

Tradable and Conservation Status of Medicinal Plants of Kurram Valley, Parachinar, Pakistan

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ABSTRACT

Present study was carried out to find the conservation status, explore the channels for tradable medicinal plants and motivate the inhabitants to use their knowledge in a better way. Several study trips were made to the study area. Kurram agency is one of the seven tribal areas in the Federally Administered Tribal Areas (FATA). Present study revealed that 37 % of the total utility plants are critically endangered, 20 % are endangered, 35% are vulnerable and only 8% are secured. Several drug dealers were interviewed by filling 70 questionnaires to confirm the local names, estimated price, and quantity of the drugs available.

INTRODUCTION

Kurram Agency is one of the seven tribal areas in the Federally Administered Tribal Areas (FATA). The Kurram Agency is easy to be located on the map as Parachinar, the major town of the valley which is close to the spot where 34th parallel of latitude crosses the 70th parallel (Stewart 1982). The forests of Koh-e-sufaid (tallest mountain of Kurram Agency) slopes are Himalayan in nature and are mesophytic (Gilani *et al* 2003). The area is very rich in flora and very little ethno botanical work has been done. Natural forests cover about 10.5% of its area while the forest department has planted about 5% area for reforestation. About 25% area is under agriculture and the rest 59.5% is wasteland. The total area of the Upper Kurram is 87,742 hectares (District Census Report, Kurram Agency 1999). The major forest

type of the agency is dry sub-tropical forest and sub Alpine scrub forest. The dry sub tropical is found in the Southern parts while the other two types are found in the Northern parts of the study area. The climate of the Kurram Agency varies at different altitudes and presents striking contrasts from sultry oppressive heat to bitter cold. Within a few hours journey of one can pass from region where snow “never falls to recesses where it never melts” (Khan *et al* 2005). The climatic condition of Kurram is high land type. In January and February the climate is harsh from snow, rain and chilly weather and some time foggy. The lowest ever temperature at Kurram was recorded -13.4°C on 29th January 2005 and the highest ever temperature 39.9°C on 27th June 2005 (Khan 2005). Plants not only provide food, fiber, and shelter for the human beings and their animals, but contain a wide range of chemical compounds. These compounds are used in pharmaceuticals, flavor, fragrance, colors and as insecticides. The use of plants in medicines is a very old and reliable practice.

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Medicinal plants remained the primary source of medicines throughout the world. Any plant or part of a plant like root, stem, leaf, bark, fruit, and seed which contain active chemical constituents in the tissue that produce a definite physiological response in the treatment of various diseases in human and in the animals are called medicinal plants (Shinwari *et al* 2003). Most of medicinal plants are used in the form of crude drugs now a day. Crude drugs which consist of natural substances that has under other processes than collection and drying. Medicinal drugs passes through many processes like collection i.e. root, rhizome bark, flowers, fruits, seed harvesting, drying, garbling, and storage (Aburjai *et al* 2006). Pakistan does not meet its total requirements of herbal medicines and has to import major part from Nepal, Sri Lanka, India, China, and Kenya. In Pakistan out of 600 species used as medicines, only 300 species are available in market (Shinwari *et al* 2002). and on the global level some 35,000-plant species are used medicinally (Khan and Humayun 2003). By surveying the literature it has been concluded that only a single paper has been published on the ethno botany of five villages of Upper Kurram Agency Zeran, Kirman, Shalozan, Pewar and Malana (Gilani *et al* 2003). This study is about the identification the conservation status of medicinal plant and their price of the whole Upper Kurram Agency Parachinar. The 37% of total utility plants are critical endangered, 20% are endangered, 35% vulnerable and 8% secure.

MATERIAL AND METHOD

All the relevant materials were thoroughly studied before going into the field. The medicinally important plants were collected from different local areas. Local people include plant collectors and other age group basis was interviewed for the local uses and marketing efforts were made to create awareness among local communities about the conservation of the medicinal plants. Most of the data were collected through literature in different libraries. Market survey was conducted in order to find the prices of various drugs. Several drug dealers were interviewed by filling 70 questionnaires to confirm the local name, price, and quantity available of the drugs.

RESULTS AND DISCUSSION

Figure 1 shows the present investigations which were based on 105 identified and 7 unidentified medicinal plants species (Annexure II), 98 genera belonging to 60 families (Table 4.1). Among them Fungi (Helvelaceae) and Gymnosperms (Pinaceae) were represented by one family each, Pteridophytes were represented by two families (Polypodiaceae and Equisetaceae), Monocots by four families (Alliaceae, Araceae, Liliaceae, and Poaceae), while rest of the 52 families all belonged to the Dicotyledon. The well represented families were Lamiaceae (10 species), Asteraceae (8 species), Rosaceae (5 species), Poaceae (3 species), Asclepiadaceae (3 species), Euphorbiaceae (3 species), Moraceae (3 species), Papilionaceae (3 species), Ranunculaceae

(3 species), Solanaceae (3 species), Alliaceae (2 species), Amaranthaceae (2 species), Apiaceae (2 species), Brassicaceae (2 species), Polygonaceae (2 species) and remaining 40 families were represented by one species each.

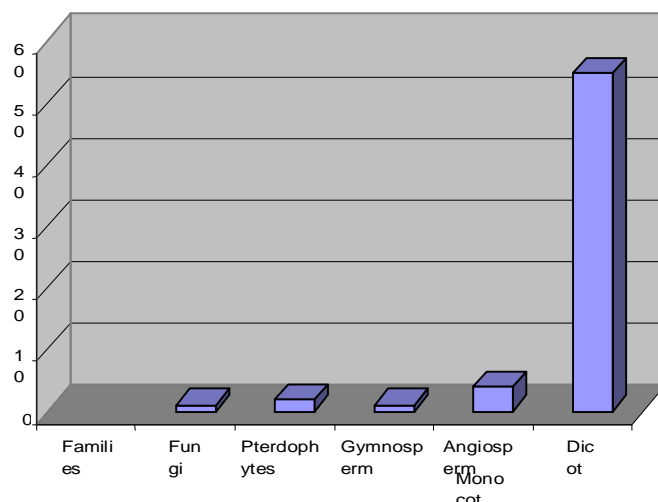


Fig. 1: The number of different families of medicinal plants.

The tradable medicinal plants are *Artemisia absinthium* (Mastyra), the price of dried powdered form without stalk was Rs. 700(8.6\$) per mound, the price of *Seriphidium kurramensis* of dried powdered form without stalk Rs. 400-500(5.8\$) per mound, *Teucrium stocksianum* (Kherbooti) the price was Rs. 170(1.9\$)/mound dried and Rs. 80(0.9\$) fresh with stalk, *Papaver somniferum* price per Kg of dried capsule Rs.100 and *Morchella esculenta* (Korkichok), the price per Kg Rs. 6000(69.8\$) in Parachinar market and 10000(116.0\$) in the Peshawar market. Market survey of the main city of Parachinar, Sadda, Village Bughday, Lalmay, Mulabagh, Shalozan and Pewar were conducted and the necessary information was recorded. Based on the market survey it was identified that there were no trade of medicinal plants except *Seriphidium kurramensis*, *Artemisia absinthium* L., *Morchella esculenta*, and *Teucrium stocksianum* Boiss and *Tanacetum artemisioides* L. The *Seriphidium kurramensis*, *Artemisia absinthium* and *Teucrium stocksianum* were exported to different parts of the country. The maximum produced medicinal plants were *Seriphidium kurramensis* followed by *Teucrium stocksianum* and *Artemisia absinthium* because of its occurrence in the adjacent fields. The production of *Morchella esculenta* is very low due to early collection and grows just after the rainfall. *Artemisia absinthium* and *Seriphidium kurramensis* are traded from Lalmay, Pewar, Shalozan and Bughday. Both are anthelmintic in nature and was purchased by Kurram Chemical Rawalpindi in past. The price of *Seriphidium kurramensis* of dried powdered form without stalk Rs. 400-500(5.8\$) per mound, *Artemisia absinthium* price Rs. 700(8.6\$) per mound, due to lack of collector and no market. *Teucrium stocksianum* was traded from Pewar, Nastikot, Malikhel and Bughday. It is insect repellent, antipyretic, blood purifier and anti sugar. The dried with stalk

price was Rs. 100(1.16\$)/mound and in fresh form with stalk, it is Rs.40 (0.4\$)/mound. In 2006 the price was Rs. 170(1.9\$)/mound dried and Rs. 80 fresh with stalk. *Morchella esculenta* was sold at Rs 2500(26\$)/Kg in 2002, Rs 6000(64.5\$)/Kg in 2006-07, and Rs. 10000(108.2\$) in 2010-11 in local market of Parachinar city. It is usually sold in Peshawar and Ralwalpindi markets at higher costs. Due to low price at local markets, local people have stopped growing plants like *Teucrium stocksianum* and *Artemisia absinthium*.

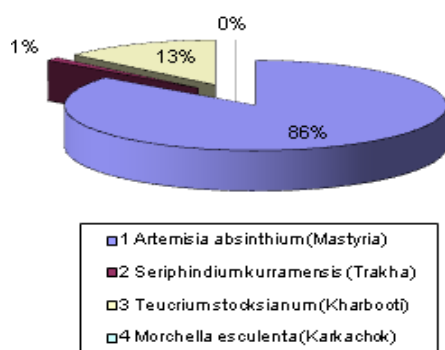


Fig. 2: Percentage of annual consumption of four species of medicinal plants in Kurram.

Table. 1: Estimated Annual Consumption of Tradable Medicinal Plants in Study Area:

S. No.	Name of Plant	Annual Consumption in (KG)	Price/Kg
1	<i>Artemisia absinthium</i> L(Mastyria)	1,16,000	11-14(0.16\$)
2	<i>Seriphidium kurramensis</i> Q(Tarkha)	1,12,000	6-12(0.13\$)
3	<i>Teucrium stocksianum</i> Boiss(Kharbooti)	1,28,000	3-6(0.06\$)
4	<i>Morchella esculenta</i> (Karkachok)	200	10000(116\$)
5	<i>Papaver somniferum</i> L	Unknown	100(1.16\$)

The local community uses most of medicinal plants for their domestic purpose. Few local Hakims were also preparing the drugs for commercial purposes which are sold in the market in two shops. The most famous Hakim is Syed Hussain Bad Shah Zakir who's the trader of medicinal drugs and he is very popular in whole Agency.

Conservation status of medicinal plants

Present study revealed that 37% of total utility plants are critical endangered, 20% are endangered, 35% vulnerable and 8% secure.

Table.2: The Conservation Status of Medicinal Plants.

S/No	Plant Name	Critical endangered	Endangered	Vulnerable	Secure
1	<i>Morchella esculenta</i> Prs ex. Fr	+	-	-	-
2	<i>Adiantum capillus</i> L.	-	-	+	-
3	<i>Equisetum arvensis</i> Linn.	-	+	-	-
4	<i>Pinus wallichiana</i> Jackson	+	-	-	-
5	<i>Allium griffithianum</i> Boiss.	-	+	-	-
6	<i>Allium sativum</i> L.	-	-	-	+
7	<i>Arisaema utile</i> Hook.	+	-	-	-
8	<i>Tulipa stellata</i> L.	-	-	-	+
9	<i>Asparagus officinalis</i> Royle.	+	-	-	-
10	<i>Fritillaria roylei</i> Hook.	-	+	-	-
11	<i>Avena sativa</i> L.	-	-	-	+
12	<i>Hordeum vulgare</i> L.	-	-	-	+
13	<i>Zea mays</i> L.	-	-	+	-
14	<i>Artemisia absinthium</i> L.	+	-	-	-
15	<i>Artemisia vulgaris</i> L.	-	+	-	-
16	<i>Cichorium intybus</i> Linn.	-	+	-	-
17	<i>Senecio chrysanthemoides</i> Dc.	+	-	-	-
18	<i>Seriphidium kurramensis</i>	-	-	+	-
19	<i>Sonchus asper</i> (L)Hill.	-	-	+	-
20	<i>Tagetes minuta</i> L.	+	-	-	-
21	<i>Taraxacum officinale</i> Webber.	-	-	+	-
22	<i>Xanthium strumarium</i> Linn.	-	+	-	-
23	<i>Tanacetum artemisioides</i> L.	+	-	-	-
24	<i>Achyranthes aspera</i> L.	+	-	-	-
25	<i>Amaranthus viridis</i> L.	-	-	-	+
26	<i>Angelica glauca</i> Edgew	+	-	-	-
27	<i>Foeniculum vulgare</i> Mill.	+	-	-	-
28	<i>Coriandrum sativum</i> L.	-	-	+	-
29	<i>Caralluma tuberculata</i> N.E.Brown.	+	-	-	-
30	<i>Periploca aphylla</i> Decne.	+	-	-	-
31	<i>Calotropis procera</i> (wild) R.Br.	+	-	-	-
32	<i>Hedera nepalensis</i> K. Koch	+	-	-	-
33	<i>Berberis lycium</i> Royle.	-	+	-	-
34	<i>Brassica rapa</i> L.	-	-	+	-
35	<i>Lepidium sativum</i> L.	-	-	+	-
36	<i>Onosma hispidum</i> Wall.	+	-	-	-
37	<i>Cannabis sativa</i> L.	-	-	-	+
38	<i>Chenopodium album</i> L.	-	-	-	+
39	<i>Colchicum luteum</i> Baker.	+	-	-	-
40	<i>Cucurbita maxima</i> Duchesne.	-	-	+	-

41	<i>Ipomea hederacea</i> L. Jacq.	+	-	-	-
42	<i>Sambucus nigra</i> L.	-	-	+	-
43	<i>Sempervivum tectorum</i> L.	+	-	-	-
44	<i>Dioscorea deltoidea</i> wall.	+	-	-	-
45	<i>Diospyros lotus</i> L.	-	+	-	-
46	<i>Euphorbia helioscopia</i> Linn.	-	-	+	-
47	<i>Euphorbia wallichii</i> Hooke.	+	-	-	-
48	<i>Chrozophora tinctoria</i> Linn.	+	-	-	-
49	<i>Ephedra intermedia</i> Wall.ex.stapf.	+	-	-	-
50	<i>Fumaria indica</i> (Hausk) pugsl.	-	-	+	-
51	<i>Quercus ilex</i> Roxb.	-	-	+	-
52	<i>Aesculus indica</i> wall.ex. Comb.	-	-	+	-
53	<i>Hypericum perforatum</i> L.	+	-	-	-
54	<i>Juglans regia</i> Linn.	-	+	-	-
55	<i>Marrubium vulgare</i> L.	+	+	-	-
56	<i>Mentha longifolia</i> Linn. Huds.	-	+	-	-
57	<i>Mentha viridis</i> L.	-	-	-	+
58	<i>Nepeta kurramensis</i> L.	+	-	-	-
59	<i>Prunella vulgaris</i> Linn.	+	-	-	-
60	<i>Salvia moorcroftiana</i> wall.	-	+	-	-
61	<i>Thymus linearis</i> Benth.	-	-	+	-
62	<i>Teucrium stocksianum</i> Boiss.	-	+	-	-
63	<i>Ziziphora tenulor</i> Linn.	+	-	-	-
64	<i>Malva sylvestris</i> L.	-	-	-	+
65	<i>Melia azedarach</i> L.	+	-	-	-
66	<i>Acacia nilotica</i> L.Delile.	-	+	-	-
67	<i>Ficus carica</i> L.	-	+	-	-
68	<i>Morus nigra</i> L.	-	-	+	-
69	<i>Morus alba</i> L.	-	-	+	-
70	<i>Jasminium grandiflorum</i> L.	-	+	-	-
71	<i>Epilobium hirsutum</i> L.	+	-	-	-
72	<i>Argemone mexicana</i> L.	+	-	-	-
73	<i>Papaver somniferum</i> L.	-	+	-	-
74	<i>Indigofera tinctoria</i> L.	-	-	+	-
75	<i>Robinia pseudacacia</i> L.	-	+	-	-
76	<i>Trifolium repens</i> L.	-	-	-	+
77	<i>Plantago major</i> L.	-	-	+	-
78	<i>Plantago lanceolata</i> L.	-	-	+	-
79	<i>Polygonum plebejum</i> L.	-	-	+	-
80	<i>Rumex dentatus</i> L.	-	-	+	-
81	<i>Portulaca quadrifida</i> L.	-	-	+	-
82	<i>Punica granatum</i> L.	-	-	+	-
83	<i>Skimmia laureola</i> (DC) Sieb & Zuec.Ex.	-	+	-	-
84	<i>Aconitum heterophyllum</i> Wall.	+	-	-	-
85	<i>Caltha alba</i> Jack.ex.comb.	-	-	+	-
86	<i>Ranunculus muricatus</i> L.	-	-	+	-
87	<i>Cratagus sonagarica</i> G.Koch.	+	-	-	-
88	<i>Fragaria chiolensis</i> L.	-	+	-	-
89	<i>Pyrus communis</i> L.	-	+	-	-
90	<i>Rosa indica</i> L.	-	-	+	-
91	<i>Rubus fruticosus</i> Miller.	-	-	+	-
92	<i>Gallium aparine</i> L.	-	-	+	-
93	<i>Berginia ciliata</i> (Haw.) Sternb.	+	-	-	-
94	<i>Aillanthus altissima</i> SW.	-	-	-	-
95	<i>Cardiospermum halicacabum</i> L.	-	-	+	-
96	<i>Datura stramonium</i> L.	-	-	+	-
97	<i>Solanum nigrum</i> L.	-	-	+	-
98	<i>Solanum surattense</i> Burm.f.	+	-	-	-
99	<i>Verbascum thapsus</i> L.	-	-	+	-
100	<i>Daphne mucronata</i> Royle.	-	-	+	-
101	<i>Celtis australis</i> L.	+	-	-	-
102	<i>Urtica dioica</i> Linn.	+	-	-	-
103	<i>Valeriana jatamansi</i> Jones.	+	-	-	-
104	<i>Voila canescens</i> Wall.	-	-	+	-
105	<i>Oxalis corniculata</i> L.	-	-	-	+

(+) symbol shows the conservation status of medicinal plants

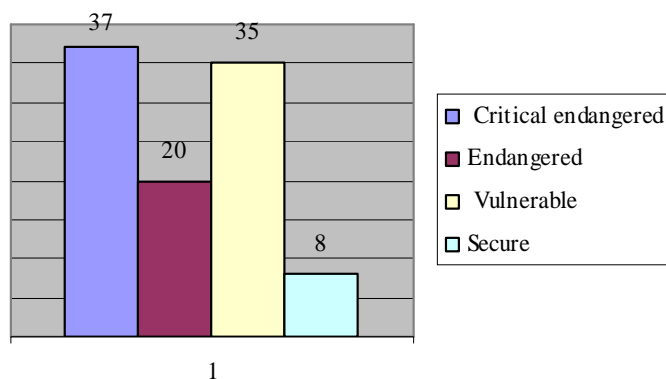


Fig. 3: The conservation status of medicinal plants in percentage

Plant Conservation

Conservation status was studied by developing a new conservation assessment scale. In Kurram, most of the critical endangered species have great medicinal importance. In order to study the conservation status of medicinal plants, transect walks were made during different seasons through the area, which covered all slopes, aspects and altitudes. Local people got valuable information about plant abundance, distribution and localities of their maximum availability. The plants were confirmed through field visits. Personal observations were made in the field keeping several parameters in consideration. Field observation includes range extent and area occupancy, exploitation level, plants availability, conservation efforts, plants collection techniques, part collected, invasive plants, threats (population, urbanization, deforestation, lack of awareness etc). The plant species were then categorized into critical endangered, endangered, vulnerable and secured.

Development of Conservation Status Scale

In order to find out conservation status of the plant species in a specific area, different localities of that area need to be surveyed. The threatened plant species can be sorted out by using field observation, information from the local people and reports of earlier collectors on the flora of that area. The conservation status score of a plant species at different localities was then added and divided by the total numbers of localities visited.

Conservation Status Scale (CSS) =

Total conservation score of a species at different localities

Total No. of localities visited

Conservation Status

Total localities visited = 60

If a Specie found in = 10

Critical endangered

If a Specie found in = 20

Endangered

If a Specie found in = 40

Vulnerable

If a Specie found in = more than 40

Secure

CONCLUSION

The last phase of this work was the documentation of the data obtained during field work. During documentation process the flora collected during the study was documented properly. The medicinal data obtained during field work was checked and compared with the available literature. Present study revealed that 37 % of the total utility plants are critically endangered, 20 % are endangered, 35% are vulnerable and only 8% are secured. Several drug dealers were interviewed by filling 70 questionnaires to confirm the local names, estimated price, and quantity of the drugs available.

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