Review on Important Ethno-Medicinal Plants in Uttarakhand

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ABSTRACT
Ethno-botany has emerged as an important branch of study which focuses on the utility of different plant species and their values as food, medicine, etc. Uttarakhand state is considered as a repository of biodiversity with particular reference to medicinal plants that can be an important option for sustainable livelihood of the hilly people in coming future. About 300 medicinal plant species have been documented from this state, indicating ethno-medicinal richness as an herbal state and for strengthening herbal-based industry in this region. The potential drug value lies in plant roots, leaves, fruits, seeds and sometimes entire plant is used to cure the various ailments. These are administered in the form of infusion or decoction or applied locally as paste or powder to the affected body part to cure. The present paper focuses about the different medicinal plants used in the Uttarakhand Himalayan region.

Key words: Medicinal Plants, Local Name, Part Used, Mode of Treatment, Demand and Market Value and Conservation

INTRODUCTION
Medicinal plants have been the subjects of man’s curiosity since time immemorial, almost every civilization has a history of medicinal plant use. About 400 plants are used in regular production of ayurvedic, unani, siddha and tribal medicine about 75% are from tropical and 25% from temperate forests in India. India is also rich in medicinal plant diversity with all the three levels of biodiversity such as species, genetic and habitat diversity. Due to its unique geographical location and different climatic condition, Uttarakhand Himalaya has rich biodiversity and variety of plant species and also has tremendous potential for domestication of medicinal plants that can be an important option for sustainable livelihood of the hilly people in coming future. The Indian Himalayan Region (IHR) is the habitat of major tribal communities such as Bhottias, Boaxas, Tharus, Jaunsaries, Shaukas, Kharvar and Mahigiri, which use medicinal plants for curing the diseases and ailments through the use of natural medicine. Published literature was collected through secondary sources mainly from the website of government of Uttarakhand (uk.gov.in), State Medicine Plant Board of Uttarakhand, SMPB (www.smpbuk.org) and Forest department of Uttarakhand (forest.uk.gov.in).

Literature Review Strategy
The references from research papers, books, articles and newspapers were taken for interpretation of data.

Traditional medicinal knowledge
The indigenous knowledge is an important tool for study of natural resources that has enormous potential to facilitate development process in cost-effective and sustainable ways. Knowledge of flora and vegetation of any area is essential for the study of biodiversity, environment and conservation of natural resources. The medicinal plants and their existing ethno-botanical knowledge as a tool will be beneficial in future understanding, research and sustainable management of medicinal plants occurring particularly in the region as well as those poor people who cannot afford expensive medicine from market and can get immediate relief from such medicinal plants traditionally used by villagers.

Uses
The 30% of preparations are derived from roots, 16% whole plants, 14% bark, 10% fruits, 7% seeds, 6% both stems & leaves, 5% flowers, 4% rhizomes, 3% wood and only less than 20% of the species used are cultivated. Medicinal plants are chiefly used for curing stomach pain, fever, cold & cough, bleeding & wounds, fungal infection, burns, rheumatic pain, insect bite, influenza, diarrhoea, jaundice and cirrhosis. The plants such as: Adiantum venustum, Capsicum annum, Hyoscyamus niger, Primula denticulate, Salix elegans, Salvia lanata, Tagetes arecta, Viola bifloraetc. appear vary high in demand in drug industry as they are being used in largest number of the preparations. The Medicinal plants available in Uttarakhand and their uses are tabulated in Table-1.

Demand and Marketing
Medicinal plants provide the natural raw material for most oral and non-oral traditional medications. Cultivation and sustainable harvesting of medicinal plants with scientific knowledge and proper marketing system might be a big source of additional income for improvement of livelihood of rural people. In the global market, the trade of herbal medicines is about Rs. 27 billion per year whereas in India it is about Rs. 3.5 billion per year and it is increasing at the rate of 7% per year. There is a great deal of potential for the development of these crops in the hill regions without much heavy investment. Uttarakhand can take advantages of increasing demand and low availability of medicinal and aromatic plant resources in the other parts of country and start to grow highly valuable medicinal plants in high altitudes areas. Medicinal principles are present in different parts of the plant like root, stem, bark, heartwood, leaf, flower, fruit or plant exudates.

Conservation Value
The conservation and cultivation of natural resources especially of medicinal plants is required. Due to various reasons, the medicinal plants that are naturally grown in abundance in this hilly area are now a day’s depleting fast. Lack of alternate income sources force people to over-exploit natural resources of this region. The cultivation of medicinal plants is considered to be of great importance for the safeguarding of biodiversity and contribution to rural livelihoods in Uttarakhand. Moreover conservation and cultivation of medicinal plants can help the villagers to earn their livelihood to some extent. Apart from human use, many plant species were also used in animal husbandry as the primary source of healthcare.

These findings would support use of medicinal plants and their conservation in the region. It is necessary to initiate systematic cultivation of medicinal plants in order to conserve biodiversity and protect endangered species. In addition to the requirement for conservation of medicinal plants it has also become essential to protect and patent the traditional knowledge. New approaches of biotechnology and conservation strategy can help preserve and utilize the indigenous knowledge of medicinal plants for humankind.
CONSERVATION INITIATIVES FOR SUSTAINABLE CULTIVATION OF MEDICINAL PLANTS

After declaration of Uttarakhand as an Herbal State, the government took initiatives for sustainable cultivation of MPs in a phased manner. The government appointed Agriculture and Processed Food Products Development Authority, as a nodal agency to promote setting up of Agri Export Zones in two phases. Under the first phase, six districts: Chamoli, Dehradun, Haridwar, Pithoragarh, Udhamsingh Nagar and Uttarkashi, are being covered. In this phase, emphasis on 10 high value species as mentioned above will be cultivated on about 500 ha land. In the second phase, the area under cultivation would be increased and additional districts brought under the aegis of Agri Export Zones and other medicinal plants will also be cultivated. This is being done with the support from Infrastructure Development Finance Company Ltd to boost exports and enhance India’s share in the world market. The State has established the Herbal Research and Development Institute at Gopeshwar in district Chamoli as a nodal agency to monitor developmental issues and for inventorisation of MPs species in the state. As elsewhere, in the Indian Himalayan Region, ethnic communities in the state of Uttaranchal rely, to a large extent, on native plant species for sustenance of their traditional health-care system, both logistically as well as economically. However, the present scenario shows a decline in these traditional, plant-based health-care practices. These age-old practices are conservation-oriented and have tremendous potential to uplift the state economy. The excessive extraction of medicinal plant resources for use in the pharmaceutical industry has resulted in ruthless destruction of natural populations of medicinal plants. This work attempts to assess the current status of knowledge of medicinal plant resources of the state. It also focuses on the importance of documenting traditional knowledge and practices related to conservation and sustainable utilization of medicinal plants in Uttarakhal. A collaborative work plan involving scientists, government institutions and nongovernmental organizations is suggested for preserving the traditional knowledge system and practices, conservation of medicinal plants and upliftment of the rural economy of this mountain state. Conservation of high-value medicinal plant species require sincere and serious attempt by stakeholders. Developing measures for ex situ conservation to encompass activities in totality within a given time frame need identification and concentration. The role of interested farmers is very vital in developing demonstrative cultivation trials and an effective long-term conservation strategy. From the perspective of biodiversity conservation, domestication, and cultivation through appropriate technological intervention, MAP resources are a viable option for natural resource management and livelihood enhancement. Cultivation of such species mostly in abandoned and marginal land will improve the economic condition of farmers and help conserve medicinal plants diversity in their natural habitat. Therefore, cultivation of these plant species in barren and marginal lands, as desired by local farmers, will be a step toward obtaining their benefits. Khoshboo summarizes different options available for conservation of biodiversity. Both in situ (on site) and ex situ (off site) means of conservation are equally important and to be considered complementary to each other. In situ conservation of crop genetic resources has sometimes not been given importance. As in situ conservation provides a natural reservoir of crop genetic resources and this method is dynamic over ex situ since plants can continue to evolve in the natural habitat. In Himalayan region a number of protected areas-biosphere reserves, national parks and wildlife sanctuaries are in existence and are proposed.

Ex situ conservation

Maintenance of ex situ populations of plants is carried out by a number of institutions including botanical gardens, forestry research institutes, and agricultural research centers. This involves three methods:
• **Field gene banks**: It is an assemblage of diverse plant species and their range of genetic diversity in an area. The plant materials are conserved and are available for breeding, reintroduction, research and other purposes. This method is useful for long living perennials trees and shrubs.

• **Botanical gardens** often have collections which are effectively field gene banks. These gardens also accommodate some endangered plants.

• **Seed banks**: Seed banks are the most efficient and effective methods of ex situ conservation for sexually reproducing seeds under long term storage. It is an effective and compact method of storage but is dependent on secure power supply, careful monitoring and testing of seed viability and regeneration in cases where the viability falls below a certain level. In India, NBPGR, is one of the largest depositories of PGR. There are a number of seed banks in the world with specialization in the nature of the collections, geographical area, taxonomic groups, wild plants, forestry trees, etc.

• **In vitro storage**: It refers to the conservation of germplasm through meristem tissues in test tubes. These methods are suited for the long term storage of propagules of species which otherwise cannot be maintained in seed banks. However, this method has limitations in applicability.

**Factors responsible for the depletion of medicinal plant bio-diversity**

• Increasing Demand of herbal products, i.e., medicine as well as cosmetic has resulted very high demand of raw plant parts causing tremendous pressure on their natural habitat.

• Shrinking of natural habitat of medicinal plants due to population pressure and other developmental activities.

• Indiscriminate and over exploitation from natural sources.

• Lack of agro-technology of highly demanded medicinal plants.

• No serious efforts for commercial scale cultivation.

• Forest fire plays a very devastating role in the destruction of small medicinal plants.

• Illegal trading of banned high value medicinal plants.

• Excessive grazing by domestic as well as wild animals.

• Cutting of medicinal trees for fuel, timber, etc., and lopping of leaves for fodder and cattle bedding.

• Change in climate and weather pattern.

• Lack of awareness towards this valuable heritage. The flora of Western and Central Himalaya were also explored by Strachey and Winterbottom from 1,846 to 1,849 and they have identified an overall flora of these regions under 137 orders, 983 genera and 2,672 species of flowering plants and 101 genera, 371 species of cryptogams. In Flora Nainitalensis, Dr. R.K. Gupta has reported 457 genera and 869 species of herbs of Nainital district. E.T. Atkinson has reported more than 200 species of medicinal plants in his book Economic Botany of Himalayas. In 1975 an international level organization ‘Conservation on International Trade in Endangered Species of Wild Fauna and Flora (CITES) was established, about 155 countries are its members. This organization checks the trade of endangered plants and animal species with the help of IUCN and SSC group. For the export of endangered flora and fauna a permit is needed from CITES. India became its 25th member after joining it in 18th October 1976.

**Income Generating Activities**

The State of Uttarakhand has high degree of agro-climatic diversity and economic backwardness. Medicinal plant products can become a parallel market which, if captured in a strategic manner, can lead to the rapid development of the hill districts of Uttarakhand. Continuous extraction of several medicinal plant species from the wild and substantial loss of their habitats during last two decades have resulted into decline of many highly valuable medicinal plant species in the region. Cultivation and sustainable harvesting of medicinal plants with scientific knowledge
and proper marketing system might be a big source of additional income for improvement of livelihood of rural people\(^5\). The economic deprivation in region is not only because of small land holdings but also because of unproductive land use due to rain fed and operational constraints faced due to harsh physical conditions. Demand of the high quality medicinal plants is increasing day-by-day in the national and global market resulting in the loss of biodiversity and environmental degradation.

**Medicinal plant education:**

The state is bestowed with abundant natural resources in the form of forests, water bodies and plants of rare kind. What it requires is focused application of skills and knowledge to make best use of it in a sustainable manner. There is a growing need for quality medicinal plants education in the state, which can create new employment in the areas such as plant science, food science, processing, agribusinesses, etc. It would be desired that special provisions be made to teach agriculture of medicinal plants to children in schools. The children’s awareness and understanding of our ecosystem is essential, they must be exposed to the necessity of sustainable medicinal plant practices to ensure that the future of our biodiversity is secure. This can become the foundation of vibrant medicinal plants businesses in the newly formed state\(^11\).

**Legislation**

There are no separate policies or regulations for conserving medicinal plants growing in forests in India. There conservation is covered under existing laws pertaining to forestry. Following are the laws formulated by government of India for conservation of forests which directly or indirectly protects the wild herbal flora: Forest Act- 1927, Wildlife (Protection) Act- 1972 and Wildlife (Protection) Amendment Act- 1991, Forest (Conservation) Act- 1980, Environment Protection Act-1986, National forest policy, 1988, National biodiversity Act- 2002, the scheduled tribes and other traditional forest dwellers Act- 2006\(^1\).

**Factors are needed to success on this sector**

- To promote the cultivation of those medicinal plants with a large market potential.
- Select a suitable area with favorable agro-ecological conditions and relatively low levels of economic development.
- Research and development needs to be carried out to understand and find out favorable conditions for the cultivation of important medicinal plants. This can help to improve productivity and production of herbal and medicinal plants through increasing cooperation between researchers and farmers.
- Identifying a buyer in the market who can guarantee to purchase the whole production at a good price with higher return than other crops and increase their trade in the state.
- To increase the area of cultivation of aromatic and medicinal plants on hilly barren land.
- Strengthening the extension activities of Herbal Research and Development Institute (HRDI), Gopeshwar, Chamoli and Centre for Aromatic Plants (CAP), Dehradun and give more emphasis on - how to grow medicinal plants and conserve them.
- To increase the knowledge about the need of pharmaceutical and food industry.
- To increase awareness about herbal supplements and herbal remedies among the villagers.
- Find out the role of cultural factors in medicinal plant use and cultivation for maintain biodiversity.
- To fix support prices by the government are required for longterm plantation.
- To increase production and productivity it is important to establish the cluster approach and low-cost processing.
- To set up good road network at village level due to the difficult physical geography of the hill villages in the state.
- Need to revise state forest policies that support conservation and sustainable use of medicinal plants in Uttarakhand.
Uttarakhand needs to build up technological and scientific capabilities to develop and improve the production of medicinal principles and to conduct R&D to develop green products.

Table 1: Medicinal plants of Uttarakhand and their uses

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Botanical Name</th>
<th>Local Name</th>
<th>Parts Used</th>
<th>Uses</th>
<th>Mode of treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Achyranthes bidentata, Blume.</td>
<td>Dansh</td>
<td>Root</td>
<td>As Laxative</td>
<td>One palmful root decoction in one litre water given two times for vigour</td>
</tr>
<tr>
<td>2.</td>
<td>Artemisia nilagirica, Pampaniani.</td>
<td>Pati &amp; Kunj</td>
<td>Whole plant</td>
<td>For urinary tract infection</td>
<td>One palmful whole body decoction in one litre water given one cup with gur</td>
</tr>
<tr>
<td>3.</td>
<td>Artemisia sacrorum, Ladeb.</td>
<td>Kaparpati &amp; Holpati</td>
<td>Leaf &amp; Bud</td>
<td>For hair fall</td>
<td>One palmful leaves &amp; bud decoction in two liter water given one cup twice a daily</td>
</tr>
<tr>
<td>4.</td>
<td>Abies webbiana, Lindl.</td>
<td>Talsipatra</td>
<td>Bud</td>
<td>In cough</td>
<td>One palmful bud decoction in 3 litre water given thrice a day</td>
</tr>
<tr>
<td>5.</td>
<td>Adina cordifolia, Hook. F</td>
<td>Haldu</td>
<td>Bud &amp; leaf</td>
<td>For wound &amp; fever</td>
<td>Applying paste of new bud on the wound. Decoction of leaves in ½ litre water given thrice a day in fever</td>
</tr>
<tr>
<td>6.</td>
<td>Acacia catecha, Wild.</td>
<td>Khair</td>
<td>Stem</td>
<td>In urine problem &amp; dysentery</td>
<td>One palmful stem decoction in ½ litre water given one cup four times a day</td>
</tr>
<tr>
<td>7.</td>
<td>Achyranthes aspera, Linn.</td>
<td>Churchira</td>
<td>Whole plant</td>
<td>For teeth problem</td>
<td>One palmful whole plant in ½ litre water</td>
</tr>
<tr>
<td>8.</td>
<td>Aconitum bautila, stapf.</td>
<td>Bisshjhalur</td>
<td>Root</td>
<td>In wound</td>
<td>One matured root burns in Hitre oil given a ointment</td>
</tr>
<tr>
<td>10.</td>
<td>Adiantum venaschnum, G. Don.</td>
<td>Hanshtatra</td>
<td>Seed</td>
<td>For chest problem and hair fall</td>
<td>One palmful seed given with fibrous food</td>
</tr>
<tr>
<td>11.</td>
<td>Agrimonia pilosa, Ledeb.</td>
<td>Katiya</td>
<td>Whole plant</td>
<td>For purification of blood</td>
<td>One half palmful whole plant decoction in three ¼ litre water given half part with gur in morning</td>
</tr>
<tr>
<td>12.</td>
<td>Ajuga parviflora, Benth.</td>
<td>Ratpatia</td>
<td>Whole plant</td>
<td>In arthritis</td>
<td>One palmful whole plant decoction in 3/4 litre water given one cup daily</td>
</tr>
<tr>
<td>13.</td>
<td>Allium streuchyi, Baker.</td>
<td>Jambu</td>
<td>Whole plant</td>
<td>For stomach problem</td>
<td>Two palmful whole plant given thrice a day</td>
</tr>
<tr>
<td>14.</td>
<td>Allium waulchsl, Kunth.</td>
<td>Jangali Lasun</td>
<td>Root</td>
<td>In infection</td>
<td>Two node given daily</td>
</tr>
<tr>
<td>15.</td>
<td>Aloe vera, Linn.</td>
<td>Patqur</td>
<td>Leaf</td>
<td>Stomach problem</td>
<td>Juice of leaves given ½ cup a day</td>
</tr>
<tr>
<td>16.</td>
<td>Altbera officinalis, Linn.</td>
<td>Jangali bauli</td>
<td>Root</td>
<td>For termination of pregnancy</td>
<td>Three/ four matured root decoction in one litre water is given</td>
</tr>
<tr>
<td>17.</td>
<td>Anagallus arvensis, Linn.</td>
<td>Vish Khapuria</td>
<td>Fruit/Leaf</td>
<td>As pain killer</td>
<td>Two palmful fruit leaves given daily</td>
</tr>
<tr>
<td>18.</td>
<td>Anemonia obtusiloba,Don.</td>
<td>Kakartia</td>
<td>Leaf</td>
<td>In simus</td>
<td>A cotton bud is made of paste of leaves with ghee for cleaning sins</td>
</tr>
<tr>
<td>19.</td>
<td>Artemisia parviflora, Roxb.</td>
<td>Pati &amp; Dhopeni</td>
<td>Leaf/ Bud</td>
<td>For round worm</td>
<td>One palmful leaves/ bud decoction in a litre water given 1/8 litre in one hour interval</td>
</tr>
<tr>
<td>20.</td>
<td>Asparagus racemomus, wild.</td>
<td>Kairuwa</td>
<td>Bud</td>
<td>In liver problem &amp; enhance lactation</td>
<td>One palmful bud given twice a day</td>
</tr>
<tr>
<td>21.</td>
<td>Atropa belladonna, Linn.</td>
<td>Dhatur Jhar</td>
<td>Leaf</td>
<td>In injury as pain killer</td>
<td>Paste of one palmful leaves burns in oil acts as ointment</td>
</tr>
<tr>
<td>22.</td>
<td>Berberis aristata, DC</td>
<td>Kilmori</td>
<td>Root &amp; stem</td>
<td>In fever &amp; weakness</td>
<td>One palmful root/ stem decoction in ¾ litre water given one cup daily</td>
</tr>
<tr>
<td>23.</td>
<td>Bergenia ciliata, Moench.</td>
<td>Silthora</td>
<td>Root</td>
<td>For hydrophobia</td>
<td>Two palmful root decoction in ¾ litre water given its one cup thrice a day</td>
</tr>
<tr>
<td>24.</td>
<td>Benula antlis, Don.</td>
<td>Bhuj &amp; Bhopatia</td>
<td>Seed</td>
<td>To protect from worm</td>
<td>Two small pinch is useful</td>
</tr>
<tr>
<td>25.</td>
<td>Boerhaavia diffusa, Linn.</td>
<td>Parnata</td>
<td>Leaf</td>
<td>In blood dysentery &amp; dropsy</td>
<td>Juice of leaves thrice a day</td>
</tr>
<tr>
<td>26.</td>
<td>Brassica napus, Linn.</td>
<td>Kali sarso</td>
<td>Seed</td>
<td>In poor appetite</td>
<td>Two palmful seed is given with fibrous food and gur twice a day</td>
</tr>
<tr>
<td>27.</td>
<td>Butea frondosa, Koen.</td>
<td>Dhanak</td>
<td>Flower &amp; Seed</td>
<td>As painkiller</td>
<td>Paste of flower and seed is given</td>
</tr>
<tr>
<td>28.</td>
<td>Calendula officinalis, Linn.</td>
<td>Ganda (Tokar)</td>
<td>Leaf</td>
<td>In bleeding</td>
<td>Juice of leaves is helping in bleeding</td>
</tr>
<tr>
<td>29.</td>
<td>Calotropis procera, R. Br.</td>
<td>Ank</td>
<td>Root</td>
<td>In indigestion</td>
<td>One palmful powder of root decoction in one litre water given one cup twice a day</td>
</tr>
<tr>
<td>30.</td>
<td>Canna indica, Linn.</td>
<td>Kewara</td>
<td>Root</td>
<td>In disinterest &amp;atra</td>
<td>Powder of one bunch of root is given with gur</td>
</tr>
<tr>
<td>31.</td>
<td>Capsella bursa-pastoris, Moench.</td>
<td>Torighash</td>
<td>Whole plant</td>
<td>For Sikkarog</td>
<td>Two palmful whole plant decoction in water given two times for vigour</td>
</tr>
<tr>
<td>32.</td>
<td>Capsicum annum, Linn.</td>
<td>Khusane &amp; Marac</td>
<td>Fruit</td>
<td>As oil massage</td>
<td>One palmful fruit decoction in three litre water gives one cup twice a day</td>
</tr>
<tr>
<td>33.</td>
<td>Cassia abolus, Linn.</td>
<td>Banar&amp;Chakwar</td>
<td>Seed</td>
<td>In urine problem</td>
<td>One palmful seeds decoction in ½ litre water given one cup thrice a day</td>
</tr>
<tr>
<td>34.</td>
<td>Centella asiatica, (Linn. Urban</td>
<td>Brahu</td>
<td>Leaf</td>
<td>For brain fever</td>
<td>Apply paste of green leaves on forehead during fever</td>
</tr>
<tr>
<td>35.</td>
<td>Cheno podium album, Linn.</td>
<td>Beihowa</td>
<td>Leaf/ seed</td>
<td>For worm</td>
<td>Two palmful seed is given before breakfast</td>
</tr>
<tr>
<td>36.</td>
<td>Cinnamomum tamala, Ness.</td>
<td>Kirrya, kirkiyra &amp; Dalchini</td>
<td>Leaf</td>
<td>In stomach problem &amp; gastric problem</td>
<td>Powder of leaves and bark with half palmful of ghee is useful</td>
</tr>
<tr>
<td>37.</td>
<td>Clerodendrum infortunatum,Gaertn.</td>
<td>Arosny</td>
<td>Bark</td>
<td>In efa</td>
<td>Powdered bark decoction in 2 litre water given one cup thrice a day</td>
</tr>
<tr>
<td>38.</td>
<td>Cuminum cyminum, L.</td>
<td>Jeera</td>
<td>Seed</td>
<td>For indigestion</td>
<td>One palmful seed in ¾ litre water given daily</td>
</tr>
<tr>
<td>40.</td>
<td>Datura metel, Linn.</td>
<td>Dhatura</td>
<td>Seed</td>
<td>As pain killer (for external use only)</td>
<td>25g roasted seed in one litre oil is used for massage</td>
</tr>
<tr>
<td>41.</td>
<td>Datura stramonium, Linn.</td>
<td>Dhatura</td>
<td>Leaf</td>
<td>In injury as pain killer</td>
<td>Paste of one palmy leaf acts as ointment</td>
</tr>
</tbody>
</table>
43. Delphinium denudatum, Wall. Nirwishi & Muncil Seed In tics One palmtul seed decoction in 1 litre water is given
44. Digitalis purpurea, Linn. Prawatspupshi Leaf In burning One palmtul leaves is roast with oil is used as ointent
45. Emblica officinalis, Gaertn. Aula & Avla Fruit In eye disease/ good health Two palmtul fruits powder with fibrous food
46. Ephedra gerardiana, Wall. Gidjing Stem In pain One bunch of stem pieces decoction in two litre water given one cup in early morning
47. Eucaurus arvense, Linn. Horsetel Whole plant For urinary problems Half palmtul whole plant decoction in one litre water given
48. Euphorbia prolifica, Buch Ham., ex. Don. Dwila Fruit Used in dog bite Powder of fruit is useful
49. Foeniculum vulgare, Mill. Saup Seed For hookworm One palmtul seed in 1/8 litre water given before morning meal
50. Fragarula vesca, Linn. Pudalai Kafal Leaf To protect abortion Two palmtul leaves given daily
51. Fumaria parviflora, Lamk. Pitupapa Whole plant In skin itching(disease) One palmtul whole plant decoction in one litre is given
52. Gentiana tenella, (Rohrb) H. Smith. Kutski & Katsuwi Fruit In hysteria and weakness 25g of bark of fruits decoction in one litre water given one cup with honey per day
53. Geranium occilatum, Camb. Bhilari Whole plant As insecticide Four whole plant with fibrous food twice a day. Powder of whole plant is given as insecticide
54. Hedychium spicatum, Ham. ex. Smith Kapur Kachari Root For fever & cough Root is given with gur
55. Holarrhena antidysenterica, Wall. Qiar & Indraw Seed & bark In fever, gastric & dysentery One palmtul powder of bark/ seed decoction in one litre water given one cup with gur
56. Hystocyamus niger, Linn. Iran juicean Leaf & Seed As pain killer Paste of leaves and seed is used as ointment
57. Hypericum cernum Vaya & Culi Whole plant For boskins and wound Two palmtul whole plant decoction in one litre water given two times for vigour
58. Juglans regia, Linn. Akhore Leaf/ fruit In stomach problem and As anti-worm Two palmtul leaves or two green fruits decoction in 1 litre water is given one cup with two spoon honey thrice a day
59. Junipera communis, Linn. Jhora & Khechuya Fruit In liver disease Twelve fruits daily
60. Linum umbrosa, Ness. Circara Leaf In bone injury Paste of leaves in water as ointment in bone injury
61. Linum usitatissimum, Linn. Alsi Whole plant For strength Two palmtul whole plant decoction in 1& 1/4 litre water given two times for strength
62. Litsaea polyantha, Jns. Cizira Leaf In injury Powder of bark & leaves in cold water as ointment
63. Lobelia pyramidalis, Wall. Bran tambaco Whole plant For liver disease Two palmtul whole body decoction in 3/4 litre water given one spoon with honey thrice a daily
64. Mallotus philippinensis, Muell. & Arg. Roli & Kasela Fruit To protect from worm Fruit extract with one palmtul fibrous food is given once a day
65. Melilotus alba, Lamk. Banmerhi Whole plant For stomach problem and Indigestion One palmtul whole plant given three times in a day for vigour
66. Mentha arvensis, Linn. Pudina & Eliachi Whole plant In post pregnancy problems Two palmtul whole plant decoction in a litre water given 1/4 part thrice a day
67. Ocimum sanctum, Linn. Tusi Whole plant In fever Two palmtul whole plant twice a day
68. Origanum vulgare, Linn. Jagali tului Whole plant Indigestion Four palmtul whole plant with fibrous food twice a day
69. Pefyllium oreata, Forsk. Esabgol Seed In dysentery One palmtul seed in 1/8 litre water makes a semisolid paste given thrice a day
70. Paeonia emodi, Wall. Bhoi Pawin Root In stomach problem One matured root decoction in 3/4 litre water is given one cup with 100g gur thrice a day
71. Pimpinella diversifolia, Dc. Dhanjuri Seed For lactation One palmtul seed given daily
72. Piper longum, L. Pipal fruit In low appetite & oil massage Powder of fruit is useful for low appetite. Oil with powder massage is useful
73. Plantago major, Linn. Vrantank Leaf In injury, teeth problem & fever Paste of leaves in water useful for injury & teeth pain. Two bunch of leaves decoction in one litre water given 1/6 part thrice a day for fever
74. Potentilliarygrophylly Dami & Bradjanti Leaf/Root For stomach problem One palmtul leaves/two matured root decoction in 3/4 litre water given thrice in a day
75. Primula denticulale, Smith. Vish Khaparia Fruit In cough & useful for mammary glands Two palmtul flower given with gur
76. Panica granatum, Linn. Darim Skull of fruit As antimicrobials One palmtul skull of fruit decoction in 1 litre water given in one cup three times a day with gur
77. Quercus dilatata, Lindl. Banj Bark In dysentery Two palmtul powder of bark decoction in one litre water given one cup twice a day
78. Reinwardtn lasticarpus, Sm. Kala Hisalu Leaf In pregnancy Leaf is useful for cow specially in pregnancy pain
79. Reinwardtn trigyna, Planch. Pyuli Root In wound One bunch of root decoction in 1/4 litre water given one cup in a gap of two days
80. Rhamnus virgata, Roxb. Chailula Fruit In leg swelling Five matured fruit decoction in 1/4 litre water given daily
81. Rheum emodi, Wall. Dolu & Archa Root For blood purificaiton & energy One matured root decoction in one litre water given three times for vigour
82. Ribes grossularia, Linn. Caktu Whole plant For preventing abortion One palmtul whole plant given daily
83. Ricinus communis, Linn. Erind Leaf For internal injury Oil of this plant is useful. Use of leaves in heat therapy
84. Rosa moschata, Herrm. Kunujani Fruit For leucorrhea, bleeding and pregnancy termination Two palmtul fruit with one spoon honey given daily
85. Rubus paniculatus, Sm. Kala Hisalu (Kadula) Leaf In pregnancy Two palmtul leaves decoction in 1/4 litre water given one cup twice a day
86. Rumex hastatus, D. Don Bhitimora Whole plant For skin disease & low fever One palmtul whole plant decoction in 3/4 litre water given one cup thrice a day
87. Salix elegans, Wall. Garbainsh Fruit In rickets Three palmtul fruits decoction in one litre water given one cup thrice a day

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CONCLUSION
Medicinal plants are the principal health care resources among the most of people in India. Their primary cure of diseases is based upon deep observation of nature and their understanding of traditional knowledge of medical practices. Local people in this region, especially tribal people and women heavily use these traditionally available medicinal plants for health and believe that these are easily available, less expensive and have no side effects as compare to modern medicine. The plants used for medicinal purposes in the primary health traditions are slowly becoming extinct due to development activities, population explosion, impact of tourism, deforestation and many more. The state has tremendous potential for medicinal plants cultivation and it can become one of the important options for sustainable livelihood for the hilly area.

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