

SURVEY OF MEDICINAL AND ECONOMIC PLANTS OF HILKOT WATERSHED AREA

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Abstract

Medicinal and aromatic plants can be a source of sustained income to the inhabitants of hilly areas, traders, hakims, pharmaceutical and allied industries. The survey brought forth some important facts and figures about floristic composition, status of medicinal and economic plants. At present exploitation of this renewable natural resource is not carried out on scientific lines and thus this resource is not fully utilized. Suggestions have been made for better utilization and the strategy to be adopted to improve marketing channels and their impact on socio-economic conditions of the local communities.

Introduction

Hilkot watershed area is rich in a variety of medicinal and economic plants. Some of which are of pharmacopoeial importance while a large number are used in traditional system of medicine against several diseases by communities in primary health care system. Although this area possesses good potential of medicinal and aromatic plants, still their richness is not known. This natural drug plant resource at present is not utilized according to resource availability, as a result a number of pharmacopoeial species became scarce due to detrimental extraction by inhabitants. Besides, there are many other plants which are of substantial economic importance.

In order to explore the sustainable utilization of medicinal and economic plants to improve the livelihood of the inhabitants, a preliminary rapid vegetation survey was carried out to determine the floristic composition, present status and ethnobotanical uses of plants.

Methodology

Survey of medicinal, aromatic and economic plants was conducted to become familiar with the floristic composition and medicinal plants of the area for sustainable utilization. In addition to this, feasibility of growing fast selling drug

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species along with agricultural crops on community land were switched over to cash earning medicinal crops suitable to the agro-climatic conditions of the region. The introduction of cash earning medicinal crops will not only ensure the pharmaceutical and other allied industries with sustained supplies, but may also help in the economic betterment of local peoples. For recording ethno-botanical information, field studies were carried out in three hamlets of the project area to document indigenous knowledge of local people about plants and their impact on the life of the people. In addition to short interviews, discussion also took place with users and buyers of medicinal plants to know the existing marketing channel and to suggest measure for improvement.

Floristic composition

The Hilkot watershed covers an area of about 20 km² with an latitudinal range from 1500 to 3200 m. Major land at foot-hill and moderate slope were brought under cultivation of cereal crops like maize and rice on terraces. The project area is thickly populated and characterized by grassland with rugged, steep to moderate slope. The southern aspects show the sign of degradation, while northern aspects are thickly vegetated.

The natural conifer forests are met above 2000 m elevation at Perai and Guzara Forest from Saidan Gali to Tal Meteorological Station and Dabli (Naka-sheer) to Hilkot. The common trees are *Pinus wallichiana* (Kail), *Cedrus deodora* (Deodar), *Picea smithiana* and *Abies pindrow*. Among broadleaved trees; *Quercus ilex* Q. *dilatata*, *Aesculus indica*, *Prunus*, *Ulmus*, *Corylus*, *Alnus*, *Morus*, *Litsaea* and *Euonymus* were principal hardwood species and from local consociation with *Indigofera*, *Lonicera*, *Rosa*, *Rubus*, *Desmodium*, *Viburnum* constituting the under growth. Whereas on the farm lands *Juglans*, *Ailanthus*, *Robinia*, *Diospyros*, *Zizyphus*, *Pyrus*, *Prunus* were common, while along nullahs *Alnus*, *Salix*, *Celtis*, *Ficus* were conspicuous.

Vegetation of Reserved Forest of Perai and Guzara Forest as well as on farm land area were analyzed and comprised both natural and planted species given as under:

Trees

Abies pindrow (Fir), *Aesculus indica* (Bankhor), *Ailanthus altissima* (Ailanthus), *Alnus nitida* (Sharol), *Broussonetia papyrifera* (Jangli Tut), *Cedrus deodara* (Deodar), *Celtis australis* (Batkarar), *Diospyros kaki* (Wild amlok), *Elaeagnus hortensis* (Singli), *Ficus carica* (Injeer), *Ficus palmata* (Ficus), *Juglans regia* (Akhrot),

Melia azedarach (Bakain), *Morus serrata* (Tut), *Pinus wallichiana* (Kail), *Platanus orientalis* (Chinar), *Populus deltoides* (Poplar), *Populus alba* (Poplar), *Populus ciliata* (Poplar), *Pyrus communis* (Nashpati), *Pyrus malus* (Seb), *Pyrus pashia* (Batangi), *Quercus incana* (Rin), *Rhus succedanea*, *Robinia pseudoacacia* (Robinia), *Salix tetrasperma* (Bed), *Taxus baccata* (Barmi), *Ulmus laevigata* (Manu) and *Zizyphus vulgaris* (Unab).

Under-growth

Shrubs

Astragalus sp., *Berberis lycium*, *Caragana ambigua*, *Daphne oleoides*, *Desmodium suave*, *Elaeagnus parviflora*, *Indigofera gerardiana*, *Lonicera* sp., *Onychium japonicum* (fern), *Plectranthus rugosus*, *Punica granatum*, *Sageretia filiformis*, *Spirea rosea*, *Sarcococa saligna*, *Viburnum nervosum* and *Zanthoxylum alatum*.

Herbs

Acorus calamus, *Angelica glauca*, *Arisaema tortuosum*, *Artemisia* sp., *Bergenia ciliata*, *Cannabis sativa*, *Chenopodium album*, *Commelina* sp., *Corydalis stewartii*, *Epilobium roseum*, *Fragaria vesca*, *Geranium wallichianum*, *Heracleum candicans*, *Hypericum dyeri*, *Launea nudicalus*, *Mentha longifolia*, *Nepeta catarica*, *Nepeta raphanorhiza*, *Nostrum officinale*, *Plantago major*, *Podophyllum hexandrum*, *Polygonum viviparum*, *Rumex hastatus*, *Scabiosa* sp., *Scutellaria chamaedrifolia*, *Silene vulgaris*, *Skimmia laureola*, *Solanum miniatum*, *Valerina wallichii*, *Verbascum thapsus*, *Viola odorata* and *Urtica dioica*.

Climbers

Hedrela helix, *Jasminum grandiflorum*, *Rosa moschata* and *Rubus* sp.

Status of important economic and medicinal plants

Survey results indicated that a number of economic and medicinal plants having good demand can be collected in sizeable quantities, while others are threatened with extinction due to their heavy use by ever-increasing population pressure. Key plant species of economic and medicinal value are given as under:

A. Plants growing wild can be collected for marketing

Acorus calamus (Bach), *Arisaema tortosum* (Sur-ganda), *Cannabis sativa* (Bhang), *Chenopodium album* (Bathu), *Mentha longifolia* (Jangli-podina), *Nastrum officinale* (Jangli-salad), *Plantago major* (Jangli Isabghol) and

Verbascum thapsus (Gidar-tambaku).

B. Plants of commercial value can be cultivated on community land

Anethum graveolens (Ajmod), *Asparagus adscendens* (Musli-sufaid), *Carum copticum* (Ajwain), *Foeniculum vulgare* (Sonf), *Hyoscyamus niger* (Ajwain-khurasini), *Linum usitatissimum* (Alsi), *Malva parviflora* (Sonchal), *Punica granatum* (Annar), *Saussurea costus* (Kuth) and *Vernonia anthelmintica* (Kali-zeri).

C. Threatened plants

Due to over-exploitation by locals resulted in the loss of plant population and need to be conserved. The threatened group of economic/medicinal plants categorized in three sub-groups.

- i. **Endangered species:** Distribution frequency of the following species is low in the visited localities and considered to be endangered with extinction.
Angelica glauca (Chora), *Aesculus indica* (Bankhor), *Celtis australis* (Batkarar), *Corydalis stewartii* (Mamiri), *Ficus palmata* (Wild Injeer), *Juglans regia* (Akhrot) *Paeonia emodi* (Mamekh), *Quercus* sp. (Rien), *Rheum emodi* (Revand-chini) and *Zizyphus vulgaris* (Unab).
- ii. **Rare species:** These species have limited distribution in specific area. Their populations are decreasing in localized habitats and became endangered:
Bergenia ciliata (Zakhm-e-hayat), *Berberis lycium* (Kashmal), *Dactylorhiza hatagira* (Salep-misri), *Delphinium denudatum*, *Geranium wallichianum* (Ratan-jot), *Polygonum amplexicaule* (Anj-bar), *Skimmia laureola* (Ner), *Thymus serpyllum* (Ban-ajwain), *Valeriana jatamansi* (Mushak-bala), *Viola serpens* (Banafsha) and *Zanthoxylum armatum* (Timar).
- iii. **Extinct species:** *Elaeagnus hortensis* (Singli), *Fraxinus excelsior* (Sum), *Fraxinus xanthoxyloides* (Sum), *Taxus baccata* (Barni) and *Ulmus laevigata* (Kain).

Marketing system

Markets of Batal and Chatter-plain area are trade center of medicinal plants and black mushroom (Guchi). People collect a limited number and quantities of drug plants from all around the Hilcot valley during summer month. They at first dried it near home-yard and later on sold them to local traders/shopkeepers. The seasonal

traders purchased dried herbal drugs after grading from local shopkeepers, who then packed in gunny bags and forwarded to Mingora Market; the main trading centre in Swat where these commodities accumulate and ultimately find their way to down markets of the country for consumption and export. Different crude drug items sold by local dealers of Batal and Chatter-plain areas in the recent year is given below:

Crude drug items sold by local dealers in the recent year

S.#	Scientific name	Local name	Qty (tonnes)	Rate/ Kg (Rs.)	Approx. value of herbal drug sold (Rs.)
1.	<i>Viola serpens</i>	Thandi-boot	2	175	350,000
2.	<i>Paeonia emodi</i>	Mamekh	4	50	200,000
3.	<i>Berberis lyceum</i>	Kashmal	1	100	00,000
4.	<i>Valeriana jatamansi</i>	Mushak-bala	0.5	200	00,000
5.	<i>Geranium wallichiana</i>	Ratan-jot	0.2	50	10,000
6.	<i>Acorus calamus</i>	Bach	1.2	40	48,000
7.	<i>Skimmia laureola</i>	Ner	1	12	12,000
8.	<i>Rheum emodi</i>	Chutial	0.16	50	8,000
9.	<i>Zanthoxylum armatum</i>	Timner	0.2	10	2,000
10	<i>Morchela esculanta</i>	Guchi	0.2	6000	12,000,00
11	<i>Vernonia anthelmintica</i>	Kali-zero	0.8	20	16000
10	<i>Zizyphus vulgaris</i>	Unab	0.6	12	7,200
Total					18,53,200

Crude drugs worth Rs.2,100,000–2,200,000 are collected annually by locals from Hilkot and suburb areas and sold to the shopkeepers/dealers of Batal and Chatter plain areas.

Ethnobotanical observations

Information obtained from Hakim and local people who had knowledge of therapeutic value of plants in 3 helmets on traditional uses of medicinal and economic plants are given below:

Plants used as folk-medicine

S.#	Scientific name	Local name	Part used	Local use
1	<i>Angelica glauca</i>	Chora	Root	Used as condiments and spices, useful in dyspepsia and constipation
2	<i>Berberis lycium</i>	Kashmal	Berry and roots	Root extract is used for the treatment of jaundice and pharyngitis, while fruit decoction useful in typhoid and common fever.
3	<i>Berginea ciliata</i>	Zakham-hayat	Root	Dried pulverized root sprinkled over wound for healing. Decoction used against indigestion and restoration of vitality in men
4	<i>Bunium persicum</i>	Kalazera	Seed and bulb	Used as spice in curries, carminative and useful in headache.
5	<i>Cannabis sativa</i>	Bhang	Seed	Oil is edible and used in cold season to keep body warm, seed used as poultry feed to enhance egg production.
6	<i>Geranium wallichianum</i>	Ratan-jot	Root	Burnished root used in hay fever, diabetic and urinary diseases.
7	<i>Hyoscyamus niger</i>	Ajwain-khurasani	Leaves and seed	Used for narcotic purposes, also used in asthma and whooping cough.
8	<i>Mentha longifolia</i>	Jungli podina	Leaves	dried and fresh leaves taken with green or cured to control vomiting and diarrhoea.
9	<i>Podophyllum hexandrum</i>	Bankakri	Root	Used in cough, skin diseases and slow purgative.
10	<i>Punica granatum</i>	Anar	Rind, seed, root & bark	Powdered rind mixed with sugar used for diarrhoea and dysentery control. Decoction of root-bark used as anthelmintic.
11	<i>Rheum emodi</i>	Rhevand-chini	Root	Fresh juice used as purgative and stomachic in dyspepsia
12	<i>Skimmia laureola</i>	Kner	Leaves	Used as incense and fumigant.
13	<i>Urtica dioica</i>	Bichu-booti	Twigs and leaves	Decoction of leaves useful in rheumatic pain, while paste of peeled leaves and twigs applied externally for skin disease.
14	<i>Valeriana jatamansi</i>	Mushk-bala	Root	Stimulant tonic and useful in cough, epilepsy and neurosis.
15	<i>Viburnum nervosum</i>	Guch	Fruit, bark and root	Fruit edible, decoction of root used for cure of urine disease. Bark juice useful in hemorrhage.
16	<i>Viola serpanse</i>	Banafsha	Whole plant	Decoction used in fever, blood purifier and refrigerant. Root emetic.
17	<i>Zizyphus vulgaris</i>	Unab	Seed and leaves	Seeds edible and useful in pectoral and lung diseases.

The use of plants is indicative of intimate dependence and relationship of the peoples of hilly areas with the vegetation in their vicinity. However, there is an ample traditional knowledge of medicinal plants which need to be fully documented.

Economic potential for sustainable harvest of medicinal/economic plants

Medicinal plant is a small component of Agriculture sector and contributes its share in economic development. The sustainable harvesting of plants having both medicinal and economic value has great potential. In fact, there is no local awareness about the proper collection of various species. Thus there is a need, to create awareness of the importance of these plants among local people and to provide them guidance and training in collection and processing to enhance their income.

Conservation and cultivation/propagation

Many medicinal plants like *Paeonia emodi*, *Podophyllum hexandrum*, *Angelica glauca*, *Rheum emodi*, *Dactylorhiza hatagira*, *Geranium wallichianum*, *Polygonum amplexicaule*, *Skimmia laureola*, *Valeriana jatamansi*, *Viola serpens* etc. and morels are collected every year by locals and no attempt is made for their conservation or to protect them against grazing pressure. If this practice continued, there is possibilities of complete exhaustion of a particular herb in near future. Therefore, it is necessary to establish demonstration plot in the farmer's field to promote cultivation of medicinal plants to uplift socio-economic condition of communities. Financial and technical assistance may be provided to the farmers of small holdings through PARDY Project for cultivation of fast-selling drug species having constant demand in the market. These species will generate additional income for the communities.

Conclusion and recommendations

- i. Nurseries of forest trees, medicinal and economic plants should be developed by PARDY Project in collaboration with PFI for transfer of packages of cultivation practices along with seeds and planting stock to community for pilot scale cultivation. Thus in-situ cultivation will boost up the mass production of endangered tree species. The local populace needs guidance in identification, collection, conservation and cultivation of profitable drug plants with the help of demonstration plot, proposed to be established in the farmer's field.
- ii. Project nursery established at Hilkot is insufficient to meet the local requirement of planting stock. It should be extended and key species of conifers like *Abies pindrow*, *Cedrus deodara*, *Picea smithiana* *Pinus wallichiana* and *Taxus baccata* may be raised alongwith broadleaved species viz: *Aesculus indica*, *Ailanthus altissima*, *Amorpha fruticosa*, *Alnus nitida*, *Celtis australis*, *Elaeagnus hortensis*, *Ficus palmata*, *Ficus carica*,

Fraxinus excelsior, *F. xanthoxyloides*, *Gleditschia tricanthos*, *Juglans regia*, *Morus serrata*, *Platanus orientalis*, *Populus ciliata*, *Populus deltoides*, *Quercus dilatata*, *Q. ilex*, *Robinia pseudoacacia*, *Sapindus mukorosii*, *Ulmus laevigata* and *Zizyphus vulgaris*. These species may be utilized for rehabilitation of eroded land and conservation of plants to restore species diversity.

- iii. Phyto-chemical analysis should be carried out to find out active principles present in medicinal plants which have a potential for export. In case of positive result, market should be identified with the help of exporters. Any financial benefits which accrue from such activities would substantially benefit local communities.
- iv. Marketing survey of important herbal drug markets should be conducted to determine the supply and demand position and to identify the annual requirements of various plant-based manufacturing units. If this information is available, links with marketing channel between community organization and end-users will be established. Thus collectors and growers will be in a better position to get maximum benefit from the sale of herbal drugs.

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