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Status of Collection, Conservation, Trade and Potential for Growth in Sustainable Use of Major Medicinal Plant Species Found in the Great Himalayan National Park and Its Environs in Kullu District of Himachal Pradesh

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May 1997

PREFACE

This report incorporates and combines the two tasks mentioned in the TOR for this consultancy. These tasks were:

1 *Study the potential for ex situ cultivation of medicinal plants around GHNP, and the Eco-development Project Area, and*

2 *Survey of the current market pressures on medicinal plants in and around the GHNP, and Eco-development Project Area.*

Since the various issues/ aspects around herb collection, trade, significance in the local economy and marketing are intricately linked, this report seeks to understand, where feasible through quantification, the money, people's activities and its seasonality related to herb collection, the quantities extracted and the impact on the conservation status of 'threatened' medicinal species. Ex situ cultivation possibilities and improved marketing are examined under alternate strategies, especially by involving and thereby benefitting, local communities. For this appropriate institutional mechanisms are needed at the local level alongwith a review to enhance the role and capacity of the forest department.

Analysis of data collected w.r.t. herb collection and its socio-economic linkages, interviews with people, collectors, park authorities and survey of published literature/ studies, current and projected market pressures, etc. on the subject, clearly establish that the significance of herb collection to the local economy, though recognised as substantial earlier, has been ***greatly underestimated****. Demand for many of the main species collected is far in excess of the supply and this trend is likely to balloon in the future. The threatened species continue to be over-exploited and many may soon slip into an extinction vortex, locally.*

The issues of herb collection and trade, ex situ cultivation and in situ conservation of threatened species; value addition and marketing HAVE to take a top rung in management priorities. For the sustainability of the GHNP and the welfare of the its people.

ACKNOWLEDGEMENTS

Many persons including some whose names I have forgotten, have helped and contributed to complete this study. So thank you everybody !

Special thanks are due to Sh Surinder Kumar, Range Officer, Tirthan for making the job much easier; to Sh N K Guleria, Director, GHNP for support, advice, discussions; to Sh S Pande (WII) for honouring me with the job; to Sh B M S Rathore for timely payments; to Ms Thanga Selvi, Ms Lakshmi Deshpande & Ms Hema Padmini of FRLHT for giving this report the shape it has; and, finally to my colleague at FRLHT, Sh D K Ved for checking, correcting and saying " It's OK ".

It remains that the errors are mine.

LIST OF ACRONYMS USED

BSI	-	Botanical Survey of India
CAMP	-	Conservation Assessment & Management Plan
CF	-	Conservator of Forests
CIMAPs	-	Central Institute for Medicinal and Aromatic Plants, Lucknow
CSIR	-	Council for Scientific and Industrial Research, New Delhi
CWLW	-	Chief Wild Life Warden
DFO	-	District Forest Officer
FD	-	Forest Department
GHNP	-	Great Himalayan National Park
HHs	-	House Holds
HP	-	Himachal Pradesh
ICFRE	-	Indian Council of Forestry, Research and Education, Dehradun
IUCN	-	World Conservation Union
MFP	-	Minor Forest Products
Mts	-	Metres
NTFP	-	Non Timber Forest Products
NWFP	-	Non Wood Forest Products
RFO	-	Range Forest Officer
RRL	-	Regional Research Laboratory, Jammu
ToR	-	Terms of Reference
WII	-	Wildlife Institute of India, Dehradun

M A Ps

CONTENTS

1 TRADE/ LOCAL NAMES OF MEDICINAL PLANTS OF GHNP

	BOTANICAL NAME/ (HABIT)	FAMILY	LOCAL NAME
1	*Abies webbiana*, Lindl. (T)	Coniferae	Poe
2	*Aconitum heterophyllum*, Wall. (H)	Ranaculaceae	Patish/ Atis
3	*Aconitum violacium* Jacquem exstapf. (H)	Rananculaceae	Mitha telia
4	*Acorus calamus*, Linn. (H)	Araceae	Buch, baj
5	*Adiantum lanulatum*, Burm. (H)	Adiantaceae	Dusgtuii
6	*Ainsliaea aptera*, D.C. (H)	Asteraceae	Sathjalari
7	*Angelica glauca*, Edgew. (H)	Apiaceae	Chora
8	*Artimesia brevifolia*, Wall. (LS)	Asteraceae	Seski
9	*Atropa acuminata*, Royle.(H)	Solanaceae	Jharka
10	*Bunium persicum*, (Boiss) B. Fedtsch. (H)	Apiaceae	Kala-zira
11	*Berberis aristata*,D.C. (S)	Berberidaceae	Masuri
12	*Berberis valgaris*,Linn. (S)	Berberidaceae	Masuri
13	*Berberis lycium*,Royle. (S)	Berberidaceae	Kirmora
14	*Betula utilis* D.Don. (T)	Betulaceae	Bhojpatr
15	*Cinnamomum tamala*,Fr.Nees. (T)	Lauraceae	Tejpatta
16	*Dactylorhiza hatagirea*(D.Don)Soo. (D.Don) Soo (Terr.O)	Orchidaceae	Salam panja
17	*Dioscoria deltoidea*,Wall. (Cl.S)	Dioscoriaceae	Singlimingli
18	*Ephedra sp.* (L)	Gnetaceae	Sutchur
19	*Girardinia heterophylla*,Decne. (H)	Urticaceae	Bichhubutti
20	*Hedychium acuminatum*,Rose. (H)	Scitaminaceae	Kapper kachri
21	*Heracleum*, candicans (H)	Apiaceae	Patishan rooli
22	*Hydrocotyle asiatica*,Linn. (H)	Apiaceae	Brahmi
23	*Hyoscyamus niger*,Linn. (H)	Solanaceae	Kurasani ajwain
24	*Jurinea macrocephala*,Benth. (S)	Asteraceae	Dhoop
25	*Morchella esculenta (Saprophyte)*	Pezizales	Guchhi
26	*Nardostachys*, D.C. (H)	Valerianaceae	Jatamansi
27	*Picrorhiza kurrooa*,Benth. (H)	Scrophulariaceae	Karoo
28	*Pinus wallichiana*,Jakson. (T)	Pinaceae	Kail cones
29	*Pistacia integrrima*,Stew. (T)	Anacardiaceae	Kakarsinghi
30	*Podophyllum hexandrum*,Royle. (H)	Berberidaceae	Bankakri
31	*Polygonatum verticillatum*, Allioni. (H)	Liliaceae	Salam misri
32	*Potentilla nepalensis*,Hook.(H)	Rosaceae	Dori ghas

33	*Rheum emodi*,Wall. (H)	Polygonaceae	Rewarchini
34	*Rhododendron campanulatum*, D.Don. (S)	Ericaceae	Kashmiri patha
35	*Hyoscyamus niger*,Linn. (H)	Solanaceae	Kurasaniajwain
36	*Selinum vaginatum*,Clarke. (H)	Apiaceae	Butkesri
37	*Salvia moorcroftiana*,Wall. (H)	Lamiaceae	Tuth
38	*Saussurea lappa*,Clarke. (H)	Asteraceae	Kuth
39	*Swertia chirata*,Ham. (H)	Gentianaceae	Chiratha
40	*Taxus baccata*,Linn.(T)	Coniferae	Bimri(rakhal)
41	*Thalictrum sp.,* Linn. (H)	Rananculaceae	Mamini
42	*Thymus sechyllum*, Linn. (H)	Lamiaceae	Banajwain
43	*Tinospora cordifolia*,Miers. (Cl.S)	Menispermaceae	Gloe
44	*Valeriana wallichii*, Linn. (H)	Valerianaceae	Muskhabala
45	*Valeriana hardwickii*,R.S. (H)	Valerianaceae	Nihani
46	*Viola odorata*,Linn (H)	Violaceae	Banafsha
47	*V. serpens*, Linn. (H)	Violaceae	Banafsha

Tree (T), Herb (H), Large Shrub (LS), Shrub (S), Terrestial Orchid (Terr.O), Climbing Shrub (Cl.S), Liana (L)

2 INTRODUCTION

The Great Himalayan National Park (GHNP), situated in the Kullu district of Himachal Pradesh (HP) is one of the least disturbed Western Himalayan representative eco-systems, supporting an extremely diverse wildlife population. It harbors one of the few known viable populations of "Western Tragopan" along with more than 350 species of birds and over 30 species of mammals. A recent, on-going study by WII lists over 520 species of plants.

The park is contiguous with the Rupi Bhaba Sanctuary (269 Sq.kms.) in the South East, Pin Valley National Park (675 Sq.kms) in the East and Kanawar Wildlife Sanctuary area in the North (90 sq. Kms) which will be connected to the park through the proposed extension of in the Parvati river catchment. These areas constitute one of the largest areas of relatively undisturbed Western Himalayan Eco-systems in Northern India.

Great Himalayan National Park constitutes the upper catchment areas of the Tirthan, Sainj, Parvati and Jiwa nala, flowing East to West and mingling into the river Beas.

2.1 AREA & LEGAL STATUS

The park (proper) is sprawled over an area of 765 sq.km. and includes 41.15 sq.kms of Reserved Forests, 631.25 sq.kms of Demarcated Protected Forests; 91.86 sq.kms of Undemarcated Protected Forests class-III and 0.74 sq.km. cultivated land.

Initial notification of intention to declare the area as National Park was issued on 1-3-1984 vide H.P. Govt. notification No.6-16/ 73 SF.II covering an area of 620 sq. Kms. The area has been further renotified to an increased area of 765 sq.kms. vide H.P. Govt. notification No. 3-6-16/ 73 SF-II dated 22-4-94. Legal formalities for issue of final notification are under way. The area constituted as NP includes 2 villages, Kunder and Majhan. 12 families (of about 100 persons) have land and all the rights that go with this land.

In addition to the above area, for management purposes, the national park includes the Tirthan Wildlife Sanctuary of about 61 sq. Kms (notified) and the Sainj Wildlife Sanctuary measuring 90 sq. kms. (Notified No. 3-6-16/ 73 SF-II dated 22-4-94). There is an eco-development zone of 255 sq. kms with 141 hamlets / villages with a population of about 11,000 persons in 1600 households; c. 1994, (Pop. Figures gathered by Park staff).

For management & protection purposes, the Great Himalayan National Park thus covers an effective area of 1171 sq. kms.

2.2 LOCATION AND TOPOGRAPHY

Latitudinal range; 31°38' 16" to 31°56' 41" North. Longitudinal range; 77°20' to 77° 12' 11" East. The park has an altitudinal variation ranging from 1300 mts to 6110 mts. The terrain is characterized by numerous high ridges (over 4000 mts.), deep gorges and precipitous cliffs, rocky crags, glaciers and narrow valleys. A little over half the park area lies above 4000 mts. Much of the eastern part of the park is perpetually under snow or ice. Soil is sandy loam with thick humus beneath Kharshu and Fir forests and is shallow in the rocky and precipitous ridges.

2.3 CLIMATE

April to June makes up spring and summer, followed by the rains during July to September. The winter onset in October and intensifies with a lot of frosty conditions between December and February. Above 3000 mts snow lasts upto March/ April. No precipitation or temperature data is, however, available for the area.

2.4 COMMUNICATION FACILITIES

The Great Himalayan National Park and its adjoining wildlife sanctuaries do not have any motorable roads inside. There are 16 kilometres of roads within the ecozone, west and southwest of the national park, (pers. Comm. Director, GHNP).

To facilitate more effective communication, a wireless system covering all important points within and around the park was established in 1993. At present the communication network is comprised of nine base stations at Shamshi, Sairopa, Kharoncha/Dingcha, Banjar, Sainj, Lapah, Diar, Panjiain and Kullu, with a number of mobile wireless sets.

2.5 PRESSURES ON THE PARK

2.5.1 Herb collection

A study among the 16 clusters of hamlets within the eco-zone to formulate micro-plans, reveals that the percentage of households involved in herb collection varies between 70 to 85 %. Undoubtedly, herb collection makes for the severest pressure within the park.

There are two villages namely Kunder and Majhan and 57 thatches inside the park. The villages are inhabited by 12 families with total population of around 100 people. The legal process for the rehabilitation of these villagers to some suitable places outside the park is underway. The land under cultivation in these villages is around 0.74 sq.kms. The villagers possess all possible

traditional rights in the park. In addition to the pressure of these two villages, about 141 villages exist within a distance of 5 kms, adjoining the western boundary of the park. The major pressure on the park comes from these peripheral villages, with many of the people claiming traditional grazing rights and also to collect herbs and mushrooms from the park. Previous estimates suggest that more than 7500 people living in the periphery of the park enter the area for herbs and mushroom collections.

2.5.2 Grazing

An Indian Institute of Public Administration (IIPA), New Delhi study (April, 1993) estimates that between 20 and 25,000 goats and sheep enter the park annually. The FREE Research proposal document of WII quotes a fig. of 35,000 (incl. 25,000 migratory) sheep/ goats entering the park annually. Many of the graziers during their stay in the park also collect herbs, thus adding to the number of herb collectors in the park. Forest departments data on grazing is patchy and inconsistently maintained at different places. The inward and outward routes of graziers are many and perhaps unmonitorable.

2.6 FLORA & FAUNA

Flora

About one third of the park area supports closed canopy forests (mainly occurring in belts around Jiwa, Sainj and Tirthan nalas and their tributaries) extending from the valley bottoms to 3300-3600 mtrs, depending on aspects. A little over half of the area lies above 4000 mtrs, the approximate upper limit for alpine meadow communities.

Gaston et al (1981) recognised five broad forest types within the park.

1 Sub-tropical pine forest, characterized by chir pine between 600-1700 M.

2 Himalayan moist temperate forest, characterized by both conifers and broad leaved species between 1250-3600 M.

3 Sub-alpine forest dominated by birch and fir species between 3000-3500M

4 Moist sub-alpine scrub characterized by Rhododendron species between 3000-3500 M.

5 Dry alpine scrub characterized by Juniper species between 3400-3800 M.

The presence of undisturbed oak forest at low and middle altitude is worth noticing, which is rare outside the park. Alpine meadows occurring above about 3800m, the upper limit of sub-

alpine and alpine scrub communities, hold a high diversity of herbaceous species, many of which have medicinal and aromatic properties and are of great commercial value.

An on-going study of the WII lists over 520 species of plants recorded so far within the park. Of these 186 species are reported to be of medicinal value according to the FRLHT medicinal plants of India database, **Annexure III**.

At lower altitude forest generally support a dense understorey with a high diversity of shrubs, the important being, *Indigofera, Viburnum, Sarcococa* and *Berberis* species.

Forest type in the park as per Champion and Seth classification are Ban Oak forest 12/c1(a), Moist deodar forest 12/c1(c), Western Mixed Coniferous Forest 12(C1(d), Moist temperate Deciduous Forest 12/C1(e), Kharsu Oak Forest 12/C2(a), Western Himalayan upper Oak/Fir Forest 12/C2(b), Montance Bamboo Brakes 12/DSI, Himalayan Temperate 12/DS2, Himalayan temperate pastures 12/DS3, West Himalayan sub alpine Fir forest 14/C1(a), subalpine pastures 14/DS1, Birch/ Rhododendron Scrub Forest 15/C1, Deciduous alpine Scrub 15/C2, and alpine pastures 15/C3.

Fauna

The park provides an excellent habitat for large number of mammals and pheasants, paramount among the latter is “Western Tragopan” *Tragopan melanocephalus,* one of the highly endangered species of pheasants. The park contains the largest remaining population of Himalayan Tahr *Hemitragus jemlahicus* (endemic to India) in India. It is possibly the only place in the whole Himalayas where Bharal *Pseudous nayaur* occurs virtually side by side with Himalayan Tahr. The highly endangered Snow Leopard *Penthera uncia* is reported to occur in areas within and adjacent to the National Park. The severely endangered Musk deer *Moschus chrysogaster* occurs particularly in the sub-alpine zone where Monals *Lophophorus impejanus* are also common in summer. The park being an abode of more than 350 species of birds represents an excellent cross section of Western Himalayan avifauna. Important Mammals, reported from the Great Himalayan National Park are listed.

2.7 TREKKING ROUTES\ INSPECTION PATHS WITHIN THE PARK

Trekking routes existing within the park, also shown on the Map attached, range wise are:-

Tirthan Range

1 Gushaini to Chalocha - 15 kms.
2 Rolla to Bhagora Dunga -23 kms

3 Rolla to Shilt - 3 kms.
4 Dunga thach to Khora thach-0.5 kms.
5 Shilt to Pardi thach-3 kms.
6 Chalocha to Nada,Dhara & Lapah.

Sainj Range

1 Neuli to Parkachi via Bah,Lapah, Shakti,Maror -34 kms.
2 Lapah to Tikku pathar-7 kms.

Jiwanala Range

1 Siundh to Gati pat, Kundar & Majhan 20 kms.

2.8 THE SOCIO-ECONOMIC SETTING

An Eco-development zone has been carved out, approximate width of 5 kilometres, along the Western -South-western boundaries of the GHNP. This zone has about 141 villages/ hamlets with a total population of about 11,000. Literacy levels are very low and government jobs, held important in Himachal, still fewer.

The mountains are high and the terrain difficult. Villages, many with scattered hamlets consisting of a few houses, are spread out along the valleys. Roads are few, connecting only the main villages. Outlying habitations are only accessible on foot.

Subsistence, rainfed agriculture gives at the most 2 crops per year. Land holdings are small. Villages, accessible by road have recently ventured into establishing orchards, apples or stone fruits. Because of subsistence and low yield agriculture, people depend on daily waged labour especially during the lean season. This is, however, invariably insufficient.

Dependence on natural resources for livestock, fuel, NWFP is high. Herb collection for many is the major or only source of cash income. Most villagers in the eco-zone are involved in herb collection for varying times in the year. The data which follows, illustrates the typical village situation in the Eco-development zone of the national park.

2.8.1 From microplan of Unit I

Table 1 : Clusterwise Pop. Status

Cluster	HHs	Pop	Male	Female	Ch. M	Ch. F	Caste
I	25	133	60	73	-	-	Rp
II	65	359	105	94	86	74	
III	41	210	61	48	57	44	
IV	14	200	59	67	40	43	Rp
V	84	395	123	103	84	85	SC5HH
Total	229	1297	408	385	267	237	

CLUSTER VILLAGES

I	Ghat & Langcha
II	Nahin, Patheli, Nadharidhar, Tirnga,Gaded,Shaduala,Riety,Burgga
III	Shalinga,Talinga, Manhar
IV	Daran,Shungcha,Dhar
V	Pekhri, Ludhar,Nadahra, Kulthi.

Table 2 : Occupation Profile

Cluster	Govt job	Orchard	Sheep/ goat	Herb.Coll.	Skilled
I	-	-	23 HH	All	-
II	5	1	55	All	18
III	4	3	21	All	13
IV	-	-	13	All	12
V	1	4	59	All	2
Total	10	8	171		46

2.8.2 From microplan of Unit II

Unit II, on the right bank of Jiwa river, in Jiwanala Range comprises 5 villages, viz Pashi, Kharongcha, Majharna, Dhatidhar and Khanyari. These fall under 'Raila' panchayat.

There are 64 HHs with a population of 377 and a Male/Female ratio of 1 : 0.92 in the Unit. 10 % people are literate. Total cattle population recorded including sheep and goats is over 1000. Most HHs are engaged in herb collection.

* data Majharna, Pashi

2.8.3 From microplan of Unit IV

Unit VI, in Jiwa Nala WL Range, comprises 3 villages viz Niharni, Bah and Chenga. These are part of Garaparli panchayat.

There are 13 HHs with 53 people of which 33 are males. 6 persons are literate. Herb collection and grazing are the main occupations which give cash income. All HHs are engaged in herb collection.

2.8.4 From microplan of Unit VI

Unit VI, in Sainj WL Range comprises 18 villages, viz Barshangad, Titri, Dharali, Goshti, Chamarda, Dharali, Patahra, Tadora, Sangcha, Birashangad, Kahna, Madana, Katwali, Dhagara, Sundernagar, Kotlu, Lot, Dhara. These are a part of Shangar panchayat.

There are 167 HHs with a total population of 760. Male/ Female literacy is 40 and 30 % respectively. All HHs rear sheep and goats and alongwith other cattle these number about 1000. 70 % of the HHs are engaged in herb collection.

Underlined villages indicate where sample data on herb collection and incomes therefrom was gathered.

2.8.5 From microplan of Unit VII

Unit VII, in Jiwa Nala WL Range, comprises 25 small villages viz Thuari, Jangla, Bhadrudwar, Seri, Chandei, Sanougi, Manahra, Khain, Bajahra, Patahra, Damayadi, Rihahra, Chhatradala, Sihan, Ruar, Guhdi, Shiyadi, Pichadi, Tung, Talyara, Julahra, Dhartha, Kaintha age, Dandi and Baruda, Jara. These are part of Shainsher panchayat.

There are 267 HHs with a population of 1396. Literacy is 6.04 %. The total cattle population including sheep and goats is around 2500. Herb collection continues to be the major source of cash income for the people.

2.8.6 From microplan of Unit IX

Unit IX, in Sainj WL Range comprises 9 villages viz Suchain, Garshaira, Narwali, Pupna, Shayargi, Seri, Tungroo, Mashla, Ropa. These are part of Suchain panchayat.

There are 61 HHs with a total population of 321. Total literacy is around 40 %. All HHs rear

sheep and goats. Total cattle population is around 400. Almost all HHs are engaged in herb collection which accounts for roughly 60 % of the annual cash income for them.

2.8.7 From microplan of Unit X

Unit X, in Jiwa Nala WL Range comprises 8 villages viz Majhan, Mail, Banougi, Badehtha, Shariadi, Badani, Soin, Bagi Kashari. These are part of Gadaparli panchayat.

There are 109 HHs with a population of 558 of which 303 are males. The literacy rate is 8 %. Total cattle population including sheep and goats is over 3300. Main source of cash income for most HHs is through herb collection.

3 SUMMARY OF RECOMMENDATIONS

3.1 SUMMARY OF FINDINGS

1 Herb collection is the most important income related activity based on use of natural resources for most HHs in the GHNP's Eco-development zone.

2 Cultivation of medicinal plants commercial or otherwise in the area is not done.

3 Trade in medicinal plants is the most important (and biggest) component of NWFP trade in the area. Estimated at Rs 112 lakhs per annum for the eco-zone alone.

4 Atleast upto 70 % of the 1600 HHs in the Eco-development zone, including women & children, in the eco-zone are involved in herb collection for some time in the year.

5 There is substantial unrecorded illegal collection and trade in medicinal plants in the area.

6 Many of the species collected in large quantities are threatened in the wild with threat categories ranging from Critically Endangered to Vulnerable.

7 Herb collection being the biggest pressure on the park also becomes the source of the biggest disturbance and adverse impact on the park's ecosystem.

8 The village communities, especially the collectors, are unorganised, without any stable village level organisation or groups.

3.2 ... AND RECOMMENDATIONS

1 HERB COLLECTION AND ITS SIGNIFICANCE IN LOCAL ECONOMY NEEDS TOP PRIORITY IN PARK / ECO-ZONE MANAGEMENT.

2 Organise the people through village level groups like Saving and Credit groups, that can be sustainable after the current project period.

3 Involve them gradually and increasingly in decision making and planning in park management to:

- i Control and curb illegal herb collection or grazing;
- ii Register collectors of their units;
- iii Regulate and monitor herb collection;
- iv Support FD for in situ conservation.

4 Project/ FD to support income generation/ value addition activities like collective marketing, small scale enterprises based on medicinal herbs collection or growing.

5 Conduct regular training for FD staff and herb collectors in methods of sustainable harvest. This is important as collection of most herbs in the GHNP area involves destructive harvest of the root or entire plant.

6 Initiate and strengthen village level organisations through involvement of outside, experienced agencies and training of FD staff.

6 Develop atleast one Medicinal Plant Development Area(MPDA) per unit within the project period, see pg. 38.

4 LITERATURE SURVEY AND OTHER RECORDS - HP, KULLU

Table 3 : Major Medicinal Herbs exported from H.P. (in Qtls.)

SN	BOTANICAL NAME	TRADE NAME	1988-89	1989-90	1991-92
01	*Jurinea macrocephala*	Dhoop	5845	4064	4940
02	*Dioscorea deltridea*	Shingli Mingli	1672	180	380
03	*Picrorhiza kurroa*	Kaur/Karu	1468	200	2899
04	*Valeriana jatamansi*	Muskabala	1954	1247	2014
05	*Cinnamomum tamala*	Tejpata	1431	849	-
06	*Taxus baccata*	Brahmi	418	166	335
07	*Saussurea lappa*	Kuth	3	648	668
08	*Morchella esculenta*	Guchhi	403	138	2801
09	*Viola serpens*	Banafsha	27	196	-
10	*Pistachia spp.*	Kakar singhi	129	438	278
11	*Cherophyllum spp.*	Mithi Patis	61	12	48
12	*Aconitum vialacium*	Kauri Patis	190	1	3
13	*Bunium persicum*	Kalazira	70	5	5
14	*Berberis aristata.*	Berberis roots	2981	11195	12824
15	*Pinus gerardiana*	Neoza	657	563	600
16	*Agaricus spp.*	Mushroom	38	15	-
17		Other spp.	4239	4913	10329
	TOTAL		21,586	24,830	38,124

* Source: from forests of Himachal Pradesh produce in project proposal in NTFP by M P Sood, Forest Department, Kullu.

As per figures above the top 5 species exported out of Himachal Pradesh during 1988-89 to 1991-92 are : 1. *Berberis aristata* (roots); 2. *Jurinea macrocephala* (whole plant); 3. *Picrorhiza kurroa* (roots); 4. *Valeriana jatamansi* (roots); & 5. *Morchella esculenta* (Guchhi). Of these one is ENDANGERED (1) and two are CRITICALLY ENDANGERED (3 & 4) in the wild (See 6.2)

Table 4 : Minor Forest Produce of the Project Area

Quantum of Average Annual Harvests Assessed from 3 yrs. Production data (1987-89)

Unit: Quintals or ,000 Kg

SN	BOTANICAL NAME	NAME	Average annual production		Percentage of forest area production
			Himachal	Project area	
01	*Jurinea macrocephala*	Dhoop	3558	570	16
02	*Dioscorea deltoidea*	Shingli Mingli	3370	3150	93
03	*Picrorhiza kurroa*	Kaur/Karu	674	440	65
04	*Valeriana jatamansi*	Muskabala	1323	200	15
05	*Cinnamomum tamala*	Tejpata	1410	1410	100
06	*Hydrocotyle asiatica*	Brahmi	540	125	23
07	*Betula utilis*	Bhojapatr	316	6	3
08	*Saussurea lappa*	Kuth	5	5	100
09	*Morchella esculenta*	Guchhi	91	560	16
10	*Angelica glauca*	Chora	139	76	55
11	*Viola serpens*	Banafsha	459	388	84
12	*Podophyllum hexandrum*	Bankakri	171	17	10
13	*Pistachio integrrima*	Kakar singhi	69	67	97
14	*Atropa acuminata*	-	34	34	100
15	*Acorus calamus*	Baj	840	840	100
16	*Valerian hardwickii*	Neehani	42	42	100
17	*Taxus baccata*	Rakahal	648	240	37
18	*Dactylorhiza hatagirea*	Salam panja	39	8	21
19	*Polygonatum verticillatum*	Salam misri	94	94	100
20	*Ainsliaea aptera*	Sathzalri	55	55	100
21	*Berberis aristata*	Berberis	1201	1201	100
22	*Cedar roses*	Diar	470	470	100
23	*Blue pine cones*	Kail cones	61	61	100
24	*Several other medicinal plants in smaller quantities*		980	582	59

(From : Farming systems & forestry related ecological aspects by Tej Pratap, 1994)

Note: Annually an export collection fee of Rs. 796,000 was collected for 632 Tonnes of medicinal plants of whole Himachal from traders. Besides 1282 Tonnes of these plants are estimated to have been collected by the right holders in Himachal Pradesh (farmers of these areas) and the benefits went to them.

In addition to the above tables, attention is invited to Annexures V, VI VIII and IX. The last two annexures abstract government orders and relevant portions from the Settlement Report pertaining to the collection of herbs and the rights of the local people. This is with respect to Kullu district and applies as well to the GHNP and its surroundings.

Annexures V and VI have been constructed with the help of records from the O/o the Conservator of Forests, Kullu Circle and the various divisional forest offices under Kullu. The table for Lahaul-Spiti has been cited as most of the herb exports from that district are actually done through Kullu. Many Lahaulas bring their herbs to Kullu and then obtain a permit from DFO, Kullu instead of exporting directly from Lahaul.

Analysis of literature and records survey pertaining to medicinal plants shows that it is difficult to form a balanced picture of the dimensions of the herb trade if one were to go by such records and data. The main lacunae in the available literature/ records seems to relate to the thoroughness and authenticity of the records maintained by the FDs. For one, these records are not maintained uniformly at all exit points and permit issuing authorities are many with no clear jurisdiction. For instance herb export permits can be issued by the director of the GHNP as well as by the DFO of Banjar even when the herbs have been collected from areas under the administrative control of the director.

While some records are maintained at the checkposts and range offices, there seems to have been no effort made at collation of these records nor any analysis done to figure out periodic variations in trends, species, volumes, quantities etc. It is interesting to note in the data (Table 3) for Kullu circle that during 1988 to 1992 there have been large exports of leaves of Taxus baccata. This and the preceding period was the time when “taxol” was in much demand for its reported anti-cancer properties. This large scale removal led to the destruction of many Taxus baccata trees. Had any monitoring of the export of this species been in place, it would have immediately alerted the authorities to find out what and why such a thing is happening.

Resultantly, only guesstimates of species and quantities exported / extracted can be made. Data on illegal trade / extraction is virtually non existent and not added to the annual figures given.

Similarly, it is only recently that some studies in the GHNP area have shown the economically important linkage between herb collection and rural cash incomes. In the absence of any significant studies pertaining to NWFP or to herb collection, forest policies and management continued to ignore or play down the significance of herb collection to the livelihood of the people.

5 HERB COLLECTION : HISTORICAL, CULTURAL & LIVELIHOOD PERSPECTIVES ?

5.1 HISTORICAL

Herb collection from the wild, high altitude ranges of the Himalayas has been an economic activity for a long time. Local people and graziers have collected a variety of herbs initially for use in local/ folk medicine. The settlement report of Anderson (1886) for Kullu mentions herb collection but records that this was done by the poorer people. Later with the opening of markets, construction of roads and general commercialisation, herb collection became increasingly lucrative.

Herb collection in Kullu forest circle, as elsewhere in H.P., has generally been an unregulated affair. From time to time various governments have fixed 'royalties' on some medicinal and aromatic species. The Punjab government in 1964 for instance fixed royalty rate for 14 species which were believed to be important and largely extracted from the forests/ alpine pastures. See **Annexure IX**. But these royalty rates have not in any substantial way been able to 'regulate' or 'control' the herb collection or trade. This is partly because till today, medicinal species are treated as a subset of MFP and records of their collection or trade are poorly maintained by the forest departments.

Originally, rights for herb collection as for other forest produce, were allocated area-wise, village-wise and these were recorded in the settlements. With the passage to time and population increase (both human and cattle), these rights got 'transmitted' to successive generations and the forest department, in the absence of any revision of the original settlements, has been obliged to accept an ever increasing number of 'rightholders'. This situation has been further exacerbated with the gradual opening up of these once remote areas. Developmental projects and cash cropping (like apple), brought in with them 'outside' workers and sooner than later many such people became de facto rightholders.

More recently, high industrial and export demand for herbal and cosmetic industry has greatly accelerated herb collection from the wild. In India, 95% of the demand for medicinal plants of herbal pharmaceutical industries is met from collection from the wild. The existing pressure on the park and environs in terms of herb collection for cash incomes both by 'rightholder' and 'outsiders' stands multiplied many times. Several instances of people from outer Seraj and even as far away as Kinnaur indulging in illegal herb collection within the park were reported by local people. Recognizing the importance and high value many of the medicinal species now command, the H.P. government in its order No. Fts(A) 3-1/77 dated 15 Aug 1993, has greatly enhanced the 'royalty' rates payable to government. See **Annexure VIII**. What does

not appear to have happened with these steep rise in royalty rates is, any concomitant effort to strengthen regulation of either collection or trade in medicinal species collected from the wild. In the GHNP area and its eco-zone, export permits for herbs are still issued by several authorities within the forest department; often one hand not knowing what the other is doing.

Resultantly, the 'incentive' to smuggle out the more high priced (and high 'royalty') species is more than ever before. Many of the high value species like Patish/ Atis (*Aconitum heterophyllum*) and Karu (*Picrorhiza kurooa*) are now collected and sold in small quantities. Monitoring their 'movement' within the park zone would be next to impossible. Further with reports of local traders directly employing Nepali labour or using local rightholders for systematic collection of herbs from inside the park, a typical case of the 'Tragedy of the Commons' is rapidly unfolding in the area.

5.2 CULTURAL

Many of the herbs collected besides being medicinal, have other cultural significance for local ethnic groups. Dhoop (*Jurinea macrocephala*) for instance is widely used in religious ceremonies as incense. Other species of cultural value include *Sausseri costus, Valeriana jatamansi* etc.

Few traditional practitioners (folk healers) are now reported to be active in the eco-zone area of the park. Still fewer in the younger generation practice any traditional form of healing. However, household level use of many species is still reported to be prevalent amongst a number of people interviewed. Local uses on many medicinal species have been compiled by the Park authorities and are given at **Annexure X.**

5.3 LIVELIHOOD

5.3.1 Significance of herb collection in local economy

In order to realistically assess the importance of herb collection, especially to villagers within the eco-zone of the national park, a sampling of households in 53 villages was carried out as part of this study. This data was collected range-wise.

Methodology : Two local investigators who are literate and knowledgeable about herb collection in the GHNP and its surrounding areas were selected. In consultation with them and the local FD staff a proforma for data collection was designed. This is the format (see annexures) on which the village wise data has been collected.

The 2 investigators were asked to begin with villages closest to the park boundaries and also to visit and interview known collectors in others villages. In some of the villages in Jiwanala range, FD staff also helped in data collection. The location of the villages covered has been shown range wise on the map of the eco development project area given at the end of the report.

The survey was carried out mainly during the summer months (April to June) of 1996 and 1997. During this period 53 villages were covered for data collection.

5.3.1.1 Tirthan Range

Typical data gathered by the Park Authorities in preparation of their Microplans for each Unit is illustrated below:

The 20 villages in this unit have been clubbed into 5 clusters:

CLUSTER	VILLAGES
I	Ghat & Langcha
II	Nahin, Patheli, Nadharidhar, Tirnga,Gaded,Shaduala,Riety,Burgga
III	Shalinga,Talinga, Manhar
IV	Daran,Shungcha,Dhar
V	Pekhri, Ludhar,Nadahra, Kulthi.

Table 5: Clusterwise Population Status

Cluster	HHs	Pop	Male	Female	Ch. M	Ch. F	Caste
I	25	133	60	73	-	-	Rp
II	65	359	105	94	86	74	
III	41	210	61	48	57	44	
IV	14	200	59	67	40	43	Rp
V	84	395	123	103	84	85	SC5HH
Total	229	1297	408	385	267	237	

Table 6 : Occupation Profile

Cluster	Govt job	Orchard	Sheep/goat	Herb.Coll.	Skilled
I	-	-	23 HH	All	-
II	5	1	55	All	18
III	4	3	21	All	13
IV	-	-	13	All	12
V	1	4	59	All	2
Total	10	8	171		46

In the eco-development zone of Tirthan range there are 7 Eco-development Units constituted. These have a total of 53 villages (read hamlets). Of these 53 hamlets, 17 have been covered in the sample survey to assess the species, quantities collected and average annual income from herbs. This gives a sampling %age of 33. In each hamlet 7 to 8 households were interviewed and data collected. See **Annexure XVI**.

The village wise abstracted data is given below :

Table 7

Village	No of Responents	No of Sps collected	Total Value Rs lakhs	Average income per HH
Nahin	14	3 to 5	1.90	13570.00
Daran	4	4 to 5	0.69	17250.00
Sungcha	7	4	1.18	16860.00
Kharongcha	3	4	0.38	12670.00
Dingcha	11	4	1.61	14340.00
Tinder	11	4	1.51	13700.00
Galingcha	17	4 to 6	1.91	11200.00
Kamera	16	4	1.77	11000.00

From the above the average income from collection of 4 to 6 species (including Guchhi), for the sampled villages of various Units in Tirthan WL Range, comes to Rs. 10860.00 per HH.

5.3.1.2 Sainj Range

Unit VI, in Sainj WL Range comprises 18 villages, viz Barshangad, Titri, Dharali, Goshti, Chamarda, Dharali, Patahra, Tadora, Sangcha, Birashangad, Kahna, Madana, Katwali, Dhagara, Sundernagar, Kotlu, Lot, Dhara. These are a part of Shangar panchayat.

There are 167 HHs with a total population of 760. Male/ Female literacy is 40 and 30 % respectively. All HHs rear sheep and goats and alongwith other cattle these number about 1000. 70 % of the HHs are engaged in herb collection.

(Underlined villages indicate where sample data on herb collection and incomes therefrom was gathered).

Sainj range has 3 eco-development Units with 29 villages (hamlets). Of these, 20 hamlets (1 to 13 HHs) were interviewed for data collection. Sampling %age 70.

See Tables at **Annexure XVI**.

The following Table gives the abstracted data for the 13 villages of Sainj WL Range:

Village	No of Respondents	No Sps Collected	Total Value Rs in Lakhs	Average income per HH
Todora	8	7	1.94	24250.00
Lapah	19	7 to 8	4.68	24630.00
Katwali	10	7	2.18	21810.00
Madana	10	4 to 9	2.16	21600.00
Daghara	5	7	1.21	24200.00
Pathara	5	7	1.08	21600.00
Goshti	9	7	1.88	20900.00
Dharali	15	6 to 7	3.249	9208.00
Kahna	8	6 to 9	1.99	24860.00
Bira Shanger	6	8	1.55	25800.00
Chamardha	13	7	2.61	20100.00
Barshangar	13	7	3.27	25160.00
Ropa	3	5 to 9	0.644	21440.00
Barogi	1	6	0.112	11200.00
Shangar	1	2	0.035	3560.00
Sansar	1	4	0.087	8700.00
Shanshad	1	8	0.438	43800.00
Sharangar	1	6	0.21	21000.00
Madana	1	5	0.376	37600.00
Dharmad	1	8	0.82	82040.00

From the above data, the average annual income per HH from collection of 6 to 9 species (including Guchhi) for the sampled villages of Sainj WL Range comes to Rs. 23,100.00

5.3.1.3 Jiwa Nala Range

Unit II, on the right bank of Jiwa river, in Jiwanala Range comprises 5 villages, viz Pashi, Kharongcha, Majharna, Dhatidhar and Khanyari. These fall under 'Raila' panchayat.

There are 64 HHs with a population of 377 and a Male/Female ratio of 1 : 0.92 in the Unit. 10 % people are literate. Total cattle population recorded including sheep and goats is over 1000. Most HHs are engaged in herb collection.

Jiwa Nala Range has 7 Eco-development Units comprising 59 villages (hamlets). Depending upon proximity to the Park boundary, 16 hamlets were covered for data collection. Sampling %age of 27.

The village wise abstracted data is given below :

Table 9

Village	No of Respondents	No of Sps collected	Total Value Rs lakhs	Average income per HH	
Khadoaa	6	3 to 5	0.68	11300.00	
Tagwacha	3	4 to 5	0.206	6860.00	
Jiwa	2	4 to 5	0.276	13800.00	
Reylla	16	4 to 5	1.34	8375.00	
Shulga	2	4	0.185	9240.00	
Shaksukhal	2	4 to 5	0.255	12750.00	
Dhara	1	5	0.055	5500.00	
Shainsher	1	3	0.074	7400.00	
Niharni	8	4	0.73	9125.00	
Majharna	3	1	0.095	3170.00	
Bhupan	3	1 to 7	0.355	11830.00	
Khadangna	3	2	0.095	3170.00	
Ghat Seri	2	3	0.128	6400.00	
Sharan	2	2	0.064	3200.00	
Paashi	3	1	0.093	3100.00	
Dhaar	2	4	0.379	18950.00	
					8385.00

Based on the above figures, the average income per HH from collection of 1 to 7 species (including Guchhi) of the various units in Jiwanala range comes to Rs 8385.00

5.3.2 Analysis :

If we take the average income figure for all the 3 W L Ranges, it works out to:

RANGE	AVERAGE Income per HH in Rs.
Tirthan	10860.00
Sainj	23100.00
Jiwanala	8385.00
	42345.00
Average	14115.00

Earlier studies and records pertaining to herb collection as a source of income for local communities show that this activity is important especially in the local cash economy. GHNP project records, from the Microplans prepared, show that in many of the Units between 70 and 100 % of HHs are engaged in herb collection.

The Eco-zone around the GHNP, as presently set out, has about 141 villages/ hamlets with 1600 HHs, all totalling to a population of 11,000 people. If we assume that half of the HHs are actively engaged in herb collection, then on the basis of the figure arrived at above, approximately the total annual income from herb collection comes to Rs 11.2 million. This means a per capita income of about Rs 1000 or about Rs 7000 per HH per year for the entire eco-zone. These figures would be much more if we take the percentage of herb collecting HHs as 70. These income figures by far outstrip income from any other source, including agriculture which is largely subsistence level & rainfed. This would apply to 70% of the HHs where the principal source of income has been recorded to be from herb collection.

Further in terms of number of individuals engaged in herb collection, it is seen that for species like Guchhi, almost the entire family, particularly the children are involved. For species like Dioscorea deltoidea women collectors are reportedly common, (pers. comm. M Sood). For other species, 2 or 3 able bodied males per HH would be collecting between 2 to 6 months in a year. From a village normally a group of people move out for herb collection and make trips varying between 10 to 15 days at a time.

6 TRADE

From the data gathered in the eco-zone it is clear that most people sell their collected herbs to local shopkeepers or agents of dealers in Bhuntar or Kullu. Few of the collectors directly sell to dealers in Banjar, Bhuntar or Kullu. The main local traders are at Gushaini, Sainj and Banjar. They appear to be handling the bulk of the raw material going out of the eco-zone area. These traders are the local procurement centres for herbs and play a crucial 'financial' role in the business.

While many of the collectors indicated that they usually take down payment from the traders or other agents, quite a few said that they either take advance money or ration to support collection trips or on credit to get over the lean season. This was corroborated by the trader in Gushaini and one at Bathad. The collectors and the local traders-cum-shopkeepers thus have a business relationship, often cemented by years of dealing together, and this is rarely breached.

6.1 QUANTITIES EXTRACTED

Based on the data collected during the course of this study, an estimate of the annual volumes/ quantities of major herbs **extracted** by people within the eco-zone of the GHNP is given below. (These figures are based on the average, annual collections made species-wise per HH in the eco-zone villages.

Table 10 : Major herbs extracted

SPECIES	QUANTITY IN Kgms.
DHOOP	34,378
MEHANDI	10,038
KADU	8,920
NEHANI	8,592
KAUDI	7,453
NEHANU	6,972
PATISH	5,101
SINGLIMINGLI	2,508
PANJA	991
MUSHKBALA	762
GUCHI	665
BANAFSHA	55

Table 11 : Exports Records from Kullu Circle Compared

Mean annual export from Sainj & Tirthan ranges based on 5 years records of FD (kgs)	SPECIES	AVG.QTY. extracted from park Kgms.
11380	DHOOP	34,378
16140 *	MEHANDI	10,038
1060	KADU	8,920
	NEHANI	8,592
	KAUDI	7,453
	NEHANU	6,972
	PATISH	5,101
7320 *	SINGLI MINGLI	2,508
	PANJA	991
4940 *	MUSHK BALA	762
140	GUCHI	665
	BANAF SHA	55

* Higher export recorded for these species than current mean annual collection pertains to high exports of these species during 1987-88.

The quantities for other species shown as exported from Sainj and Tirthan ranges are on the lesser side because some traders/ collectors directly export herbs from Banjar, Bhunter or even Kullu, thus their figures are not reflected in above table. There could also exist a case of illegal export which could have been partly prompted by the recent hike in royalty rates. See Table 12.

Trade: From the data gathered in the ecodevelopment zone it is clear that most people sell their collected herbs to local shopkeepers or agents of dealers in Bhuntar or Kullu. Few of the collectors directly sell to dealers in Banjar, Bhuntar or Kullu. The main local traders are at Gushaini, Sainj and Banjar. They appear to be handling the bulk of the raw material going out of the eco-zone area. These traders are the local procurement centres for herbs and play a crucial 'financial' role in the business.

While many of the collectors indicated that they usually take down payment from the traders or other agents, quite a few said that they either take advance money or ration to support collection trips or on credit to get over the lean season. This was corroborated by the trader in Gushaini and one at Bathad. The collectors and the local traders-cum-shopkeepers thus have a business relationship, often cemented by years of dealing together, and this is rarely breached.

6.2 COMPARISON OF ROYALTY FOR THE IMPORTANT MEDICINAL HERBS FIXED IN 1964 AND REVISED IN 1993

The 1993 revised rates have been arrived at by generally taking 10 % of the prevalent market price for a species in Delhi market or the rates offered by Tribal Co-operative Marketing Federation (TRIFED), New Delhi.

Table 12: Comparison of royalty of important medicinal herbs

SN	Name of plant	Rs/Qtl (Year 1964)	Rs/Qtl (Year 1993)
01	Ainsliaea aptera (Sathjalari)	13.00	50.00
02	Aconitum heterophyllum (Patis)	780.00	7500.00
03	Picorrhiza kurroa (Karoo)	52.00	540.00
04	Jurinea macrocephala (Dhoop)	52.00	500.00
05	Podophyuim hexandrum (Bankakri)	40.00	450.00
06	Valeriana (Jatamansi)	26.00	500.00
07	Angelica glauca (Chora)	26.00	125.00
08	Viola odorata (Banfasha)	200.00	2250.00
09	Dioscorea deltoidea (Singlimingli)	4.00	900.00
10	Rheum emodi (Rewar chini)	38.00	110.00
11	Thalictrum foliolosum (Mamira)	38.00	335.00
12	Thymus serphyllum (Banjawain)	25.00	100.00
13	Artemisia brevifolia (dry flowers of Seski)	27.00	50.00
14	Atropa acuminata (Dry leaves of Belladonna)	70.00	50.00

For the above mentioned species the royalty rate increase ranges from 4 to 20 times. In case of Guchhi, *M. esculanta*, while no royalty fee is given in the 1964 order, the 1993 order fixed the rate at Rs 10,000/ quintal.

6.3 TRADE IN KULLU, AMRITSAR & DELHI

The trading channels/ traders of medicinal plants are many and complicated. A list of the principal traders locally is at **Annexure VII A**. It is seen that there are 18 traders in Kullu town, 4 in Bhuntar, 1 in Banjar and 1 in Chanon (Distt. Mandi). Below these is a network of local shopkeepers as in Gushaini, Bathad and Sainj alongwith their agents or agents of the town traders or even independent agents/ merchants. The local herb collectors sell to any one or more of these. Records of quantities traded (bought and sold) by this network is not available/ maintained or not shown. The only source of information is export permit records of the FD. From this source the record of exports from Kullu Circle, including GHNP ranges, **Annexure V**, has been constructed.

It is clear that the medicinal herb related economy is much more significant to the local people and to the traders than has been thought to be heretofore. This realisation viewed with the conservation status of many of the species in the wild, has important trade regulation and protection implications and are of immediate concern if the resource base of these species is to be sustainably conserved and managed.

Table 13 : Table showing price/ kg change between local and Amritsar/ Delhi market for selected medicinal species

Average prices in Rs/ kg. Amritsar market ('96)*	Avg. price / kg in Delhi market in 1992	SPECIES	Avg. price/ kg GHNP (1996+97)
70 - 90	50 - 60	DHOOP	40
NQ		MEHANDI	18
145	50 - 170	KADU	164
100		NEHANI	100
100	55	PATISH (Meethi)	
NQ		NEHANU	18
700 - 900	750	PATISH (Kauri)	648
NQ		SINGLI MINGLI	20
500 - 600	600 - 700	PANJA	365
65 - 70	59 - 65	MUSHKBALA	82
2000	2700	GUCHI	1800
250	175 - 225	BANAFSHA	213

(* Annexure VII)

For 5 species the rates quoted are better in Amritsar market, while for 3 species they are either the same or less than found out in GHNP area. For 3 species no rates were quoted in the Amritsar market (NQ). The Delhi rates quoted for some species pertain to the period 1992 -93 and vary substantially with the rates quoted by TRIFED (Delhi) at that time. However, on many of these rates the royalty fees notified by HP Government were based.

Some of the local shopkeepers and traders in Kullu indicated that changes in rates vary substantially depending upon the export market.

6.4 DIRECT MARKETING TO MERCHANTS IN AMRITSAR & DELHI

According to some of the merchants, they are willing to buy medicinal herbs directly from people provided the quantities are substantial and genuiness of the species is assured. Collective marketing by various Eco-development units, singly or together, if it can be organised at the local level would ensure substantial quantities for sale to merchants, some of whom

may purchase ex GHNP area & arrange their own transportation. But before such arrangements can be operationalised, procurement, drying, storage, account keeping at each unit level has to be tried, tested & strengthened, a task in which project intervention seems to be necessary.

Table 14 : The Table below shows the gap between demand and supply for Critically Endangered NW Himalayan species in 1986

Botanical Name	Demand (tonnes)	Supply
Dactylorhiza hatigera	> 5000	< 100
Gentiana kurroo	> 5000	< 100
Aconitum heretophyllum	> 1000	< 100
Picrorhiza kurroa	> 5000	< 100
Dioscorea deltoidea	> 5000	< 100

(Source: Min. of Health, New Delhi, in Jain, 1987)

The above figures illustrate that for species now assessed as CRITICALLY ENDANGERED, the vast gap in the demand and supply and consequently the high prices for these species would further lead to their disappearance from the wild.

7 CONSERVATION STATUS

The original forest settlements pertaining to forests of and around the GHNP permitted collection of herbs for 2 months, beginning 15 August. Over time due to increased population and increasing monetary returns from herb collection, this period is now extended from April till October.

A diagrammatic sketch (next page) shows the present collection time, species wise distributed over several months of the year, and involving men, women & children at various times.

7.1 SEASONALITY DIAGRAM : COLLECTION OF MEDICINAL PLANTS

(Source: M. Sood, FD, Kullu)

With several reports of herb collections now being organised through outside labour and contractors directly by some herb traders, there is both, an intensification and an extensification of herb collection operations. This process has led to competition in collection between the local, traditional collectors (amongst themselves) as well as with outsider collectors. Garret Hardin and Free Riding ! As a result not only are immature herbs being collected, but newer and perhaps more 'marginal' (difficult) areas are also being exploited. Without being allowed to flower and seed, natural regeneration of many species could be adversely affected. Spaces thus created would be taken up by uneconomic species exacerbating to a severe decline in the populations of medicinal herbs.

Other than these general insights, there appear to be no information in terms of location of populations or viable breeding populations of herbs presently being exploited from within the park. Their habitat loss/ degradation or declining population trends are mainly due to severe over-exploitation, perhaps followed by over-grazing.

7.2 THREAT CATEGORIES

One of the important species collected from the GHNP is *Picrorrhiza kurooa*, locally karoo or kaur. The Red Data Book of Indian Plants (BSI, 1987) lists this species as endangered. Another species listed as endangered in the RED DATA book is *Gentiana kurroo.*

Interestingly, this species is listed as collected from Kullu in the 1964 Punjab Govt. order fixing royalty rates. However, after that there is no mention of *Gentiana Kurroo* as either being collected or any royalty having been fixed for it. There appears to be no separate trade name for the species either. The Hindi name is KUTKI and the Bengali name KARU, same as that

for *P.kurrooa*. *Gentiana kurroo* is listed in Appendix II of CITES. It is reportedly more valuable than *Picrorhiza kurroa* and the roots of the latter are often reported to be mixed with those of *G. kurroo* due to their similarity in appearance when dry. It needs investigation whether *G. Kurroo* is being collected from the park & if so, in what quantities.

P. kurrooa, *Nardostachys grandiflora* and *Dioscorea deltoidea* are listed as Vulnerable, while *Sausserea costus* as Endangered in the RED DATA book of Indian Plants, BSI, 1987,

More recently, an exercise to attempt threat categorisation (IUCN ver. 2.2) of Himalayan medicinal species through the CAMP (Conservation Assessment and Management Plan), was held at Lucknow, end January, 1997. Given below is the new threat category assigned to some of the species currently being extracted from the GHNP and environs.

It needs to be emphasised that these THREAT CATEGORIES are NOT FINAL and in this case apply to ONLY the North Western Himalayas, unless the status is given as global due to a particular species endemicity.

BOTANICAL NAME	***FAMILY***	***THREAT STATUS***	
Aconitum heterophyllum, Wall.	Ranunaculaceae	**CR**	
Aconitum violaceum Jacquem ex stapf.	Rananculaceae	**CR**	
Angelica glauca, Edgew.	Apiaceae	**CR**	
Atropa acuminata, Royle.	Solanaceae	**CR**	
Berberis aristata,DC.	Berberidaceae	**EN**	
Berberis lycium, Royle.	Berberidaceae	**EN**	
Berberis chitria Ham.	Berberidaceae	**VU**	
Bergenia ligulata, Wall	Saxifragaceae	**VU**	
Bunium persicum,(Boiss) B. Fedtsch	Apiaceae	**EN**	
Dactylorhiza hatagirea(D.Don) Soo.	Orchidaceae	**CR**	
Dioscorea deltoidea,Wall.	Dioscoriaceae	**CR***	
Gentiana kurroo Royle	Genitanacaeae	**CR***	
Hedychium spicatum Smith	Zingiberaceae	**VU**	
Heracleum candicans, Wall ex DC.	Apiaceae	**EN**	
Nardostachys grandiflora,DC.	Valerianaceae	**CR+**	
Picrorhiza kurrooa,Benth.	Scrophulariaceae	**EN+**	
Podophyllum hexandrum,Royle.	Berberidaceae	**CR***	
Saussurea costus,Clarke.	Asteraceae	**CR#**	
Swertia chirata,Ham.	Gentianaceae	**CR**	
Taxus baccata,Linn. **	Coniferae	***CR/NE***	
Thalictrum foliolosum DC.	Rananculaceae	**VU**	
Valeriana jatamansi (wallichii),	Valerianaceae	**CR**	Jones

(Threat categorisation based on CAMP workshop held at Lucknow, Jan. 21-25, 1997. Details See **Annexure XII**). NE refers to North East India.

** (Taxus wallichii is under CITES Appx. II)
* (CITES Appx. II)
+ (Under consideration for CITES Appx. II)
# (CITES Appx. I)

7.3 DOMESTICATION

Status of domestication and in agro-technology of threatened Himalayan medicinal plants is given below. This is based on literature survey published by ICAR or CIMAPS. The detailed list of 36 species (All India) is at **Annexure XIII.** The booklets published by CIMAPS and one by RRL, Jammu is given at **Annexure XIV**.

Atropa acuminata (belladona)
Dioscorea deltoidea (shinglimingli)
Hyoscyamus niger
Saussurea costus (lappa) - (kuth)
Heracleum candicans (Hogweed) : RRL Jammu.

(Other species and booklets detailed in **Annexure XIV**).

Though agro-technology is available for *Dioscorea deltoidea* (Shingli-mingli), its cultivation is not reported from anywhere in the eco-development zone of the park. This is despite the fact that there are restrictions on the collection of this species. FD records and data obtained from collectors around the park, however, reveal that this species is being freely collected and exported. Only in the Amritsar/ Delhi market was the price of *Dioscorea deltoidea* not quoted.

The CSIR centre at Palampur in Kangra district is currently engaged in standardising agro-technology packages for several medicinal species of the Himalayan ranges including for *Valeriana jatamansi*. Similarly, the Tibetan Astro-Medical Research Institute, “Men-Tsee-Khang”, at Dharamsala has initiated trials for ex situ cultivation of some species used in Amchi medicine but are now increasingly difficult to procure. Botanical names of the species could not be ascertained.

Propagation techniques of the following species found in the GHNP have been given in a booklet published by the High Altitude Plant Physiology Research Centre at Tungnath, district Garhwal:

Aconitum heterophullum (Atis, Pathish)

A. balfourii

Angelica glauca (Chora)

Nardostachys grandiflora (Jatamansi)

Picrorhiza kurrooa (Karu)

Podophyllum hexandrum (Bankakri)

Rheum moorcroftianum (Dolya)

Sausserea obvellata (Bhramakamal)

Thalictrum foliolosum (alpinum) (Mamira)

The details of all the species listed is at **Annexure XI**. A package of practices for 10 medicinal herbs is reported to have been developed at the centre.

The GHNP authorities can take steps to initiate cultivation trials of the above species, all of which grow and are collected from the park. These trials can be done through the various village level eco-development committees set up under the current project. Trials for different altitudes/ species need to be done. It may, however, be prudent to first encourage cultivation for species of lower altitudes and those which are not threatened or over-exploited. This is because herb collection is economically too important in the area and small scale cultivation of threatened species may become an alibi to indulge in further exploitation/ trade and export especially by non-rightholders. The role of eco-development committees in checking such malpractice would be crucial.

8 ALTERNATE STRATEGIES: MPDAS ? VALUE ADDITION ? IMPROVED MARKETING?

Any alternative strategy for conservation and sustainable use of the medicinal plant resource of the park needs to be based on sound policy and clear objectives of park management. Thus, issues that would affect herb collection and sustainable harvest for the benefit of the local people would also affect many other aspects of park management. For instance the need for attitudinal change in the FD and their willingness to increasingly involve local people, foster local level institutions/ organisations is crucial. This in turn would depend much on the quality of FD personnel deployed on park management duties and their continual training.

It is important to realise that the GHNP is a state and national heritage. Its longterm conservation is important to all of us. The systems and means/ procedures of regular departmental working would be unable to respond adequately to the urgent needs of the park for prioritised action. While state level and Kullu level national park 'committees' have been made under the GHNP Eco-development project, regular visits to the park over the last two years reflect the usual, routine approach and working of the department.

It seems unlikely that under such dispensation, many of the species that are critically endangered or otherwise threatened would be able to stage to secure recovery within the project period. The departmental procedures, frequency of transfers, politicised developmental priorities and the growing 'work' of the department in terms of increasing annual outlays seem to stack up aganist concerted and prioritised action. The present stereotypic departmental approach towards this national park is unlikely to deliver, maintain or improve this great national heritage.

8.1 CONSERVATION

8.1.1 Conservation awareness

The threat faced by many of the medicinal species it appears is not clear either to the people or the managers. There are general reports of decline in terms of quantity and quality by collectors and traders. However, no systematic study / research seems to have been carried out to either locate viable populations of threatened species or to monitor their decline.

The bigger traders or industry too seem to be blissfully unaware of the imminent decline in collection levels from the wild. On the other hand due to competition, exploitation is getting worse with more and more areas being 'tapped'. An awareness building exercise that is

targeted at all sections of the users of this resource, particularly the local people needs to be taken up immediately.

8.1.2 Community organisation

A key to community action is the level of community organisation achieved. Whether it is the success of awareness campaigns, joint protection and management or enterprise development, a lot depends on how well the community is organised. Grass root village level organisations like women's groups have started to be organised in the GHNP eco-zone following the introduction of the World Bank supported project. Though this is a step in the right direction, much, much more remains to be done. And it is not clear whether the FD is best agency to do this job all on its own ?

Using PRA, several microplans for most of the 16 units of eco development have been developed. A microplan typically lists out, alongwith budget outlays, the various developmental works to be carried out in the Unit's villages/ hamlets. Most of these plans are stereotypical and reflect the usual developmental aspirations in terms of paths, roads, schools etc. A local level committee per unit has been formed to review and monitor the implementation of these microplans.

The protection/ conservation role these units are supposed to play in the longterm is not clear. The apprehension is that these local level organisations are constituted for the project objectives and for the project period and may keep going as long as there are funds under the project to keep them together. It has been seen elsewhere, as in the Dhauladhar project in Kangra, that once the project is over, most such groupings wither away.

What is therefore needed is an institutional mechanism that is locally rooted to provide continuity (in the face of frequent departmental transfers) and longterm involvement of local people in the decision making processes of the park management. Such an organisation HAS TO BE ABLE TO SURVIVE ON ITS OWN, possibly for a very long time, after the current GHNP project is over.

Women's or Men's or Mixed SAVING AND CREDIT groups could be one answer to organising village communities around a theme (their own money) that is independent of any project and sound enough to sustain interest of group members on a longterm. A good starting point could the already constituted village eco development committees like the one at Shangarh. In many parts of the country, S & C groups, particularly women's groups, are being encouraged and set up as a tested and sustainable mechanism for rural development. This work is, however, of a rather specialised nature and initial outside help in this could help set up such groups in

the eco-zone villages of the park.

8.1.3 Community involvement

Herb collection in and around the park is very important and significant to the local economy. Any management option will have to keep this in mind. And because of the scale and size of herb collection in the area and the large numbers of people involved, increasing community involvement in management pertaining to regulation, collection / extraction, trade etc. is essential.

Community involvement MUST BE SECURED to turn around the present situation and look forward to sustainable extraction and possible value addition for more benefit of the local communities, thereby increasing their stake in conservation of the resource. Departmental policies and practices in this regard need to be unequivocal. If the people can be made to feel confident that the process of involving them would finally lead to their empowerment to manage their natural resources in a participatory manner, the stage would be set to secure community involvement. However, at present it is not clear whether the different levels within the FD subscribe fully to this position.

8.1.4 Protection and regulation

Protection and any form of regulation without the support of the local people does not work. The first option seems to be to address illegal collection and intrusion into the park by outsiders or contracted labour. The various eco development committees need to take on the responsibility of protection their resource. This would have to be built into the functions of such committees.

Unit wise, the collectors of threatened species can register with these committees and made aware of the short and long term consequences of excessive harvest of these species. Such registered collectors can help the FD in checking illegal collections within the park.

Presently the panchayats are allowed to levy some fee for the export of herbs from their area. This is also an unregulated affair and needs to be tightened. Awareness about the conservation status of threatened species is necessary before permits are recommended by the panchayat. The eco development committees may control / regulate collection of such species in their areas.

The seasonality diagram **(pp. 27**) shows the peak times of collection of various herbs. During these periods, the eco development committee members, panchayat members etc. can be involved by the department to spot check collection in the field and/ or records maintained by traders.

On the department side, issue of export permits needs to be streamlined. Presently there is dual control being exercised by the park director and the DFO, Banjar. This needs to be looked into and an effective cross check mechanism evolved or the authority vested only with the park staff.

Similarly, record keeping at Range level has to be considerably strengthened. Traders, local and outside, need to register with the park authorities and obliged to maintain proper records which should be regularly reported to the Range Office.

Illegal trade of many medicinal species is reportedly taking place. This is also corroborated by the difference between the quantities collected and those exported as per records of the FD. The checkpost system has proved to be largely ineffective. Further the FD staff is ill equipped to be able to tackle any systematic, illegal removal or trade of medicinal herbs. They are either too few, too ill trained, not mobile or simply 'over busy' with regular, departmental works.

It seems unlikely that the departmental response to the needs of the situation will improve sufficiently in the foreseeable future. The only plausible option then remains to get the people involved to intercede where government intervention has failed. This course again, ironically, needs to be backed by the FD and in the absence of clear policy and institutional intent may not work. But it has a future, given the right initial support.

8.1.5 Sustainable harvest

One of the major reasons for decline in wild populations of medicinal herbs due to over-exploitation is the destructive harvest of species. This is especially true where the whole plant or the roots are extracted. Under the project efforts need to be initiated to study and train the local collectors in methods of sustainable harvest of herbs. This may involve restraint in time of collection, allowing the herbs to flower and fruit and thus regenerate. Interventions that require the support of the local eco unit committees.

8.1.6 In situ conservation areas

In situ conservation areas for medicinal herbs or even the general flora need to set up immediately, atleast one in each different forest type within the national park. These could be easily protectable and accessible micro-watersheds of about 200 ha. within the park with easily distinguishable natural boundaries. Detailed floristic, botanical and ecological studies could then be commissioned in these 'reserves'. Some such areas could be merged with the other longterm study areas being taken up by the WII.

The current floristic survey of the park could also suggest some such in situ reserves containing valuable populations of threatened medicinal herbs.

The in situ 'reserves' would be 'hands-off' areas within the park where no collection would be permitted. This arrangement would ofcourse need to be endorsed by the various eco-development units and their help secured in keeping collectors off these areas.

Their ultimate value would lie in harbouring viable, breeding populations of known medicinal herbs (other species as well). Research could help in enriching the genetic variation within a species so that a sufficiently large genepool can be conserved over longterm.

8.2 CULTIVATION

There is no report of cultivation of any species of herbs reported from the eco zone or environs of the GHNP. Trials of some Himalayan medicinal species like Valeriana wallichii (V. jatamansi), Dioscorea deltoidea and other lower altitude species are being conducted at the CSIR complex at Palampur in Kangra district.

It may be mentioned that whenever cultivation of medicinal plants is talked about, the assumption is of an agricultural, monocrop model. For this, appropriately worked out agro-technology which is fairly site specific is necessary. In the absence of such technology, which is not researched for most of the GHNP species, it becomes impossible for the agricultural extension services to promote medicinal plants cultivation. With the returns being unknown and reliable marketing next to non-existent, cultivation of medicinal plants becomes a very dicey affair. In the GHNP area, most farmers are not in a position to take any risk especially on the meagre land holding they have and the totally rainfed conditions under which agriculture is practised.

Propagation techniques: A 1996 publication of the 'High Altitude Plant Physiology Research Centre' of HNB Garhwal University, located at Tungnath in Chamoli district of UP has come out with a booklet that gives the propagation techniques of most of the medicinal herbs found

in the GHNP. Details are at **Annexure XI**. This centre is reportedly encouraging farmers to take up cultivation of some of the alpine species at lower levels.

It is suggested that a team of the GHNP staff be deputed to visit this facility and study the cultivation methods being promoted by this centre.

8.2.1 Medicinal Plant Development Areas (MPDAs)

The concept of a MPDA is a relatively new one. Some MPDAs have been started in southern India under the FRLHT co-ordinated project for medicinal plants conservation and sustainable use by local communities.

These areas are degraded forest land that are earmarked for medicinal plants 'production'. Production here implies that selected economic, indigenous species, trees, herbs or shrubs are grown in the MPDA in sufficient intensity so as to give substantial benefits to the local community, thereby increasing their economic stake in the MPDA and its longterm conservation. Gradually the degraded forest area is expected to get re-habilitated in this manner. MPDAs are managed under a system of Joint Forest Management with the bulk of the benefit or share going to the local community and a token share to the FD. This sharing proportion needs to be notified by the FD. In Tamil Nadu this has been fixed as 80:20 with 80 % of the value of the raw material harvested going to the community.

As an institution, the FD's role, besides making suitable degraded forest areas available for establishment of MPDAs, is essentially supportive and let the initiative lie with the community. A MPDAs success may finally lie in the degree to which the FD is able to empower the local community to handle and manage the area for their benefit while contributing to rehabilitation of the forest.

The major advantage of an MPDA over a conventional JFM area is that because of the species mix of herbs, shrubs and trees, the returns or harvest from the area comes within an year for herbs, 1 or 2 years for shrubs and longer for trees. This quick return from an MPDA greatly helps in getting people interested in the scheme.

What is, however, important for an MPDA to work is that the beneficiaries whether individuals, households, hamlets or villages be clearly identified to avoid complication later on. The beneficiaries be well organised as a group with good leadership and a clear understanding of what the MPDA implies in terms of responsibilities and gains. Once the beneficiaries are clearly identified, an MPDA committee (in GHNP's case it could even be the Unit's Eco

development committee) which interfaces between the FD and the local community is set up. This committee is responsible for management of the affairs of the MPDA including its protection and later for using the MPDA income for appropriate development activities as decided by the beneficiary community. This committee may have FD representation of an appropriate level on it. This role could be facilitated by a local NGO, but it is often difficult to find the appropriate kind of NGOs. In the absence of a suitable NGO, community organisation becomes a responsibility of the FD and this is difficult due to lack of trained personnel, time, motivation etc.

The size of a MPDA would depend upon the number of beneficiaries. It can vary between 5 and 50 hectares or more. The area should be protectable and manageable. The choice of species would have to be balanced between the site suitability and the value of the species and its demand in the market. Park management can help provide the MPDAs with experienced marketing people as consultants, initially. MPDAs can be established and funded as part of the park project's eco development activities and would ultimately help in rehabilitation of degraded areas. In the GHNP Eco-development zone, where there are fairly strong village level committees, MPDAs could be initiated.

In the longterm, successful MPDAs can be extended or more can be started. Where the mechanism of planting, protection, harvesting and sale has stabilised, value addition to the raw materials harvested can be thought of to increase the return to the community.

8.2.2 Value Addition

It has been seen that in the GHNP area the entire trade and marketing is controlled by outside traders/ businessmen. In order to make value addition work at the local level, much more effort has to be made to seek and develop better marketing. Market tie-ups with major exporters or with industry are needed to avoid middlemen and improve profits. In the present context this only seems feasible where MPDA committees represent well organised communities capable of pooling together the produced and the collected medicinal plants for collective marketing. Marketing tie-ups and buy back guarantees by industry for instance, need timely supply of agreed to quantities, regularly; and this requires a high degree of organisation at the production end. The various MPDA committees can hypothetically join together for better marketing or availing of professional help in marketing their produce/ products.

Collective marketing, even if can be organised right away would lead to better remuneration for the local collectors in the herb trade. As the market for local herbs improves and the MPDA committees get experience in trade, simple processing and semi-processing enterprises can

be encouraged and promoted in the area. For stable, S & C self-help groups, banks like NABARD and others are extending loans to encourage income generation enterprises. Capital and working capital investment for medicinal plants related income generating activities can be obtained from such sources. Other ways and means to tap institutional support need to be explored.

In terms of ex situ 'production' of economic medicinal species, MPDAs offer an alternative where an individual farmer take no risk and where raw material can be grown in sufficient quantities to make remunerative marketing feasible, open up possibilities of value addition and at the same time contribute to relieving pressure on the wild.

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