

*Full Length Research Paper*

## Medicinal plants and their uses in selected temperate zones of Pakistani Hindukush-Himalaya

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Pakistan is bestowed with diversity of non-timber forest products (NTFPs), particularly medicinal plant resources, which are used by the marginal communities for domestic and commercial purposes. This study focused on the traditional uses of plant species with the objective to document non-timber forest flora and its characteristics, and to also assess the current state of knowledge associated with these medicinal plants. The results of field surveys and literature review of the temperate region showed the presence of 196 non-timber forest species belonging to 151 genera. Among them, 124 species are herbaceous, almost 78% plants are perennial and about 44% plants are adapted to the condition from partial shady to sunny. Medicinally important plants species are 152 (78%), in which majority of the plants (81 species) are used for curing intestinal diseases. Aged men and women knew more about medicinal plants. *Bergenia ciliate*, *Morchella esculenta*, *Paeonia emodi*, *Valeriana jatamansi* and *Viola canescens* are economically valuable species for the marginal communities. The overall marketing chain, from collection to the final consumer has resulted in 98% market prices losses to the medicinal plants collectors. Moreover, unsustainable collection practices and lack of marketing capacity has deteriorated the existence of certain medicinal plants. It was concluded from the present study that sturdy approaches of awareness and management of economically important medicinal plant resources would not only help the species to be conserved but will also help in improving livelihood opportunities.

**Key words:** Non-timber forest products, conservation, rural livelihood, indigenous knowledge.

### INTRODUCTION

The Hindukush-Himalayan (HKH) region is one of the 10 mega-centres and part of one of the 34 biodiversity hotspots in the world (Sharma and Chettri, 2005). The medicinal plants of HKH are habitat specific (Dhar et al., 2000) and are an integral part of the diverse traditional medical practices in the region (Ghimire et al., 2004). The HKH are facing new problems and opportunities in almost

every aspect of the economy, environment, and the society (Banskota, 2000). During the last few years, the habitat of medicinal plants across this region has been under pressure due to urbanization and exploitation of raw materials by pharmaceutical companies (Tandon, 1996). Yet, for all its biological diversity, it is among the least known of the world's mountain systems (Banskota, 2000). Thus, the most pressing challenge in the HKH is to conserve biodiversity and improve the livelihood of dependent communities (Sharma and Chettri, 2005).

Pakistan has a diverse flora containing a total of 1572 genera and 5521 species mostly confined to the

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**Figure 1.** Map of the study area. (A) Pakistan and the location of the study region. (B) The study region with the Ayubia National Park (ANP) boundary (inside boundary), its surrounding forests (outside boundary).

Hindukush, Himalaya and Karakorum region (Sheikh et al., 2002; Ali and Qaiser, 2010). People collect about 600 species of medicinal plants as one of the major non-timber forest products (NTFPs) (Latif and Shinwari, 2006; Shinwari, 2010). Of these species, 500 are commonly used in traditional health care practices and 350 are traded for millions of US dollars to national and international markets (Ahmad, 2003). Twenty-eight leading manufacturing units of Greco-Arabic, Ayurvedic and Homeopathic are involved in using medicinal plants for making various recipes of which 75 crude herbals drugs are extensively exported (Hamayun, 2004). About 60 thousand traditional practitioners (Hakeems) in rural and remote areas utilize more than 200 plants as household remedies for curing several disease (Hamayun, 2004). Medicinal plants are found more abundantly in mountainous region than in plain areas. Shinwari (2010) mentioned more than 80% of plant diversity in the mountain regions of Pakistan.

This study has been carried out in the Khyber Pakhtunkhwa (KPK) Province, formerly known as the Northwest Frontier Province of Pakistan, which constitutes 40% of the country's forested area (Lubna, 2001; Latif and Shinwari, 2006), and stretch across the Himalayas and Hindukush mountain ranges. Our study area consisted of the Ayubia National Park (ANP) coupled with its surroundings and Miandam valley which are the model temperate zones. Several studies have been done in the ANP and Miandam; however, most of them are unpublished. We aimed to gather the related information through field survey and literature search and make it available for conservation strategy development

and awareness for sustainable use. The objectives of this study are (i) to document the reported flora, its characteristics and uses from all possible sources and (ii) to assess the current state of knowledge of non-timber forest products in ANP with respect to other case studies of similar region.

## METHODOLOGY

### Study area

ANP and its surrounding forests constitute 8,978 ha area. ANP with an area of 3,312 ha is among the 21 national parks in Pakistan and is situated between 33°-01' to 34°-38' N latitude and 73°-20' to 73°-30' E longitude (Figure 1). The natural vegetation in this area is Himalayan moist forest (Aumeeruddy et al., 2004), with a population approximately 50,000. ANP has reserved and *Guzara* forests. Reserved forests are defined as the forests in which all acts are prohibited, while *Guzara* forests on the other hand are left relaxed by the government to meet the domestic requirement (forest products) of local people. A part of the reserved forest was declared as National Park in 1984 (ANP) (Farooque, 2002; WWF-P, 2004). The Miandam valley is similar to ANP as the natural vegetation of the valley constitutes Hindukush-Himalayan moist temperate forest. Geographically, the area can be traced on 35°, 02' N and 72°, 33' E (Rehman, 2002). Miandam valley consist of 4388 ha area (Adnan et al., 2006) with the altitude range of 1400 to 3800. The Miandam valley has a population of 19,516 (Adnan et al., 2006). About 3000 people are earning 25% of their total income from the collection and sale of plants (Begum and Adnan, 2006; Sher et al., 2010). The indigenous knowledge is being threatened by modernization (Sher et al., 2010). The Miandam forests are state owned protected forests (Nafees and Asghar, 2009), in which all acts (grazing, grass cutting, fuelwood collection, etc) are allowed until prohibited by the government.

In both areas (ANP and Miandam), different forest land-use types are available consisting of old-growth forests (with little human interference), forests degraded by logging, derived woodlands (grazing areas), agroforests, degraded areas, naturally re-growth forests and plantation forests (reforestation areas) (Adnan and Hölischer, 2010; Adnan and Hölischer, 2011).

### Data collection and analysis

Data was collected in two parts. First part of data collection was carried out from June 2009 to September 2010, in which we documented species used as non-timber forest products at Ayubia National Park and its surroundings from the available literature (Gilani et al., 2001; Ibrar, 2003; Shafiq, 2003; WWF-P, 2004; Hameed and Begum, 2005; Sher and Hussain, 2007; Gilani et al., 2010). Species names (Latin), family names and publication authors were corrected according to the Flora of Pakistan (Ali and Qaiser, 2010) and the software Index Kewensis version 2. Related information such as local names, habit, reproduction, part use, uses as NTFPs and medicinal uses were also collected from the available literature. Most of the local names of plants are in two languages - *Hindko* (spoken in the ANP) and *Pashto* (spoken in the Miandam). Habit consisted of species characteristics such as climbers, herb (also mushrooms), shrub and trees. Perennial, biennial and annual nature of plants was termed as reproduction status.

A plant may have been used for only one part or several parts such as leaves, whole plants, roots or tuber, stem or bark, flowers and seeds or fruits. Species used as non-timber forest products has been put in 16 categories namely medicinal, fodder, fuelwood, vegetables, furniture, thatching, fruit, narcotic, handicraft (baskets, hats, sweeps, ropes, weaving clothes, walking sticks, house materials, knife stick, agricultural appliances, tea, insecticides, cosmetics, dye, fencing and others (plant breeding, fish poison, shady, writing ink, bees attractant, spiritual). While medicinal uses have been divided into 21 categories such as use for chest related diseases, intestinal diseases etc (Appendix). Data on most of species for their adaptation to sun or shade was collected from online web data base "plants for a future" (Larkcom, 1997) and verified from discussion with locals and WWF-P representatives. However, some of the species were not listed in the database, therefore, information on those species were collected from the local people. They were divided into six groups in terms of adaptation to various light conditions such as deep shady species, deep shady to partial shady species, deep shady to sunny species, partially shady species, partial shady to sunny species and sunny species. All percentages and graphs were developed in Microsoft Excel.

The second part of the study was based on social data collected between July to October 2005 from Miandam valley. This part of the study was conducted in two villages located in proximity to the Miandam valley's forest, namely Gujarokaley and Swatookaley. Gujarokaley has 300 households and a population of 2460, while Swatookaley has 400 households and 3280 population. Data on peoples profession were collected from 10% household heads (70) randomly selected from the aforementioned two villages. Mostly the household heads are the sole economic source for the whole family (Adnan et al., 2006). They were asked questions about their primary occupation and also any other subsidiary occupation in which they also involve their family members such as agriculture, medicinal plants collection etc. Data was also collected on the number of children, women and men involved in collection, processing and marketing of medicinal plants per household.

Total economic losses in medicinal plants from collection to marketing stage were collected in two steps. First step of data on physical losses during collection, processing and grading was collected from literature (Gilani et al., 2003). In the second step

data was collected on offered price to collector, local market price and national or international market price. For this purpose market survey was also undertaken for five medicinal plant species. Combination of the these two steps enabled us in estimating the total market losses to the local collector since collection to the final consumer price. Fifty respondents of different age groups were randomly selected in two study villages of the Miandam valley, whom were asked about the number of plants known to them, which gave us an idea about the indigenous knowledge.

## RESULTS

### Plants and uses at Ayubia National Park

Ayubia national park and its surroundings consist of a total of 196 plant species belonging to 73 families and 151 genera (Annexure). Most of the 124 plant species were herbs, while 32 and 28 species were trees and shrubs, respectively. Reproductively, 78% plants were perennials, 17% annual and 5% biennial. About 44% of plants were adapted to the condition from partial shady to sunny, 27% to sunny, 13% deep shady to partial shady and 6% to deep shady conditions. Majority of 55% plant species were collected for leaves being used as non-timber forest products (Table 1). As non-timber forest products, maximum of 152 plant species were used as medicinal plants followed by 86 species as fodder (Figure 2). In medicinal plants, majority of 81 (41%) plant species were used for the treatment of various intestinal diseases. This is followed by 58 (30%) plants used for chest diseases (Figure 3). Data on vulnerability status of medicinal plants was available on 67 medicinal plant species, of which 12 plant species were highly vulnerable (Table 1).

### Medicinal plants collection, processing and marketing in the temperate Himalaya

Children (47%) were mostly involved in collection, women (55%) in processing and men (70%) in the marketing (Figure 4). Around 10% people were involved as primary occupation to medicinal plants marketing, while 30% were involved as subsidiary occupation to medicinal plants (Figure 5). Strong positive correlation ( $r^2=0.8$ ,  $P<0.01$ ) has been observed between the age of people and number of plants known. This indicates that with the increase in age, people know more about plants (Figure 6). Five plant species *Bergenia ciliate*, *Morchella esculenta*, *Paeonia emodi*, *Valeriana jatamansi* and *Viola canescens* were highly valuable to the local people. Highest losses in monetary terms to the local collector from collection stage to the final market price was observed in *B. ciliate* (98%) followed by *V. canescens* (90%) (Table 2).

## DISCUSSION

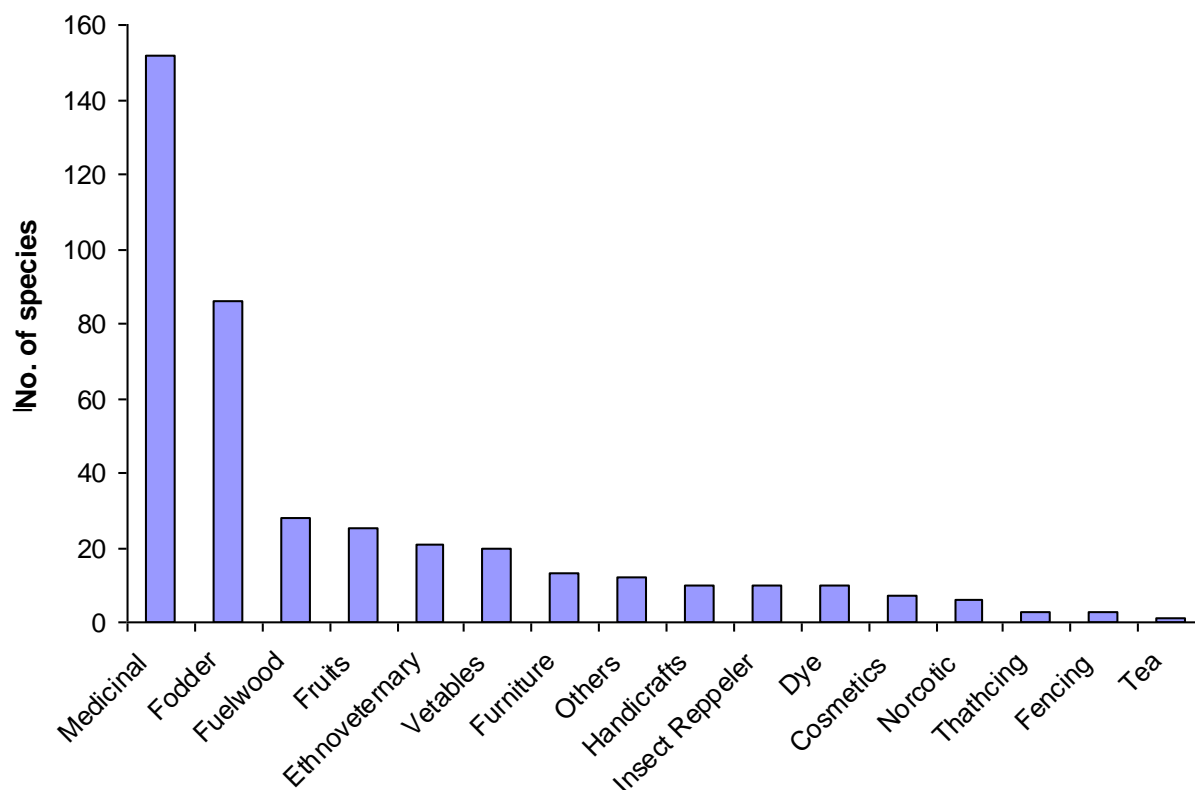
The present study provided information on the

**Table 1.** General attributes of medicinal plants.

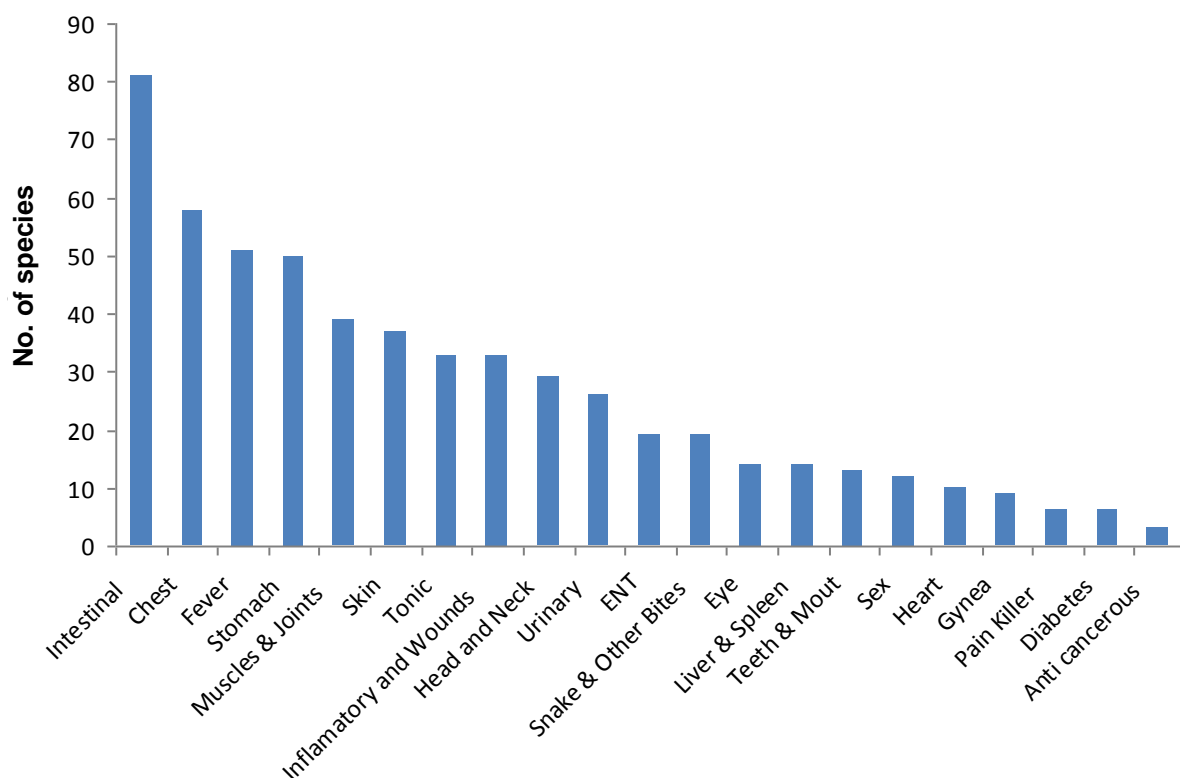
Attribute	Climbers No.	Herbs No.	Shrubs No.	Trees No.	Total No. of Species	
					No.	Percentage (%)
Habit	12	124	28	32	196	100
Reproduction						
Perennial	11	82	28	32	153	78
Annual	1	33	0	0	34	17
Biennial	0	9	0	0	9	5
Adaptation to shade and sun						
Deep shady	3	8	0	1	12	6
Deep shady to partial shady	6	18	1	0	25	13
Deep shady to sunny	1	4	2	1	8	4
Partial shady	0	9	3	0	12	6
Partial shady to sunny	2	49	14	21	86	44
Sunny	0	36	8	9	53	27
Part use						
Leaves	5	64	13	26	108	55
Whole plant	2	36	10	0	48	24
Roots, tuber	6	34	7	0	47	24
Stem and bark	2	7	7	30	46	23
Flowers	0	7	4	0	11	6
Seed and fruits	4	23	6	20	53	27
Vulnerability						
Highly	0	10	2	0	12	6
Moderately	5	33	9	5	52	27
Less	0	2	1	0	3	2

ethnobotanical uses of 196 plant species. Most of these species were herbs and perennials. This type of distribution is very typical to the Himalayan temperate region (Sheikh et al., 2002; Ibrar, 2003). As a moist temperate region, ANP and its surrounding forests provided different light conditions between shady and sunny to the underground flora, however, many of the species can be found in old-growth forest despite having its deep shady conditions (Larkcom, 1997; Adnan and Hölscher, 2011). Non-timber forest products in general and medicinal plants in particular are a vital source of income for the local people of Himalayan moist temperate region of Pakistan (Shinwari, 2010). People of ANP were using the indigenous flora as NTFPs to fulfil some of their basic needs. For example, agricultural tools like handles, wheels, cart, plough, etc (Khan et al., 2003). Cosmetic plants were normally used by women as *Mehendi* (for making various temporary tattooing designs on hands), perfume and shampoo etc. These subsistence goods from NTFPs play's an important role of hidden income in the rural livelihood.

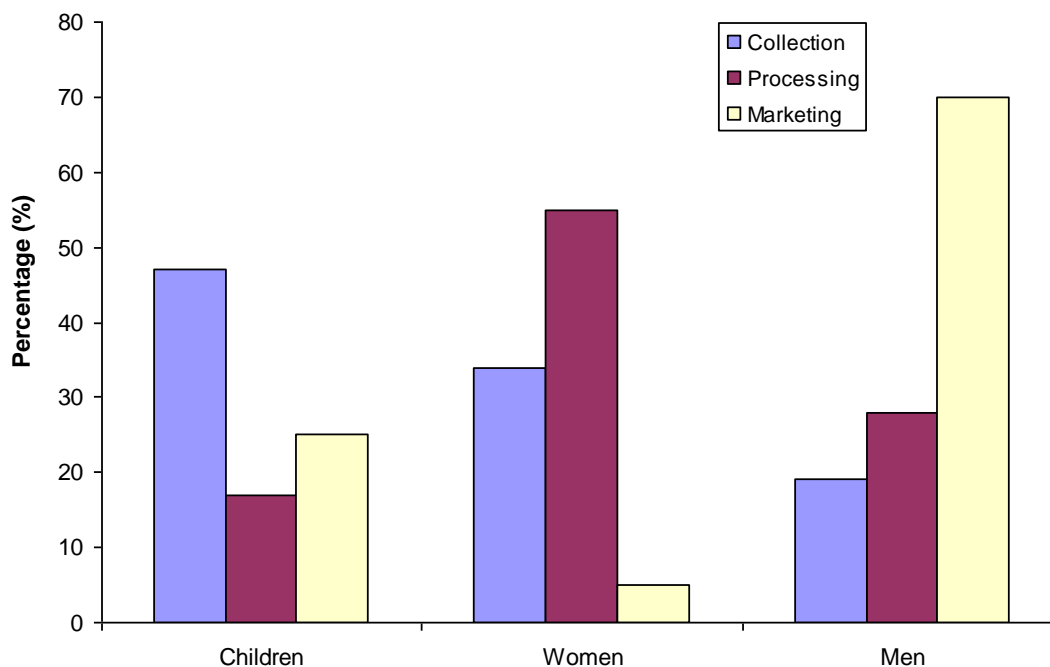
The local population living in the mountainous area use indigenous knowledge to cure various diseases (Ahmad and Javed, 2007; Hamayun et al., 2003). They know the preparation of raw drugs from herbs through personal experience and ancestral prescription (Ali and Kaiser, 2009). These drugs were regularly used and have proved to be effective, cheap and beneficial with almost no side effects as compared to the allopathic drugs that are beyond the reach of poor locals (Hamayun et al., 2003; Khan, 2003). Our study showed that most of the plant species reported from the region were used for common diseases such as intestinal, chest, fever, stomach and muscles, which might have been caused due to bad hygienic condition and fuel wood smoke inside the houses. Indigenous ethnobotanical knowledge at ANP has been transferred orally from generations to generations, maintaining strong interrelationship between people and plants (Gilani et al., 2001). Our study showed that as the age of people increases, they know more about the medicinal plants. Aged people, collectors, vendors and *hakeems* (traditional practitioners) posses



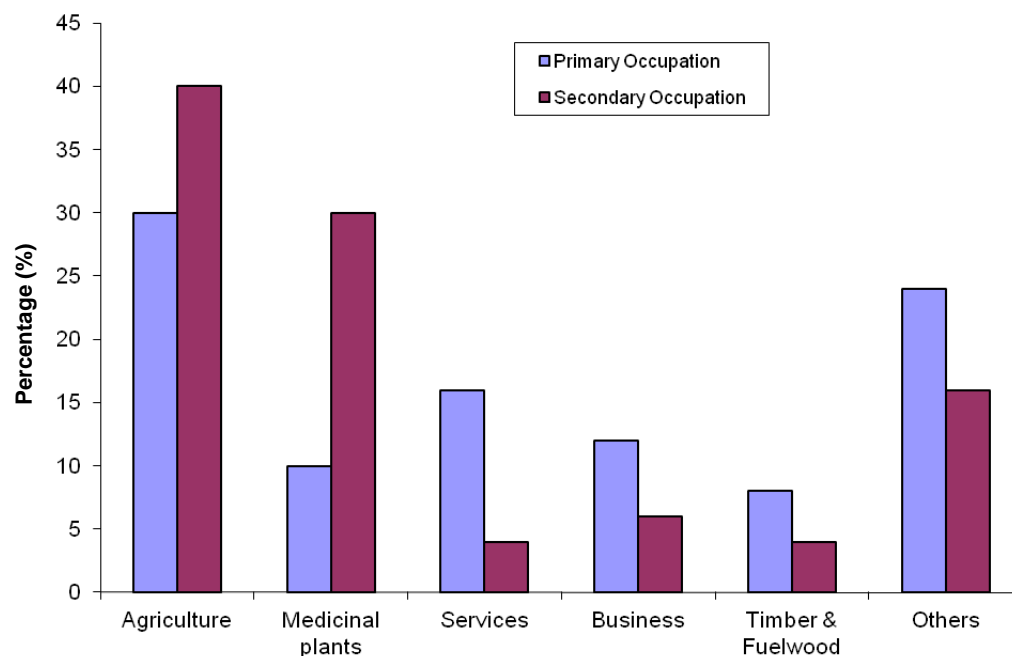
**Figure 2.** Number of plants used as non timber forest products.



**Figure 3.** Number of medicinal plants used for curing various diseases.



**Figure 4.** Medicinal plants collectors, processors and marketers.

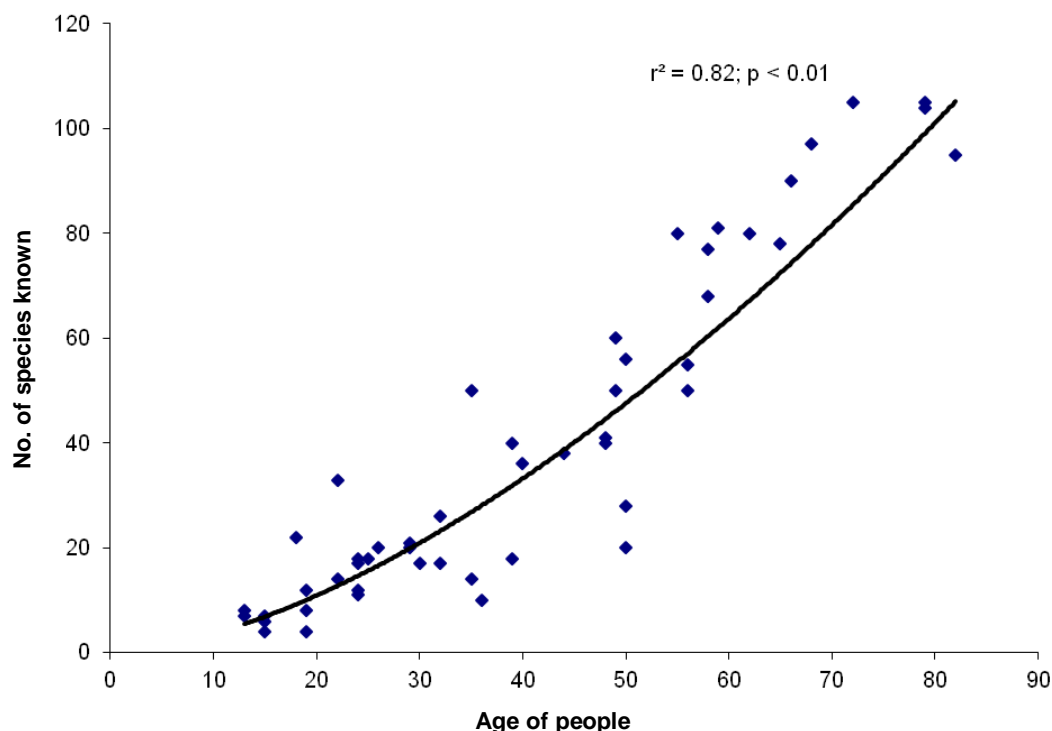


**Figure 5.** Number of people involved as primary and secondary occupations.

more indigenous knowledge than other young people and children of that area (Khan et al., 2003; Qureshi et al., 2009). However, the current modernization has reduced the transmission of indigenous knowledge to young people, which might result in the disappearance of such

knowledge and weakening the relationship among people and plants.

Most of the medicinal plant resources used by the marginal communities have not been conserved but rather irrationally exploited. Medicinal plants have been



**Figure 6.** Correlation between indigenous knowledge and age of the locals.

**Table 2.** Market losses to the medicinal plants collectors.

Highly economical species	Collection and processing losses (%)	Price A (US \$/ kg)	Price B (US \$/ kg)	Price C (US \$/ kg)	Total Market losses to the collectors (%)
<i>Morchella esculenta</i> L.	45 - 65	55 - 80	90 - 120	150 - 200	63 - 87
<i>Viola canescens</i> Wall.	35 - 60	4 - 9	10	20 - 25	67 - 90
<i>Valeriana jatamansi</i> Wall.	35 - 60	2 - 4	5 - 6	>10	70 - 87
<i>Paeonia emodi</i> Wall. ex Royle	40 - 65	2 - 4	7 - 8	> 10	71 - 88
<i>Bergenia ciliate</i> (Haw.) Sternb.	55 - 70	1 - 3	6 - 11	20 - 30	90 - 98

Collection to processing losses includes market losses during collection, carrying, cleaning and drying of medicinal plants. Price A indicates middle men offered price. Price B indicates price at local markets. Price C indicates price in national and international markets (Ahmad, 2003; Adnan et al., 2006; Shinwari, 2010). Total market (economic) losses of medicinal plants to the collectors include all the aforementioned losses from collection to the national or international market.

unsustainably collected from wild habitats for domestic and commercial purposes without any strategies reported to conserve them. This lack of efforts to sustain these resources may result in depletion from natural habitats (Qureshi et al., 2006). Reserves of herbs and stocks of medicinal plants in developing countries are diminishing and prone to extinction as a result of growing trade demands for cheaper healthcare products and new plant-based therapeutic markets (Hoareau, 1999). The most direct ecological consequence of medicinal plants extraction is alteration of the rates of survival, growth and reproduction of harvested individuals (Ticktin, 2004). When a portion of plant material is harvested by an individual, the nature and quantity of nutrients and

photosynthetic capacity removed, and the potential for survival and effective propagation, will depend on the kind of material harvested (Ticktin, 2004). Our study indicated up to 98% losses in medicinal plants from collection to marketing stage in term of monetary losses to its local collectors. This is in agreement with the reported 70% of losses in medicinal plants observed from collection to marketing stage (Latif and Shinwari, 2006; Ahmad and Javed, 2007; Ali and Kaiser, 2009; Shinwari, 2010).

Locals of ANP have no proper training in collection, harvesting, post harvest care, storage and marketing of medicinal plants (Ahmad and Javed, 2007). Majority of the collectors and processors were children and women

whom have a great significance in the overall chain of medicinal plants. They collect medicinal plants in parallel with their field activities such as fuelwood collection, rearing their livestock or agriculture (Farooque, 2002; Hamayun, 2004). They usually do improper collection, carrying and processing due to which they lose a good quantity of medicinal plants (Ahmad and Javed, 2007; Hamayun, 2004). Additionally, the non-scientific and haphazard collection involves uprooting of the whole plant species, even if only one part is needed (Shinwari and Khan, 2000). Moreover, the collectors have insufficient knowledge about seasonal timing of harvest, timing of harvest in the plant life cycle, frequency of harvest, size of individuals harvested and intensity of harvest, which is not only essential for maximisation of active ingredients but also from the view point of sustainability of the resource (Shinwari and Khan, 2000; Ticktin et al., 2002). The most threatening aspect is exploitation of plants having the perennial nature requiring prolonged period of growth. As an example, *V. canescens* was heavily collected because of its high demand, making it vulnerable (Shinwari and Khan, 2000). Such over exploitations and improper collection have resulted in diminishing and extinction of many important herbals including highly economically valuable and endangered species. It can also lead to the deterioration of habitat where these plants used to grow and may raise conservation concerns (Hamayun, 2004; Kumar, 2006; Ilahi, 2008).

Medicinal plants play an important role in uplifting the socio-economic conditions of its dependent people (Michael and Perez, 2001). Medicinal plant marketing contributes considerable amount money to the income of local people (Adnan and Hölscher, 2010). Species such as *M. esculenta*, *Bistorta amplexicaulis*, *P. emodi*, *Podophyllum emodi*, *V. jatamansi* and *V. canescens* are highly traded medicinal plant species in the Pakistani Himalayan region (Ibrar, 2003; Adnan et al., 2010). However, at a local scale, most of the people form poorest link in the trade of medicinal plants (Hersch, 1995). Shinwari (2010) gave an account of more than 300 medicinal plants to be traded in Pakistani herbal markets. He figured out in the last 20 years that the consumption of medicinal plants has increased by 3-times while price by 4-times in ten leading herbal industries of Pakistan. The increased consumption and demand shows a much higher pressure on the wild medicinal flora.

In conclusion, ANP and its surrounding forests consist of economically and medicinally valuable flora that needs to be conserved for the ecological restoration and livelihood of the local people. Therefore, it is recommended that the eroding indigenous knowledge about plant use for medicinal purposes needs to be protected. Capacity building of local collectors, processors and marketers of medicinal plants in an efficient way to avoid losses is also recommended. In addition, a direct market link needs to be established with

the local collectors of medicinal plants.

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**Appendix.** Medicinal plants. Habit\*: T for tree, S for shrubs and H for herbs. Rep (Reproduction) \*\*: P indicates perennial, A indicates annual and B indicates biennial. Light requirements\*\*\*: DS indicates deeply shaded, PS indicates partially shaded and S indicates sunny (Larkcom 1997). NTFP uses\*\*\*\* include 1) medicinal, 2) ethnoveterinary use, 3) fodder, 4) fuelwood, 5) vegetables, 6) Furniture, 7) thatching, 8) fruit, 9) narcotic, 10) handicrafts, 11) tea, 12) insecticide, 13) cosmetics, 14) dye, 15) fences, 16) others. Part use\*\*\*\*\* include 1) leaves, 2) whole plant, 3) roots and tubers, 4) stem, 5) flower, 6) seeds and or fruits. Medicinal uses\*\*\*\*\* include 1) chest, 2) tonic, 3) ENT (ear, throat, nose), 4) sex, 5) stomach, 6) muscles, 7) teeth, 8) eye, 9) intestine, 10) fever, 11) heart, 12) inflammatory, 13) skin, 14) bites (snakes, scorpion etc), 15) gynea, 16) pain killer, 17) liver and spleen, 18) head, 19) urination, 20) diabetes, 21) anti-cancer (Ibrar, 2003; Shafiq, 2003; WWF-P, 2004; Shinwari, 2010). V (vulnerability status) \*\*\*\*\*: 1 indicates highly vulnerable, 2 indicates moderately vulnerable and 3 indicates less vulnerable.

Botanical name	Family name	Local Names	Habit*	Rep**	Light***	NTFP uses****	Part use*****	Medicinal uses*****	V*****
<i>Abies pindrow</i> Royle.	Pinaceae	Palundar/Achir	T	P	DS	1,4,6	1,4	1	
<i>Acer acuminatum</i> Wall. ex D. Don,	Aceraceae	Trekanna	T	P	PS-S	4	4		
<i>Achillea millefolium</i> L.	Asteraceae	Sonfi Buti/Jarai	H	P	PS-S	1,3,12,13,14	2	2,3,4,5,6,7,9,10,11,12	2
<i>Aconitum heterophyllum</i> Wallich ex Royle.	Ranunculaceae	Atis/Maneri	H	P	DS	1,12	1	1,2,4,5,13	2
<i>Acorus calamus</i> L.	Araceae	Bach/Skha waja	H	P	S	1,2,7,10,12	1,3	14	2
<i>Adhatoda vasica</i> Nees ex Wall.	Acanthaceae	Bansa/Bekar	H	P	PS-S	1	1,3,5	1,4,6,8,9,10,13,14	
<i>Adiantum capillus-veneris</i> L.	Polypodiaceae	Pakhi/ Parsushah	H	A	DS	1,3	2	1,10,15	2
<i>Adiantum incisum</i> Forsk.	Polypodiaceae	Kakhpai/ Masle sumbul	H	A	PS-S	1,3	2	1,10,15	
<i>Adiantum venustum</i> D.Don.	Polypodiaceae	Skhavaja	H	P	PS	1	2	2,9	2
<i>Aesculus indica</i> (Wall. ex Camb.) Hook.	Hippocastanaceae	Bankhor/Jawaz	T	P	PS-S	1,2,4,6,10	1,4,6	1,2,9,12,13,16	2
<i>Agrimonia eupatoria</i> L.	Rosaceae	Kanachika	H	P	PS-S	14	1		
<i>Ajuga bracteosa</i> Benth.	Labiatae	Booti/ Neel Kanti	H	P	PS-S	1	2	3,7,17,18	
<i>Ajuga parviflora</i> Benth.	Labiatae	Ratti Buti	H	P	PS-S	1	2	3,10,11,17,18	
<i>Althaea rosea</i> (L.) Cav.	Malvaceae	Gule khaira	H	P	S	1	3	5,10,12,17,19	
<i>Amaranthus gracilis</i> Desf.	Amaranthaceae	Chaleri/ Jolai surk	H	A	S	1,5,14	1	14,18	
<i>Androsace rotundifolia</i> Y. Nasir	Primulaceae	Gariboti	H	P	PS-S	1	2	9	
<i>Angelica glauca</i> Edgew.	Apiaceae	Chora	H	P	PS-S	1,5	3	5,9	
<i>Aquilegia pubiflora</i> Wall. ex Royle.	Ranunculaceae	Phool	H	P	PS-S	1,3	6	15	
<i>Arisaema flavum</i> (Forssk.) Schott	Araceae	Adbis/Margarai	H	P	PS-S	1,2,8,12	3,6	1,9,14	2
<i>Artemisia fragrans</i> Wild.	Asteraceae	Afsantin	H	A	PS-S	1	1	1,3,7,9	
<i>Artemisia indica</i> Willd.	Asteraceae	Matura/Afsantin	H	A	PS-S	1,12	2	2,8,18	
<i>Artemisia roxburghiana</i> Wall.ex Besser	Asteraceae	Chao	H	B	S	1,5	1	1,3,7,12	
<i>Artemisia scoparia</i> Waldst. & Kit.	Asteraceae	Dona Jhan/Dada tarkha	H	B	S	1	2	3,9,12	
<i>Arum venosum</i> Ait.	Araceae	Sap ki booti	H	P	DS-PS	1	3	9,14	
<i>Asparagus adscendens</i> Roxb.	Liliaceae	Musli Sufaid/Tindorai	S	P	PS-S	1,2,3	3	1,9	1
<i>Atropa acuminata</i> Royle.	Solanaceae	Challa Pulara/Bargak	H	P	DS	1	1,3	1,6,14,18	1
<i>Atropa belladonna</i> L.	Solanaceae	Bargak	H	P	DS	1	1	1,6,9	1
<i>Barleria cristata</i> Linn.	Acanthaceae	Tadrelu	H	P	PS	1	2	1,6,8,10,13	
<i>Berberis lycium</i> Royle.	Berberidaceae	Sumbal/Kwaray	S	P	PS-S	1,2,3,8,14	1,3,4	1,3,6,9,10,17,18,20	2
<i>Bergenia ciliata</i> (Haw.) Sternb.	Saxifragaceae	Zakhmehayat/Ghat panra	H	P	DS-PS	1,3,13	1,3	1,2,5,6,9,10,12,21	2
<i>Bergenia himalaica</i> Boiss.	Saxifragaceae	Zakhme Hayat	H	P	DS-PS	1	3	2,8,9,10	

## Appendix. Contd.

<i>Bergenia stracheyi</i> Stein,	Saxifragaceae	Spinsar Ghat Pana	H	P	DS-PS	1	3	9,12	
<i>Bistorta amplexicaulis</i> D.Don.	Polygonaceae	Maslun/Anjabar	H	P	PS	1,3	1,3	1,,3,5,6,10,12,15	2
<i>Boerhaavia procumbens</i> Banks, ex Roxb.	Nyctaginaceae	Itsit	H	P	PS-S	1	3,4	9,14,19	3
<i>Bupleurum falcatum</i> L.	Apiaceae	Phelepholon	H	P	PS-S	1,3	2	17	
<i>Caltha alba</i> Jacquem.	Ranunculaceae	Anjabar	H	P	PS-S	1	1,3,6	1,6	2
<i>Campanula latifolia</i> L.	Campanulaceae		H	P	DS-PS	3	1,3,5		
<i>Cannabis sativa</i> L.	Cannabinaceae	Bhang	H	A	S	1,9,10	1,4	1,2,12,15,18	
<i>Carissa opaca</i> Stapf. ex Haines	Apocynaceae	Garanda	S	P	PS-S	1,2,5,12	2	1,11	
<i>Carthamus oxycantha</i> Bieb.	Asteraceae	Kandiara/ Karyosa	H	A	PS-S	3	1		
<i>Cedrus deodara</i> G. Don	Pinaceae	Deodar/Diar	T	P	S	1	4	1,2,5,6,10,13,14,19	
<i>Chrysanthemum leucanthemum</i> Linn.	Asteraceae	Chitay Phool/Gul chini	H	P	S	3,10,12	2		
<i>Chrysanthemum pyrethroides</i> B. Fedtsch.	Asteraceae	Sufed Phul	H	A	PS-S	3	2		
<i>Cichorium intybus</i> L.	Asteraceae	Kasni/Han	H	P	S	1,2,3	3,6	1,5,10,11,15,18	2
<i>Cirsium arvense</i> (L.) Scop.	Asteraceae	Kandehiara	H	P	S	1	2	5,10	
<i>Cissampelos pareira</i> Linn.	Menispermaceae	Bilri, Pilligar	C	P	DS-PS	1,3	1,3	5,9,10,12,13,14	
<i>Clematis grata</i> Wall.	Ranunculaceae	Bilri, Ghrazela	C	P	DS-PS	1,3	2	17	
<i>Colchicum luteum</i> Baker	Liliaceae	Surinjantalkh/Qaimatgullay	H	A	S	1,16	6	3,6,12,17	2
<i>Convolvulus arvensis</i> L.	Convolvulaceae	Lehli/ Hiran padi	C	P	PS-S	1,3	2	9,13,18	
<i>Coptis tecta</i> Wall.	Ranunculaceae	Mamira	H	P	DS	1	2	8	
<i>Coriandrum sativum</i> L.	Apiaceae	Dhaniya	H	A	PS-S	1	6	1,5,8	
<i>Cornus macrophylla</i> Wall.	Cornaceae	Kandar	T	P	PS-S	3,4,6	1,4		
<i>Corydalis govaniana</i> Wall.	Fumariaceae	Desi mamera	H	P	PS-S	1	1	2,5,9,13	1
<i>Corydalis stewartii</i> Fedde (Coptis tecta)	Papaveraceae	Momiran/Mamera	H	B	PS	1	2	8	
<i>Cuscuta reflexa</i> Decne.	Convolvulaceae	Doddar/Zalai	C	P	DS	1	4	5,6,7,8,9,10,11,17,18,19,20	2
<i>Cynodon dactylon</i> (L.) Piers. (Syn: Panicum dactylon L.)	Poaceae	Talla/ Kabal	H	P	S	1,2,3	2	9,13	
<i>Cynoglossum lanceolatum</i> Forsk.	Boraginaceae	Choro/Gat gul	H	B	S	1,3	1,4	1	
<i>Daphne mucronata</i> Royle	Thymeleaceae	Kuttilal/Laighunai	S	P	DS-S	1,8	2	6,9,12	
<i>Datura stramonium</i> L.	Solanaceae	Dhatura/Batora/Harhanda	H	A	S	1,9	1,5,6	3,9,10,13,14,18	
<i>Delphinium roylei</i> Munz,	Ranunculaceae	Adwar	H	P	S	1	3,5	18	2
<i>Dioscorea deltoidea</i> Wall.	Dioscoreaceae	Kanis	C	P	DS-PS	1,16	3	6,9,19	2
<i>Dioscorea melanophyma</i> Prain & Burkill	Dioscoreaceae		C	P	DS-PS	3	3		
<i>Diospyros lotus</i> Linn.	Ebenaceae	Kala amlook/Toor amlok	T	P	PS-S	1,3,4,6,8	4,6	3,9,12,18	
<i>Dipsacus inermis</i> Wall.	Dipsacaceae	Tandi	H	P	PS-S	5	1		
<i>Dodonaea viscosa</i> (L.) N.L. Jacq.	Sapindaceae	Sanatha	S	P	S	1,4,6,10,16	1,4	6,12	
<i>Dryopteris juxtaposita</i> H. Christ	Pteridaceae	Kwanjay	H	P	DS	1	1	1,9	2
<i>Dryopteris ramosa</i> (Hope) C. Chir	Pteridaceae	Pakha	H	P	DS	1,3,5	1	2,5,9	
<i>Ephedra gerardiana</i> Wall.	Ephedraceae	Asmani/Tshe	S	P	S	1,3,4,9	3,4,6	1,13	

## Appendix. Contd.

<i>Euphorbia helioscopia</i> Linn.	Euphorbiaceae	Dhodai/Mandanro	H	A	S	1	3,6	5,9,13	
<i>Euphorbia wallichii</i> Hook f.	Euphorbiaceae	Harvi/ Shangla	H	A	S	1,3	4	9,13	
<i>Ficus carica</i> L.	Urticaceae	Anjir	T	P	S	1,3,4,8,9	1,4,6	1,2,4,14,18	
<i>Ficus virgata</i> Roxb. (Syn: F. Palmata Forsskal)	Urticaceae	Phagwaria/Pepal	S	P	PS-S	1,3,8	1,6	1,9,12,19	
<i>Flacourtia indica</i> Merrill, (Syn: F. Ramontchi L Hent)	Flacourtiaceae	Kokoh/Talis pattar	T	P	PS-S	1,8	4,6	9,17	
<i>Foeniculum vulgare</i> Mill.	Apiaceae	Sonf/Badyan	H	P	S	1,5	2	5,8,9	
<i>Fragaria nubicola</i> Lindl. ex Lacaita	Rosaceae	Panjakha/Budimeva	H	P	PS-S	1,3,5	1,6	5,12,19	
<i>Fumaria indica</i> (Haussskn.) Pugsley	Papaveraceae	Pitpapa	H	A	PS-S	1	1,4	1,2,5,10,18	2
<i>Galium aparine</i> L.	Rubiaceae	Kochan	H	A	PS-S	1,3	2	9,10,11,12,17,19,21	
<i>Gentiana kurroo</i> Royle	Gentianaceae	Nilakant	H	P	PS-S	1,5	3	2,5,9,19	
<i>Geranium wallichianum</i> D. Don. ex Sweet	Geraniaceae	Rattanjot/ Srazela	H	P	PS-S	1,3,5	1,3	6,7,8,9,10,17,19,20	2
<i>Gerbera gossypina</i> (Royle) Raiz. & Saxena	Asteraceae	Chit patra	H	P	PS	3	1		
<i>Grewia asiatica</i> L. (Syn: G. Subinaequalis Parker)	Tiliaceae	Falsa	T	P	PS-S	1,8	1,4,6	5,6,10	
<i>Hedera nepalensis</i> K. Koch. (Syn: H.helix L.)	Araliaceae	Albumber/Prewata	C	P	DS	1,2,3	1,6	9,10,20	2
<i>Heracleum candicans</i> Wall.	Apiaceae	Gadhganna	H	P	DS-S	3	1		
<i>Hyoscyamus niger</i> L.	Solanaceae	Ajwain Khursani/Bargag	H	B	S	1,2,9	1,6	1,6,18	1
<i>Hypericum perforatum</i> L.	Hypericaceae	Balsana/Shin chai	H	P	PS-S	1,2,11	1,4	5,12,18,19	
<i>Impatiens bicolor</i> Royle	Balsaminaceae	Batmander	H	A	DS-PS	1,3,13	6	2,10,19	
<i>Impatiens brachycentra</i> G. M. Schulze & Launert	Balsaminaceae	Batmandar	H	A	DS-PS	3	1		
<i>Impatiens edgeworthii</i> Hook. f.	Balsaminaceae	Batmandar	H	A	DS-PS	3	1		
<i>Indigofera heterantha</i> Wall.	Leguminosae	Canthy/ Ghwarja	S	P	S	1,3,4,7,15	1,2	2,7	
<i>Ipomoea hederacea</i> Jacq.	Convolvulaceae	Kala dana	C	A	PS-S	1	6	9	
<i>Isodon rugosus</i> (Wall. ex Benth.) Codd.	Labiatae	Boei/ Sperkai	S	P	PS-S	1	1	3,9,13	
<i>Jasminum humile</i> Linn.	Oleaceae	Peeli Chambeli	S	P	PS-S	1,3,13	3,5	2,6,9	
<i>Jasminum officinale</i> Linn.	Oleaceae	Chambeli/ Rambil chambil	S	P	PS-S	1,3,13	2	7,9,13,14,18,19	
<i>Juglans regia</i> L.	Juglandaceae	Akhrot/Ghuz	T	P	S	1,5,6,8,14	1,4,6	2,4,7,9,18	
<i>Justicia adhatoda</i> Linn. (Syn: Adhatoda vasica Nees.)	Acanthaceae	Bhekar	S	P	PS-S	1,2	1,3,4,5	1,5,6,9,15,20	3
<i>Lavatera kashmiriana</i> Mast.	Malvaceae	Raisha Khatmi	H	P	S	1,14	2	1,19	2
<i>Leucanthemum vulgare</i> Lam. 31	Asteraceae	Marguerite	H	P	S	3	2		
<i>Mallotus philippinensis</i> (Lam.) Muell.-Arg	Euphorbiaceae	Kamila	T	P	PS-S	1,14	1,4,6	2,9,13	2
<i>Mentha longifolia</i> Z.K. Shinwari & M.N. Chaudhri	Labiatae	Chitta Pudina/Velaney	H	P	PS-S	1,2	1	1,5,7,9,19	2
<i>Mentha viridis</i> L.	Labiatae	Pudina	H	P	PS	1	1	1,5	2
<i>Morchella conica</i> Pers.	Helvellaceae	Gujhai	H	A	DS-PS		2		1
<i>Morchella esculenta</i> L.	Helvellaceae	Spina Guchhi	H	A	DS-PS		2		1
<i>Morus alba</i> L.	Urticaceae	Toot	T	P	PS-S	1,3,4,6,8	1,4,6	3,9,10,13	
<i>Murraya koenigii</i> Spreng.	Rutaceae	Kamni	T	P	PS-S	1,5	1	9,14	
<i>Myrsine africana</i> Linn.	Myrsinaceae	Chapra/Bebrang	S	P	PS-S	1,3	1,5	5,9,18	

## Appendix. Contd.

<i>Nasturtium officinale</i> R.Br.	Cruciferae	Talmera	H	P	S	1,5	2	1,5,9	
<i>Nepeta laevigata</i> (D. Don) Hand. -Mazz.	Labiatae	Muskbal	H	P	S	3	1		
<i>Nerium oleander</i> L.	Apocynaceae	Kanair, Kanchri	S	P	S	1	2	12,13,14,15,18	
<i>Ocimum basilicum</i> L.	Labiatae	Niazboo/Faranj musk/Gule Rehan	H	P	S	1	2	6,9	
<i>Oenothera rosea</i> [Soland.]	Onagraceae	Mirchi	H	P	PS	3	1		
<i>Origanum vulgare</i> L.	Origanum	Juggle Ajwain/ Shmaky	H	P	PS-S	3	1		2
<i>Otostegia limbata</i> Benth. ex Hook. F.	Labiatae	Chiti boi/ Speen Azghay	S	P	S	3	1		
<i>Paeonia emodi</i> Wall. ex Royle	Paoniaceae	Mamekh/ Ud-e-Saleeb	H	P	PS-S	1,2,5	3,5,6	5,6,9,10,16,18	2
<i>Picea smithiana</i> (Wall.) Boiss.	Coniferae	Kachlal/ Mangazai	T	P	S	1,4,6	4		
<i>Pinus wallichiana</i> A. B. jacks.	Pinaceae	Kail/ Peyoach	T	P	S	4,6,16	4		
<i>Pinus roxburghii</i> Sarg. (Syn: P. Longifolia Roxb.)	Pinaceae	Chir/Bihroza	T	P	S	1,4,6,8,14	1,4	1,10,13,14	
<i>Plantago lanceolata</i> L.	Plantaginaceae	Ispaghol/Jabai	H	P	S	1	2	1,5,7,9,12,13	
<i>Plantago major</i> Bert. ex Barn.	Plantaginaceae	Chamchipatra/Gwa jabai	H	P	S	1,2,3	2,6	5,9,12	3
<i>Plantago ovata</i> Forsk.	Plantaginaceae	Ispaghol	H	A	S	1	6	5,9	1
<i>Podophyllum emodi</i> Wall.	Berberidaceae	Bankakri/Kakora	H	P	DS-PS	1,8	3,6	2,4,5,9,13,17	2
<i>Polygonatum multiflorum</i> All.	Liliaceae	Nooryalam	H	P	DS-PS	1	1	2,6,13	2
<i>Polygonatum verticillatum</i> All.	Liliaceae	crimcha/ Nooryalam	H	P	DS-PS	1,3	1	15	2
<i>Polygonum amplexicaule</i> D. Don 29	Poygonaceae	Anjbar, Palpulak	H	P	PS-S	1,3,5	1,3	2,3,9,10	
<i>Polygonum plebeium</i> R. Br.	Polygonaceae	Dremak	H	A	PS-S	1	2	1	
<i>Populus ciliata</i> Wall.	Salicaceae	Palach/ Supedar	T	P	S	3,4	1,4		
<i>Potentilla nepalensis</i> Hk.	Rosaceae	Rattayphool/ Mammhar	H	P	PS-S	1	3	5,10,12	
<i>Primula denticulata</i> Sm.	Primulaceae	Mamera	H	P	PS-S	1	1	8	2
<i>Prunus amygdalus</i> Stokes,	Rosaceae	Badam	T	P	PS-S	3,4,8	1,4,6		
<i>Prunus armeniaca</i> L.	Rosaceae	Khobani/ khormarai	T	P	PS-S	3,4,8	1,4,6		
<i>Prunus domestica</i> L.	Rosaceae	Alubukhara/ Alochai	T	P	PS-S	3,4,8	1,4,6		
<i>Prunus insititia</i> L.	Rosaceae	Alu balu	T	P	PS-S	3,4,8	1,4,6		
<i>Prunus padus</i> L.	Rosaceae	Jamana	T	P	PS-S	3,4,6,8	1,4,6		
<i>Prunus persica</i> (L.) Batsch,	Rosaceae	Aaro/ Shaltalo	T	P	PS-S	3,4,8	1,4,6		
<i>Pteracanthus urticifolius</i> Bremek. Sny (Strobilanthes attenuata)	Acanthaceae	Daruna/Anar dana/Nangoray	S	P	DS-PS	1,3,8,14,16	3,4,6	1,2,3,5,9,10,11	
<i>Punica granatum</i> Linn.	Lythraceae	Bikri/Nangoray	T	P	S	3,8	1,6		2
<i>Pyrus pashia</i> Buch. -Ham. ex D.Don,	Rosaceae	Batangil/Shangetei	T	P	PS-S	1,3,4,8,10	1,4,6	5,6,18	
<i>Quercus dilatata</i> Lindl.	Cupuliferae	Barungi, Toor banj	T	P	PS-S	1,2,3,4,10	1,4,6	9,12,19	2
<i>Quercus incana</i> Roxb.	Cupuliferae	Ban/Reen/Spin banj	T	P	PS-S	1,3,4,10	1,4,6	1,5,6,9,19	
<i>Quercus infectoria</i> Oliv.	Cupuliferae	Mazu phal, Mazu sabz	T	P	PS-S	3,4,10	1,4,6		
<i>Ranunculus arvensis</i> L.	Ranunculaceae	Ratmondia	H	A	PS-S	3,8	1,6		
<i>Ranunculus muricatus</i> L.	Ranunculaceae	Ratmondia/ Ziarr Gulay	H	A	PS-S	3	1		
<i>Rheum australe</i> D. Don,	Polygonaceae	Chotial	H	P	PS-S	1	1,3	1,5,6,9,10,13	2

## Appendix. Contd.

<i>Rheum emodi</i> Wall.	Polygonaceae	Chutial/Rewand chini	H	P	PS-S	1	3	5,6,9,10,19	2
<i>Robinia pseud-acacia</i> L.	Leguminosae	Kikar	T	P	PS-S	3,4	1,4		
<i>Rosa macrophylla</i> Lindl.	Rosaceae	Choti chali	S	P	PS	1,3	2	2,8,9,13,16	
<i>Rosa moschata</i> Benth.	Rosaceae	Chal/Kurach	S	P	PS-S	1,3,15	5	9,16	2
<i>Rosa webbiana</i> Wall.	Rosaceae	choti kanachi/Phalwari	S	P	PS	3	6		2
<i>Rubia cordifolia</i> L.	Rubiaceae	Srajarai / mangeet	C	P	DS	1	1,6	2,6,9	2
<i>Rubia Purpurea</i> Dcecne,	Rubiaceae	Majeeth	C	P	DS-PS	1,14	1,3,4	7,14,19	
<i>Rubus fruticosus</i> A. & D. Love	Rosaceae	Kanachi/Karwara	S	P	DS-S	1,3,7,8	1	1,9,10,19	2
<i>Rumex nepalensis</i> Spreng.	Polygonaceae	Hula/Shalkhay	H	P	PS-S	1,3	1,3	9,13,18	
<i>Salix tetrasperma</i> Roxb.	Salicaceae	Binsa/ Bed sada	T	P	S	3,4	1,4		
<i>Sarcococca saligna</i> Muell. Arg.	Euphorbiaceae	Sila/ Ladora	S	P	PS-S		1		
<i>Saussurea heteromalla</i> (D.Don.) Hand.-Mazz.	Asteraceae	Butt peva/Batula	H	P	PS-S	1,2,3	1,6	12	
<i>Saussurea lappa</i> C. B. Clarke,	Asteraceae	Kut/Sharshamy	H	P	PS-S	1	1,3	1,2,5,6,9,13	2
<i>Sauussurea costus</i> (Falc.) Lipsch	Asteraceae	Kuth	H	P	PS-S	1,2,3	1,6	12	
<i>Scrophularia nodosa</i> L.	Scrophulariaceae	Makhiboti	H	P	PS-S	16			
<i>Scrophularia scabiosaefolia</i> Benth.	Scrophulariaceae	Makhiboti	H	P	PS-S	3,16	1		
<i>Sedum ewersii</i> Ledeb	Crassulaceae	Kupadd jari	H	P	PS-S	3,16	1		
<i>Senecio salignus</i> DC.	Asteraceae	Chita Ula	H	P	DS	1,2,3	1,3,6	6,9,12,14	
<i>Serratula pallida</i> DC.	Asteraceae	Cathra	H	P	S		1		
<i>Sida cordifolia</i> L. F. sensu FBI.	Malvaceae	Bekh Bandal/Bach	S	P	PS-S	1	2	4,6,8	2
<i>Silene conoidea</i> L	Caryophyllaceae	Chota takla	H	A	S	1	2	13	
<i>Silybum marianum</i> (L.) Gaertn.	Asteraceae	Kandiali	H	B	S	1	1,3	9,10,12	
<i>Sisymbrium irio</i> Linn.	Cruciferae	Rai/Khasi	H	A	PS-S	1	6	1,3,10	1
<i>Skimmia laureola</i> Sieb. & Zucc. ex Walp.	Rutaceae	Ner/ Nazar panra	S	P	PS	1,12,16	1	1,3,5,10,13,14,17,18	1
<i>Smilax aspera</i> DC.	Liliaceae	Chobchini	C	P	DS-S	1	3	1,6,10,13	2
<i>Solanum miniatum</i> Bernh. ex Willd.	Solanaceae	Mako/ Kachmach	H	A	S	1	1,6	6,9,10,11,12,17,19	
<i>Solanum nigrum</i> L.	Solanaceae	Kachmach/Mako	H	A	S	1	1	1,9,13	1
<i>Solena amplexicaulis</i> (Lam.) Gandhi	Cucurbitaceae	Bankakra	C	P	DS-PS	1	1,3,6	4,9,12	
<i>Sonchus oleraceus</i> L.	Asteraceae	Hind	H	B	DS-S	1,5	1,3	9,10,11,12,13,20	
<i>Swertia angustifolia</i> Buch. -Ham. ex D. Don,	Gentianaceae	Chirata	H	A	PS	1	2	1,10	1
<i>Swertia chirata</i> Buch. -Ham. ex D. Don,	Gentianaceae	Chirata	H	A	PS	1	2	1,10	2
<i>Taxus wallichiana</i> Zucc.	Coniferae	Barmi, Banrya	T	P	DS-S	1,3,4,6,8,10,13	1,4,6	1,12,21	2
<i>Thymus serpyllum</i> Coss. ex Wilk. & Lange,	Labiatae	Bezori boti/ Sperkai	S	P	S	1	2	1,5,6,17	2
<i>Trachyspermum ammi</i> Sprague	Apiaceae	Ajwain	H	A	S	1	6	1,5,6,9,10	2
<i>Tribulus terrestris</i> L.	Zygophyllaceae	Bhakra/Markundai	H	B	S	1	2	2,4,5,6,10,11,19	2
<i>Trifolium repens</i> L.	Leguminosae	Trepatra/ Shaftal	H	P	PS-S	3	1,4		
<i>Trigonella foenum-graecum</i> L.	Leguminosae	Metharay/ Malkhwazai	H	A	S	1,3	2,6	4,5,13	

## Appendix. Contd.

<i>Trillidium govanianum</i> Kunth,	Liliaceae		H	P	DS-S	3	1		
<i>Ulmus wallichiana</i> Planch.	Ulmaceae	Kain	T	P	PS-S	3,4,6	1,4		
<i>Urtica dioica</i> L.	Urticaceae	Bichu boti/Jalbang	H	P	PS-S	1,2,5	1,3	1,6,10,12,13	
<i>Valeriana jatamansi</i> Wall.	Valerianaceae	Mushkebala	H	P	DS-PS	1,3,12	1,3	1,2,5,9,18,19	2
<i>Verbascum thapsus</i> L.	Scrophulariaceae	Tamaku boti/Khardag	H	B	S	1,2,9,16	2	1,3,4,9,10,16	
<i>Verbena officinalis</i> L.	Verbenaceae	Karanta/ Shamakai	H	P	S	1	1,3	2,10,14	
<i>Veronica laxa</i> benth.	Scrophulariaceae	Mashkanne	H	P	PS-S	1,3	1	16	
<i>Viburnum grandiflorum</i> Wall.	Caprifoliaceae	Guch/ Ghuz mava	S	P	PS-S	1,3,8	1,3,4,6	2,5,12,19	
<i>Viola biflora</i> L.	Violaceae	Banafsha	H	P	DS-PS	1	1,5	3,5	
<i>Viola canescens</i> Wall.	Violaceae	Banafsha	H	P	DS-PS	1,3,5	2	1,5,9,10,13,19	2
<i>Viola canina</i> L.	Violaceae	Banafsha	H	P	DS-PS	1	1,5	1,10,18	
<i>Viola Serpens</i> Wall.	Violaceae	Banafsha	H	P	DS-PS	1	1	5,8,10	2
<i>Vitex negundo</i> (L.) Moldenke.	Verbenaceae	Nargandi/ Marvandai	S	P	S	1,12	2	1,9,10,13,18	2
<i>Withania somnifera</i> (L.) Dun.	Solanaceae	Asgan/Kotilal	S	P	S	1,5	2	2,4,6,12,18,19	2
<i>Wulfenia amherstiana</i> Benth.	Scrophulariaceae		H	P	PS-S	3	2		
<i>Xanthium strumarium</i> L.	Asteraceae	Katula	H	A	DS-S	1	1,3	9,10,13	
<i>Zanthoxylum armatum</i> DC.	Rutaceae	Timbar/ Dambara	S	P	PS-S	1,2,5,13,16	1,4,6	2,5,7,9,10	2