was rechecked and compared with literature. Conservation status of ethnobotanically valued flora of the study area was studied by using IUCN criteria (version 3.1). This version included nine different categories which were modified to five categories and criteria for rare species were also included in the present study.

The use value of plant species and the relationship between people's age and the extent of their knowledge about plants was calculated by using the following statistical formula:

$$UV_s = \sum U_{is} / nis$$

UV stands for the use value attributed to particular species by one informant. This value was calculated by first summing all of the uses indicated by the symbol \sum mentioned in each event by the informant (U_{is}) and dividing by the total number of events in which that informant gave information on the species. The result was added to calculate use value derived from other local people. Then it was divided by the total number of people interviewed about that particular species (nis) to yield the overall value as indicated in the formula. A comparison was made between the use values given by younger and aged people of the community (Phillips *et al.*, 1994).

Results and Discussion

Among 168 species studied 140 plant species have medicinal value, 60 species were used as food, 109 species were used as fodder, 116 species were used for fuel purpose and 150 species were used for miscellaneous uses (Fig. 2, Table 1). The miscellaneous uses of plants include pot herbs, spices and condiments, ornamental plant species, agricultural tools, basket making, cosmetics, dish cleaner, house decoration, field fencing, furniture, narcotics, packing material, sticks and handles, shade tree and for making utensils. Similar ethnobotanical projects were also reported by Hamayun (2003), Ahmad *et al.*, (2004), Shinwari & Shah (1996). Similarly, Iqbal & Hamayun (2004) classified the plants of Malam Jabba into medicinal plants, agroforestry based plants, vegetable and pot herbs, ornamental, honey bee attractance,

agricultural tool making, plants yielding edible fruits, thatching and sheltering, fencing and hedge plants, poisonous and timber yielding plants.

The conservation status of 33 species was noted in the study area according to IUCN criteria. It was found that 37% species were vulnerable, 12% were endangered, 21% were critically endangered, 24% were rare and 6% species were extinct in the area (Fig. 3, Table 2). During the survey 3 groups of people were formed viz. 20-40 years, 40 to 60 years and above 60 for the use values of the selected plants. The people of the first group have given 5.5 UVs for *Punica granatum* and the third group has given 12.6 UVs (Fig. 4, Table 3). There is a considerable gap between these two values and it is because of the fact that the people are shifting their dependence from medicinal plants to allopathic and other hi-tech drugs.

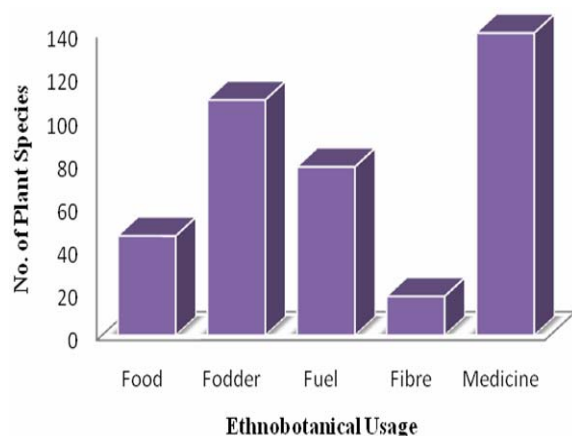


Fig. 2. Ethno botanical uses of selected plant species of Azad Jammu and Kashmir.

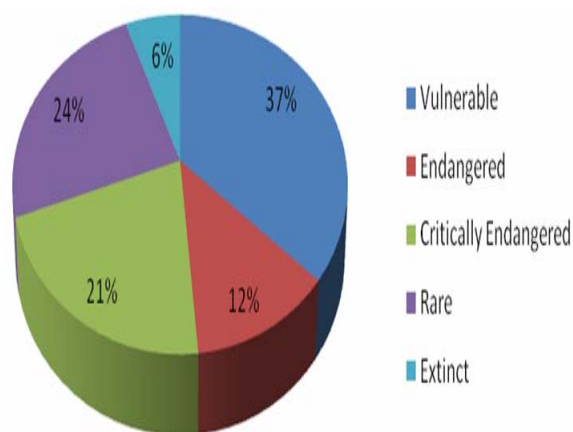


Fig. 3. Conservation status of selected plant species of Azad Jammu and Kashmir.

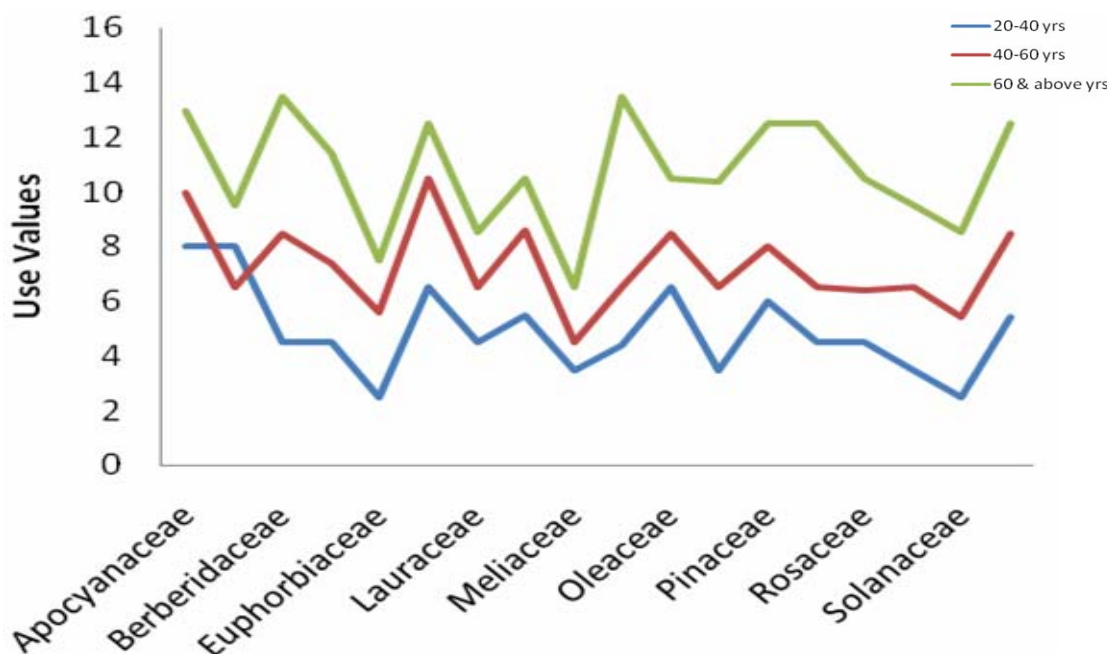


Fig. 4. Use Values of some selected plants species of Azad Jammu and Kashmir.

Table 1. Ethno botanical profile of selected floral biodiversity of Azad Jammu and Kashmir.

S.No.	Plant species	Food	Fodder	Fuel	Fiber	Medicines	Miscellaneous
1.	<i>Abies pindrow</i> Royle	-	+	+	-	+	+
2.	<i>Acacia modesta</i> Wall	-	+	+	-	+	+
3.	<i>A. nilotica</i> (L.) Delile	-	+	+	-	+	+
4.	<i>A. catechu</i> (L.) Willd.	-	+	+	-	+	+
5.	<i>A. caesia</i> (L.) Willd.	-	-	-	-	-	+
6.	<i>Addhatoda vesica</i> Nees	-	+	+	-	+	+
7.	<i>Aesculus indica</i> (Wall. ex Camb.) Hook.f.	-	+	+	-	+	+
8.	<i>A. excelsa</i> Roxb.	-	-	+	-	+	+
9.	<i>Agave cantula</i> Roxb.	-	-	-	+	+	+
10.	<i>A. americana</i> L.	-	-	-	+	+	+
11.	<i>Albizia lebbek</i> (L.) Benth.	-	+	+	-	+	+
12.	<i>A. odoratissima</i> (L. f.) Benth.	-	+	+	-	+	+
13.	<i>A. procera</i> (Roxb.) Benth.	-	+	+	-	+	+
14.	<i>A. julibrissin</i> Durazz.	-	+	+	-	+	+
15.	<i>Alnus nitida</i> (Spach) Endl. Gen.	-	+	+	-	+	+
16.	<i>Aloe vera</i> (L.) Burm. f.	-	-	-	-	+	+
17.	<i>Ailanthus altissima</i> (Mill.) Swingle	-	-	+	-	+	+
18.	<i>Araucaria cookie</i> R. Br. ex D. Don.	-	-	-	-	-	-
19.	<i>Arundo donax</i> L.	-	+	+	-	+	+
20.	<i>Astragalus scarabaeoides</i> (L.) Baker	-	-	-	-	+	+
21.	<i>Azadirachta indica</i> A. Juss. (L.)	-	+	+	-	+	+
22.	<i>Bauhinia variegata</i> L.	+	+	+	-	+	+
23.	<i>Berberis lyceum</i> Royle	+	+	+	-	+	+
24.	<i>Bischofia javanica</i> Blume	-	-	-	-	-	+
25.	<i>Baugainvillea glabra</i> Choisy	-	-	-	-	-	+
26.	<i>B. spectabilis</i> Willd	-	-	-	-	-	+
27.	<i>Broussonetia papyrifera</i> (L.) Vent.	-	+	+	+	-	+
28.	<i>Butea monosperma</i> (Lam.) Taub.	-	+	+	-	+	+
29.	<i>Buxus sempervirens</i> L.	-	-	+	-	-	+
30.	<i>Calotropis procera</i> (Aiton) W. T. Aiton	-	-	+	-	+	+
31.	<i>Carissa opaca</i> Stapf. Ex Haines	+	+	+	-	+	+
32.	<i>Cassia angustifolia</i> Vahl.	-	-	-	-	+	+
33.	<i>C. fistula</i> L.	-	+	+	-	+	+
34.	<i>Citrus aurantium</i> L.	+	-	-	-	+	-
35.	<i>C. aurantifolia</i> (Christm.) Swingle	+	-	-	-	+	-
36.	<i>Cedrela toona</i> Roxb ex Willd	-	+	+	-	+	+
37.	<i>C. serrata</i> Royle	-	+	+	-	+	+
38.	<i>Cedrus deodara</i> (Roxb.) D. Don	-	-	+	-	+	+
39.	<i>Cestrum aurantiacum</i> Lindl.	-	-	-	-	+	+
40.	<i>C. nocturnum</i> L.	-	-	-	-	+	+
41.	<i>Celtis australis</i> L.	-	+	+	-	+	+
42.	<i>Citrus limetta</i> Rissoo	+	-	-	-	+	+
43.	<i>C. limon</i> L.	+	-	-	-	+	-
44.	<i>C. reticulata</i> Blanco	+	-	-	-	+	-
45.	<i>C. sinensis</i> (L.) Osbeck	+	-	-	-	+	-
46.	<i>Cassia obtusifolia</i> L.	-	-	-	-	-	+
47.	<i>C. occidentalis</i> L.	-	-	-	-	-	+
48.	<i>Colebrookia oppositifolia</i> Smith	-	+	+	-	+	+
49.	<i>Cordia myxa</i> L.	+	+	+	-	+	+
50.	<i>Crataegus ssongarica</i> K. Koch	+	+	+	-	+	+
51.	<i>Cycas revoluta</i> Thunb.	-	-	-	-	-	+
52.	<i>C. circinalis</i> Roxb.	-	-	-	-	-	+
53.	<i>Cydonia oblonga</i> Mill.	+	+	+	-	+	+
54.	<i>Dalbergia sissoo</i> Roxb.	-	-	+	-	+	+
55.	<i>Datura alba</i> L.	-	-	-	-	+	+
56.	<i>D. innoxia</i> Mill.	-	-	-	-	+	+
57.	<i>Debregeasia salicifolia</i> (D. Don) Rendle	+	+	-	+	+	+

Table 1. (Cont'd.).

S.No.	Plant species	Food	Fodder	Fuel	Fiber	Medicines	Miscellaneous
58.	<i>Dendrocalamus strictus</i> (Roxb.) Nees	-	+	-	-	+	+
59.	<i>Desmodium monotorium</i> (Houtt) Merril	-	-	+	-	-	+
60.	<i>Diospyros lotus</i> L.	+	+	+	-	+	+
61.	<i>D. kaki</i> Thunb.	-	-	-	-	-	-
62.	<i>Dodonaea viscosa</i> Jacq.	-	-	+	-	+	+
63.	<i>Datura stramonium</i> L.	-	-	-	-	+	+
64.	<i>Elaeagnus angustifolia</i> L.	+	+	+	-	+	+
65.	<i>Eucalyptus citriodora</i> (Hook.) K. D. Hill & L. A. S. Johnson	-	-	+	-	+	+
66.	<i>E. globulus</i> Labill.	-	-	+	-	+	+
67.	<i>Elaeagnus umbellata</i> Thunb	+	+	+	-	+	+
68.	<i>E. latifolia</i> L.	+	+	+	-	+	+
69.	<i>Eriobotryan japonica</i> (Thunb.) Lindl.	+	-	-	-	+	+
70.	<i>Eucalyptus rostrata</i> Scldt.	-	-	+	-	+	+
71.	<i>E. sideroxylon</i> A. Cunn. Ex Woolls	-	-	+	-	+	+
72.	<i>E. tereticornis</i> Sm.	-	-	+	-	+	+
73.	<i>Eugenia jambolana</i> Lam.	+	+	+	-	+	+
74.	<i>Euphorbia pulcherrima</i> Willd ex Klotzsch	-	-	-	-	-	+
75.	<i>Ficus auriculata</i> Lour.	+	+	+	-	+	+
76.	<i>F. bengalensis</i> L.	-	+	+	-	+	+
77.	<i>F. carica</i> L.	+	+	+	-	+	+
78.	<i>F. elastica</i> Roxb.	-	-	-	+	-	+
79.	<i>F. foveolata</i> Wall. ex Miq.	-	+	+	-	+	+
80.	<i>F. racemosa</i> L.	+	+	+	-	+	+
81.	<i>F. lacor</i> Ham. F. Roxb.	-	+	+	-	+	+
82.	<i>F. nerifolia</i> J. E. Sm.	+	+	+	-	+	+
83.	<i>F. palmata</i> Forssk.	+	+	+	-	+	+
84.	<i>F. reliogiosa</i> L.	-	+	+	-	+	+
85.	<i>Flacourtia indica</i> (Burm. f.) Merrill	+	+	+	-	+	+
86.	<i>Grevillea robusta</i> A. Cunn. ex R. Br.	-	-	-	-	-	+
87.	<i>Grewia optiva</i> Drum. ex Burret.	-	+	+	+	+	+
88.	<i>Gymnosporia royleana</i> Wall. ex Lawson	+	+	+	-	+	+
89.	<i>Hippophae rhamnoides</i> L.	+	-	-	-	+	+
90.	<i>Ipomea carnea</i> Jace.	+	+	+	-	+	+
91.	<i>Jacaranda mimosifolia</i> D. Don	-	-	+	-	-	+
92.	<i>Jasminum officinale</i> L.	-	-	-	-	+	+
93.	<i>J. humile</i> L.	-	-	-	-	+	+
94.	<i>J. sambac</i> (L.) Aiton	-	-	-	-	+	+
95.	<i>Juglans regia</i> L.	-	-	-	-	+	+
96.	<i>Leucaena Leucocephala</i> (Lam.) de Wit	-	+	+	-	+	+
97.	<i>Mallotus philippensis</i> (Lam.) Muell.	-	+	+	-	+	+
98.	<i>Mangifera indica</i> L.	+	+	+	-	+	+
99.	<i>Melia azedarach</i> L.	+	+	+	+	+	+
100.	<i>Morus alba</i> L.	+	+	+	+	+	-
101.	<i>M. indica</i> L.	+	+	+	+	+	-
102.	<i>M. laevigata</i> Wall ex Brandis	+	+	+	+	+	+
103.	<i>M. nigra</i> L.	+	+	+	+	+	+
104.	<i>M. serrata</i> Roxb.	+	+	+	+	+	+
105.	<i>Myrsine africana</i> L.	-	+	+	-	+	-
106.	<i>Neolitsea chinensis</i> (Lam.) Chun.	+	+	+	-	+	+
107.	<i>Nerium odorum</i> Aiton	-	-	+	-	+	+
108.	<i>Olea europaea</i> L.	+	+	+	-	+	+
109.	<i>O. ferruginea</i> Royle	+	+	+	-	+	+
110.	<i>Opuntia dillenii</i> Haw	-	+	-	-	+	+
111.	<i>Ostegia limbata</i> (Benth.) Boiss.	-	+	+	-	+	+
112.	<i>Prunus domestica</i> L.	+	+	+	-	-	-
113.	<i>P. armeniaca</i> L.	+	+	+	-	+	+

Table 1. (Cont'd.).

S.No.	Plant species	Food	Fodder	Fuel	Fiber	Medicines	Miscellaneous
114.	<i>Paulownia tomentosa</i> (Thunb.) Stued.	-	+	+	-	-	-
115.	<i>Prunus bokhariensis</i> Royle ex C. K. Schneid.	+	+	+	-	+	+
116.	<i>P. ciliata</i> Royle	+	+	-	-	-	+
117.	<i>P. communis</i> L.	+	+	+	-	+	+
118.	<i>Populus euphratica</i> Olivier	+	+	-	-	-	+
119.	<i>P. euamericana</i> Guarieuto	+	+	-	-	-	+
120.	<i>Periploca aphylla</i> Dcne.	-	-	+	-	+	+
121.	<i>Phoenix dactylifera</i> L.	+	-	-	-	+	+
122.	<i>P. humilis</i> Royle	+	-	-	-	+	+
123.	<i>Phyllanthus embilica</i> L.	+	+	+	-	+	+
124.	<i>Pinus roxburgii</i> Sargent	-	-	+	-	+	+
125.	<i>P. wallichiana</i> A. B. Jackson	-	-	+	-	+	+
126.	<i>Platanus orientalis</i> L.	-	-	-	-	+	+
127.	<i>Pyrus lindeyi</i> Redh.	+	+	+	-	+	+
128.	<i>Populus nigra</i> L.	+	+	-	-	-	+
129.	<i>P. alba</i> L.	+	+	-	-	-	+
130.	<i>Pyrus pashia</i> Ham. ex D. Don	+	+	+	-	+	+
131.	<i>Prosopis glandulosa</i> Torr.	+	+	+	-	+	+
132.	<i>Prunus persica</i> (L.) Batsch.	+	+	+	-	+	+
133.	<i>Psidium guajava</i> L.	+	+	-	-	+	+
134.	<i>Phoenix sylvestris</i> (L.) Roxb.	+	-	-	-	+	+
135.	<i>Punica granatum</i> L.	+	+	+	-	+	+
136.	<i>Pyrus malus</i> L.	+	+	+	-	+	+
137.	<i>Quercus dilatata</i> Lindl. ex Royle	-	+	+	-	+	+
138.	<i>Q. glauca</i> Thunb.	-	+	+	-	+	+
139.	<i>Q. incana</i> W. Bartram.	-	+	+	-	+	+
140.	<i>Rhamnus triquerta</i> (Wall.) Brandis	-	+	+	-	+	+
141.	<i>Rhus cotinus</i> L.	-	+	+	-	-	-
142.	<i>Ricinus communis</i> L.	-	+	-	-	+	+
143.	<i>Rosa macrophylla</i> Lindl.	-	+	-	-	+	+
144.	<i>Rubinia pseudoacacia</i> L.	+	+	+	-	+	+
145.	<i>Rosa brunonii</i> Lindl.	-	+	-	-	+	+
146.	<i>R. indica</i> L.	-	+	-	-	+	+
147.	<i>Rubus ulmifolius</i> Schott.	+	+	+	-	+	+
148.	<i>Salix alba</i> L.	-	+	+	-	-	-
149.	<i>Salmalia malabarica</i> (DC) Schott & Endl.	-	-	+	+	-	+
150.	<i>Sapindus mukorosii</i> Gaertn.	-	+	+	-	+	+
151.	<i>Schinus molle</i> L.	-	+	+	-	-	-
152.	<i>Solanum pseudocapsicum</i> L.	-	+	+	-	+	+
153.	<i>Terminalia arjuna</i> (Roxb.) Wight & Arn.	-	+	+	-	+	-
154.	<i>Tecoma stans</i> (L.) Juss. ex Kunth	-	+	+	-	-	+
155.	<i>Terminalia bellirica</i> (Gaertn.) Roxb.	-	+	+	-	+	+
156.	<i>Ulmus villosa</i> Brandis ex Gamble	-	+	+	-	+	+
157.	<i>Viburnum cotinifolium</i> D. Don.	-	+	+	-	+	-
158.	<i>Vitis vinifera</i> L.	-	+	+	-	+	+
159.	<i>Vitex negundo</i> L.	-	+	-	-	+	+
160.	<i>V. negundo</i> L. cv. Kashmiriana	-	-	+	-	+	+
161.	<i>V. parviflora</i> A. L. Juss	-	+	+	-	+	+
162.	<i>Withania somnifera</i> (L.) Dunal	-	+	+	-	+	-
163.	<i>Woodfordia fruticosa</i> (L.) Kurz	-	+	+	-	+	-
164.	<i>Zanthoxylum armatum</i> DC	-	+	+	+	+	+
165.	<i>Ziziphus oxyphylla</i> Edgew.	-	+	+	+	+	+
166.	<i>Z. jujuba</i> Mill	-	+	+	+	+	+
167.	<i>Z. nummularia</i> (Burm. f.) Wight & Arn.	-	+	+	+	+	+
168.	<i>Z. sativa</i> Gaertn.	-	+	+	-	+	+

Table 2. Conservation status of selected plant species of Azad Jammu and Kashmir.

S.No.	Name of species	Family	Vulnerable	Endangered	Critically endangered	Rare	Extinct
1.	<i>Dendrocalamus strictus</i> (Roxb.) Nees	Bambusaceae	--	--	--	+	--
2.	<i>Cordia dichotoma</i> Frost. F.	Boraginaceae	+	--	--	--	--
3.	<i>Cassia obtusifolia</i> L.	Caesalpinaceae	--	--	--	+	--
4.	<i>Quercus dialata</i> Lindl. ex Royle	Fagaceae	+	--	--	--	--
5.	<i>Q. glauca</i> Thunb	Fagaceae	+	--	--	--	--
6.	<i>Q. Incana</i> Bartram	Fagaceae	+	--	--	--	--
7.	<i>Flacourtia indica</i> (Burm. f.) Merrill	Flacourtiaceae	--	--	+	--	--
8.	<i>Neolitsea chinensis</i> (Lam.) Chun.	Lauraceae	--	--	+	--	--
9.	<i>Acacia catechu</i> (L.) Willd. Oliv.	Mimosaceae	--	--	+	--	--
10.	<i>Albizia odoratissima</i> Benth.	Mimosaceae	--	--	--	+	--
11.	<i>A. procera</i> (Roxb.) Benth.	Mimosaceae	--	--	--	--	+
12.	<i>A. julibrissin</i> Durazz.	Mimosaceae	--	--	--	--	+
13.	<i>Ficus bengalensis</i> L.	Moraceae	--	--	--	+	--
14.	<i>F. foveolata</i> Wall. ex Miq.	Moraceae	--	--	+	--	--
15.	<i>F. racemosa</i> L.	Moraceae	--	--	+	--	--
16.	<i>F. nerifolia</i> Sm.	Moraceae	+	--	--	--	--
17.	<i>F. lacor</i> Ham. F. Roxb.	Moraceae	--	--	+	--	--
18.	<i>F. religiosa</i> L.	Moraceae	+	--	--	--	--
19.	<i>Morus laevigata</i> Wall ex Brandis	Moraceae	--	--	--	+	--
20.	<i>Dalbergia sissoo</i> Roxb.	Papilionaceae	--	--	--	+	--
21.	<i>Desmodium motorium</i> (Houtt.) Merrill	Papilionaceae	--	--	+	--	--
22.	<i>Abies pindrow</i> Royle	Pinaceae	+	--	--	--	--
23.	<i>Cedrus deodara</i> (Roxb.) G. Don	Pinaceae	+	--	--	--	--
24.	<i>Prunus bukhariensis</i> Royle ex C. K. Schn.	Rosaceae	--	+	--	--	--
25.	<i>P. armeniaca</i> L.	Rosaceae	--	+	--	--	--
26.	<i>Pyrus pashia</i> L.	Rosaceae	+	--	--	--	--
27.	<i>P. lindleyi</i> Redh.	Rosaceae	--	+	--	--	--
28.	<i>P. communis</i> L.	Rosaceae	--	+	--	--	--
29.	<i>Salix alba</i> L.	Salicaceae	+	--	--	--	--
30.	<i>Ulmus villosa</i> Brandis ex Gamble	Ulmaceae	+	--	--	--	--
31.	<i>Debregeasia salicifolia</i> (D. Don) Rendle	Ulmaceae	+	--	--	--	--
32.	<i>Vitex negundo</i> L.	Verbenaceae	--	--	--	+	--
33.	<i>Lantana indica</i> Roxb.	Verbenaceae	--	--	--	+	--

It was observed that commercial gatherers collect medicinal plants in large amounts from remote areas of the valley. Such activity is likely causing a rapid depletion of medicinal plant resources in the area. Similar activities have been reported in other areas such as Swat (Sarwat *et al.*, 2012) whereas Choudhry *et al.*, (2000) reported that 500 local families were involved in medicinal plant collection and that they collected 5000 tons of medicinal plants annually. It is likely that similar harvest pressures are at work here. Many species were found to be used in the study area for veterinary medicine. Similar reports have come from nearby areas such as Samahni Valley District Bimber Azad Kashmir (Ishtiaq *et al.*, 2006).

Fuel wood is likely one of the prime causes of forest destruction in study area because the winter season is long and very harsh. People need fuel for heating and cooking. Similar study was conducted by Shinwari & Khan, (1999) in Margalla Hills National Park. Martin, (1995) revealed that the chief threat to the trees and shrubs of the Sulaiman range is the fuel shortage and that during long and severe winter seasons a huge amount of wood is used as fuel.

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. Similar observations were reported by Rawat & Uniyal, (1993) for the alpine meadows of Jammu & Kashmir, where overgrazing results in great loss to vegetation cover and wide occurrence of unpalatable weedy species of *Sambucus*, *Stipa*, and *Viburnum*. Similarly, Khan (1994) reported that thorn forest area of Punjab is under decline due to overgrazing, felling, wind erosion, desertification, salinity and water logging.

Traditional knowledge of herbal medicine is disappearing (Shinwari, 2010). Above the 60 years old people of the area have valuable wealth of information about the use of the indigenous medicinal plants, which should be conserved through conduct of surveys. The local community especially young generation should be encouraged to actively involve themselves in conservation practices.

Table 3. Use value (UVs) of selected plant species of Azad Jammu and Kashmir.

S. No.	Plant species	20-40 Years	40-60 Years	60 and Above
1.	<i>Abies pindrow</i>	6	8	10.5
2.	<i>Alnus nitida</i>	4.5	7.4	11.4
3.	<i>Bauhinea variegata</i>	3.5	6.5	10.4
4.	<i>Berberis lyceum</i>	4.5	8.5	13.5
5.	<i>Carissa opaca</i>	8	10	13
6.	<i>Cedrella toona</i>	4.5	7.4	11.4
7.	<i>C. serrata</i>	4.5	6.4	10.5
8.	<i>Cedrus deodara</i>	4	8	10.5
9.	<i>Debregea siasalicifolia</i>	6.5	10.5	10.5
10.	<i>Ficus bengalensis</i>	3.5	6.5	12.6
11.	<i>F. carica</i>	6.4	7.5	12.4
12.	<i>F. racemosa</i>	3.5	7.5	9.5
13.	<i>F. palmata</i>	6.4	6.5	13.5
14.	<i>F. religiosa</i>	3.5	5.4	7.4
15.	<i>Neolitsea chinensis</i>	3.8	6.5	8.5
16.	<i>Mallotus philipensis</i>	2.5	5.4	7.5
17.	<i>Melia azedarach</i>	3.5	4.5	6.5
18.	<i>Morus alba</i>	4.4	6.5	13.5
19.	<i>M. indica</i>	4.5	8.5	12.5
20.	<i>M. laevigata</i>	4.6	6.5	10.5
21.	<i>M. nigra</i>	4.6	5.5	7.4
22.	<i>M. serrata</i>	4.6	5.5	12.4
23.	<i>Nerrium odroum</i>	3.4	5.4	10.5
24.	<i>Olea ferruginea</i>	6.5	8.5	10.5
25.	<i>Pheonix dactylifera</i>	4.6	6.5	9.5
26.	<i>Pinus roxburgii</i>	6	8	12.5
27.	<i>Platanus orientalis</i>	4.5	6.5	12.5
28.	<i>Pyrus pashia</i>	4.5	6.4	10.5
29.	<i>Punica granatum</i>	5.5	7.5	12.6
30.	<i>Quercus incana</i>	6.5	10.5	12.5
31.	<i>Ricinus communis</i>	2.5	5.6	7.5
32.	<i>Terminalia bellirica</i>	4.5	6.4	10.5
33.	<i>Vitex negundo</i>	5.4	8.5	12.5
34.	<i>Withania somnifera</i>	2.5	5.4	8.5
35.	<i>Woodfordia fruticosa</i>	5.5	8.6	10.5
36.	<i>Zanthoxylum armatum</i>	3.5	6.5	9.5

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