

Final Report on
Pilot Study on
"Mechanism for Sustainable Development & Promotion of
Herbal & Medicinal Plants (H & MP) in the State of
UTTARANCHAL (INDIA)

Forwarded to
SER DIVISION, PLANNING COMMISSION, GOVT. OF INDIA
Parliament Street, New Delhi-110 001



Sarpagandha



Rattan Jot



Safaid Musli



Aloe

By

Natural Resources India Foundation (NRIF)

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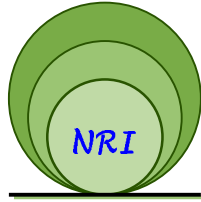
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Brief on NRIF

- The **Natural Resources India Foundation (NRIF)**—a young multi-disciplinary research and consultancy NGO / society, offering professional services / Turnkey jobs in the fields of: natural resources-agriculture, forestry, environment, water management, rural livelihood, development finance, economic security, science & technology, human resources development and, women empowerment.... programs in India & Abroad.
- Like other assignments, this study too has a highly qualified and experienced team of specialists under an expert senior professional, who is supported by a multi-disciplinary team and a trained field staff, who carried out this study. NRIF team has integrated its field and management expertise to provide cost-effective and implementable solutions to problems, which have been focussed in the preceding paragraphs.
- **NRIF** Governing Body has a mix of members both from rural and, urban background, but they are keen to find ways to involve programme beneficiaries in the management along with the government field functionaries. *“We in NRIF hold ourselves accountable to both those we seek to assist and, those from whom we accept resources”*.
- The **NRIF** has a great start in four years period with clients from a cross-section of Government: Central & State to other autonomous bodies to name a few. Viz.
 - Planning Commission, Govt. of India;
 - National Afforestation and Eco-Development Board, Ministry of Environment & Forest;
 - Ministry of Rural Development, GoI;
 - Defence Research Development Organization, Ministry of Defence, GoI;
 - Indian National Science Academy;
 - National Council of Applied Economic Research;
 - National Science and Technology Management Information System Division (NSTMIS), Department of Science & Technology (DST), GoI;
 - Council for Advancement of People’s Action and Rural Technology (CAPART), MoRD, GoI;
 - Dept. of Land Resources & Water Management, Govt. of UP, etc.

NRIF Study Team:

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MUDIT KUMAR, IFS, [ADG (PF / JFM), ICFRE, Dehradun).
PRA conducted by: The President (Mr. R S Bisht) and Staff of Swati Gramudhyog Sansthan (NGO), Pithoragarh,



Foundation (NRIF)

NATURAL RESOURCES INDIA FOUNDATION

(A not-for-profit NGO working on the issues related to research, consultancy & Turnkey jobs in the fields of: natural resources-agriculture, forestry, environment, water management, rural livelihood, development finance, economic security, and women empowerment.... programs in India & Abroad)

NGO under Societies Registration Act XXI of 1860

Regd. No. s43105, Registrar of Societies, Govt. of NCT of Delhi

Regd. with MHA, Gol: FCRA No 231660367 under Section 6 (1) (a) Societies

No. NRIF: P (RPM): PC, Gol (SERD): MP&H: 2004: 0344

Dated: 25th May 2004

CONFIDENTIAL

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Dear Madam,

Ref. No.: O-15012/59/02-SER dated 8th July 2003

Sub: Research Study on: "Mechanism for Sustainable Development & Promotion of Herbal & Medicinal Plants in the State of Uttaranchal"- Submission of Final Report

This is in continuation of our letter of even number dated 20th May 2004, enclosing therewith a copy of the **Final Report** after incorporating all the observations and suggestions provided on the Draft Summary and Draft Final Report respectively.

Once the Planning Commission approves the Report, may we seek further permission of PC, to publish the Study Report, in view of great demand expressed by the officials of the State Govt. and, the other Institutions within Uttaranchal and, outside, including NMPB?

We shall be grateful, if a formal permission is granted to publish the report for wider circulation among all the stakeholders involved in the promotion and developmental work of Herbal & Medicinal Plants (H&MP), within Uttaranchal State in particular and, the country in general.

Further, keeping in view, the great interest taken by your good self, in reading through the Draft Summary and Draft Final Report, may we have the permission to include your name as one of the authors of the Study at the time of publishing the Report by the NRIF?

We shall be grateful to have an early confirmation and, approval on the same.

We value your kind patronage and, shall strive to deliver quality services as ever before.

Thanking you,

Yours sincerely,

For **NATURAL RESOURCES INDIA FOUNDATION (NRIF)**

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Abbreviations & Acronyms

AEZ's:	Agri Export Zones
AMC:	Agriculture Marketing Committee
APEDA:	Agriculture and Processed Food Products Development Authority
BS's:	<i>Bhesaj Sangh's</i> (Co-operative Societies)
CBD:	Convention on Biological Diversity
CBF:	Central Board of Forestry
CF:	Conservator of Forests
C&I:	Criteria & Indicators
CIMAP:	Central Institute of Medicinal & Aromatic Plants
COP:	Conference of Parties
CSIR:	Council of Scientific & Industrial Research
DC:	Divisional Commissioner
DFO:	Divisional Forest Officer
DRF:	Dabur Research Foundation
DARL:	Defence Agricultural Research Laboratory, (DRDO) MoD, Gol;
DoA&C:	Dept. of Agriculture & Co-operation
DoH&FP:	Dept. of Horticulture & Food Processing, Haldwani, Nainital
DRDO:	Defence Research Development Organization
FAO:	Food and Agriculture Organization
FD:	Forest Department
FDA's:	Forest Development Agencies
F&ED:	Forest & Envoi. Dept., Govt. of Uttarakhand;
FDC:	Forest Development Corporation
FPC:	Forest Protection Committee
FRI:	Forest Research Institute
GBPIHED:	GB Pant Institute of Himalayan Environment & Development, Almora
GBPUA&T:	GB Pant University of Agriculture & Technology, Hill Campus, Tehri Garhwal
GBPUA&T:	GB Pant University of Agriculture & Technology, Pantnagar, U Nagar;
GHNP	Great Himalayan National Park
GoU:	Government of Uttarakhand
Gol:	Government of India
HDRI:	Herbal Research & Dev. Institute / State Medicinal Plant Board, Gopeshwar
HAPPRC:	High Altitude Plant Physiology Research Centre
HIMCON:	Himalayan Consortium for Himalaya Conservation
H&MP:	Herbal & Medicinal Plants
HRMS:	Hill Resource Management Society
ICFRE:	Indian Council of Forestry Research & Education
IRDC:	International Development Research Centre
IFFCO:	Indian Farmers' Fertilizer Cooperative Limited
IFFDC:	Indian Farm Forestry Development Cooperative Limited
IIADR:	Indian Institute of Ayurvedic for Drug Research
IIED:	International Institute for Environment and Development
ISM	Indian Systems of Medicine
IUCN	International Union for the Conservation of Nature
JBSS:	Jadi Buti Shodh Sansthan
JFM:	Joint Forest Management
JFMP:	Joint Forest Management Programme
JICA:	Japan International Co-operation Agency
KMVN:	Kumaon Mandal Vikas Nigam

MAP:	Medicinal & Aromatic Plants
MoEF:	Ministry of Environment and Forests
MoA:	Ministry of Agriculture
MoD:	Ministry of Defence
MoU:	Memorandum of Understanding
MPCA	Medicinal Plants Conservation Areas
MPPA's:	Medicinal Plant Protected Areas
MT:	Metric Tonne
NA:	Not Available
NABARD:	National Bank for Agriculture and Rural Development
NBRI:	National Botanical Research Institute
NCA:	National Commission on Agriculture
NDDB:	National Dairy Development Board
NFP:	National Forest Policy
NFAP:	National Forestry Action Programme
NGO:	Non-Government Organization
NHB:	National Horticulture Board
NMPB:	National Medicinal Plant Board
NRIF:	Natural Resources India Foundation
NTFPs:	Non-Timber Forest Products
NTGCF:	National Tree Growers' Cooperative Federation Limited
PC:	Planning Commission
PCCF:	Principal Chief Conservator of Forests
PP:	Principal Player
PRA:	Participatory Rural Appraisal
RRL:	Regional Research Laboratory
Rs.:	Rupee
SAC:	Standing Advisory Committee
SIC:	Steering Implementation Committee
SEBI:	Securities and Exchange Board of India
SHER:	Society for Himalayan Environmental Research
SMPB:	State Medicinal Plant Board
TERI:	Tata Energy Research Institute
TPA:	Tonnes per Annum
TP & L:	Transit Permit & License
TRIFED:	Tribal Co-operative Marketing Development Federation
UA:	Uttarakhand
UAFDC:	Uttarakhand Forest Development Corporation, Dehradun;
UAIDFCL:	Uttarakhand Infrastructure Development Finance Company Ltd. Dehradun
UNDP:	United Nations Development Programme
UNEP:	United Nations Environment Programme
UP:	Uttar Pradesh
VFC's:	Village Forest Committees
VFDC	Village Forest Development Committee
VP:	Van Panchayats
VSS	Van Suraksha Samiti
WB:	World Bank
WC:	Working Circle
WTO:	World Trade Organization;
WWF:	World Wide Fund for Nature

Conversion Table

For Weight

1 Kg. = 1000 gms

1 Qtl. = 100 Kg.

1 MT = 100 Qtls.

For Area

1 Beegha = 2.5 nali

1 Acre = 6 Beegha

1 Hectare = 2.47 Acre

10 Nali = 0.269733 Hectare

100 Nali = 2.69733 Hectare

For Currency

1 million = Rs. 10,00,000

1 Billion = Rs. 10 million

PREFACE

The Planning Commission, Govt. of India, has funded this "*Pilot Study of the Mechanism for Sustainable Development & Promotion of Herbal & Medicinal Plants*" in the State of Uttarakhand¹. This **Final Report (FR)** is based on the extensive field survey and, research completed in about five-months period.

The Report is based on the detailed field investigation in each region of Uttarakhand State, mainly concentrating in Pithoragarh District (of *Kumaon Region*) and, Chamoli District (of *Garhwal Region*), [out of the 13 Districts], spread over in an area of 51,082 sq.kms.

The NRIF team had interactive consultations with officials of Planning Commission, NMPB, Forest Department, Govt. of Uttarakhand, GBPIHED / GBPUA&T / ICFRE / FRI / other institutions, local NGO's and, villagers involved in the promotional and development of Herbal & Medicinal Plants (H & MP), in Uttarakhand State.

This FR is a sequel to **Draft Summary Report (DSR)** submitted on the 19th January 2004², followed by presentation of the findings made on 15th March 2004, in the meeting presided by Honourable Dy. Chairman, Planning Commission (Mr. K. C. Pant). The presentation was well received, generated lot of discussions and, deliberated upon to a great length of time.

This **Final Report** has incorporated all the comments and, suggestions deliberated upon at the presentation, as well as, the queries communicated vide letter no. O-15012 / 59 / 02 / SER, dated 18th March 2004, from the Dy. Advisor (SER Division), Planning Commission, Govt. of India.

The Report accordingly delineates the suggestions and recommendations as the short-term, and, long-term strategies, which could make the report acceptable and, implement able.

¹ Vide order No. O-15012 / 59 / 02-SER, dated 30th June 2003,

² Vide letter No.: NRIF: P(RPM):PC, Gol (SERD): H &MP: 2004:0277, dated 19th January 2004.

Acknowledgement

The NRIF is grateful to the officials of Planning Commission for reposing confidence in assigning this prestigious Study for the State of *Uttarakhand*, as pre-cursor for a detailed Study for the other two States viz. *Chhattisgarh* and, *Jharkhand*, as approved by the Planning Commission earlier.

This Study has been made possible with the help of a wide range of people and organizations. We would specifically like to thank the: officials of Planning Commission; NMPB; Forest Department, Govt. of Uttarakhand; GBPIHED; GBPUA&T; ICFRE; FRI; Research Institutions; selected Pharmacies; and, other Stakeholders, for their whole hearted co-operation extended during the completion of the Study.

We greatly acknowledge the support and, frank response during PRA exercise from: Cultivators; Gatherer's, Collector's, Traditional Practitioner's, *Vaidya's*, Gardener's; Herbarium's, Trader's, Transporters; Exporter's; Pharmacies; NGO's; JFM Group's / Committee Members, local NGO's and, villagers involved in the promotional and development of Herbal & Medicinal Plants (H & MP), in Uttarakhand State

We are grateful to the selected manufacturers, pharmacies and traders who helped with information and gave us some insights about their method of functioning.

We would like to thank all those who attended and contributed during the presentation made on 15th March 2004, presided by the Honourable Dy. Chairman (Mr. K. C. Pant), Planning Commission.

Ms Sushma Choudhary, IAS Advisor (Health & FW), Planning Commission, read through the Draft Summary Report and provided valuable comments and, suggestions. We are extremely grateful to her for the same.

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The opinions presented in this Report are those of the authors alone and not necessarily of NRIF.

EXECUTIVE SUMMARY

The Planning Commission desired that the present state of affairs concerning H & MP, collection, cultivation, local sales and final trade within Uttarakhand (*vis-à-vis India in brief*) be studied in the context of livelihood, conservation of the natural resources, biodiversity, economy and well being.

The NRIF has endeavoured to put their effort in the **Final Report** organized into the following eight Chapters³: -

- Chapter- 1: Introduction
- Chapter- 2: Objectives & Methodology
- Chapter- 3: Herbs and Medicinal Plants – National Scanning
- Chapter- 4: Herbs and Medicinal Plants-The Uttarakhand Scenario
- Chapter- 5: Policy Dimensions Analysis
- Chapter- 6: Marketing Scenario
- Chapter- 7: Socio-Economic Linkages
- Chapter- 8: Suggestions and Recommendations

The scanning of state and national scenario of H & MP unfurled that; Uttarakhand not only enjoys a significant position but also can bring meaningful improvement in livelihood and well being of large section of rural population while enriching the state resources through trade in markets within the country and abroad.

The Study revealed that present arrangements are beset with: -

- Destructive harvesting and erosion of genetic base and exploitation both of source as well as primary producers;
- Collection, marketing and trades are disorganised and much of these go through hidden paths and with little transparency that deprives the primary producers of their income share, user agencies of quality and service return to State coffers;
- Marketing intelligence, logistics and a code of conduct are missing, so also is the case with research & development to enhance production in quantity as well as quality to meet the market demands;
- Absence of any systematic value addition technology and programme total return is low with consequent reduction in the share to primary producers to a meagre percent of total.

Issues that emerge from the study are:

- Though there are Government departments, research and educational institutions, user bodies in field, but there is no integrating strategy, harmonized policy to support

³ In accordance with the Outline submitted through "**Inception Report**" to Planning Commission on 12th August, 2003, which included the Checklists, Formats, Questionnaires canvassed from the different Stakeholders involved in the use, promotion and, development of herbs & medicinal plants in the State.

holistic plan from collection and, cultivation to sale at bigger markets in the country and abroad;

- Therefore, to provide a definite direction the study perceived a felt an urgent need for a Principal Player or an Apex Body and suggest that Uttarakhand State Medicinal Plant Board (USMPB) be reconstituted under the Chairmanship of Chief Minister to act as a Single Umbrella System. The salient functions, features of Principal Player are given here under: -
- **A Principal Player:**
 - To evolve a common perception, strategy instruments, harmonious policies, guidelines and directions for both short term or immediate and, long term action plan;
 - To formulate a plan for periodic survey & intervention, collection & cultivation; value addition at grassroots' level and at intermediary stages; systematically organizing community based organization (CBOs) at different levels for creating employment and income opportunities to all stakeholders; promoting transparent linkages between producers, collectors and local regional and terminal market points on one hand and amongst principal users-industries and Practitioner's, pricing and disbursement of proceeds etc.;
 - Implementing the plan with collaboration and coordination amongst line departments, R & D Institutions, industries, marketing institutions / agencies and representative people's body from village Sabha's to Zila Panchayat with transparency and with the principle of 'Shared Concern and Shared Governance';
 - Monitoring and Impact Assessment / Evaluation.
- The USMPB should have a permanent Standing Advisory Committee (SAC) to provide direction on: -
 - Conservation, collection, cultivation, & production;
 - Value addition, pricing & marketing;
 - Policy and legislation;
 - Coordination and collaborations.
- The USMPB should also have Steering Implementation Committee (SIC) under the Chairmanship of Chief Secretary, to provide direction and modality for coordination and collaboration for holistic and integrated planning and implementation of entire action plan programme.
- The Apex Body-USMPB should be serviced by a Nodal Agency-The Forest Department, in this case. The salient functions, features of Nodal Agency are given here under: -
- **Nodal Agency:**
 - Implement plan activities for conservation, collection, cultivation through CBOs, Institutions, Industries etc.;
 - Conduct research through relevant Research Institutions under ICFRE, CSIR, Universities etc.;
 - To formulate a trade channel with consensus and ensure providing a level ground for sale purchase so that primary producers and gatherers get their share of much higher returns;

- To collaborate and coordinate development of post-harvesting technology and their transfer to grassroots' level for value addition;
- To ensure *In-situ* as well as *Ex-situ* conservation;
- To carry out in collaboration with other agencies like BSI etc. periodic survey, categorization and preparation of State of art report;
- To get regularly on quarterly and yearly basis compiled reports on market issues both for internal and export market;
- Adopt M&E system including an Online Monitoring System CPM & MIS (Computerised Project Monitoring & Management Information System)
- As the current activities must not be interrupted while the comprehensive changes are also called for. A two-pronged approach has been suggested viz.
 - *Short term or Immediate action oriented strategy and plan;*
 - *Long term or Perspective Action oriented Strategy and Plan.*
- In both cases the JFM model will form the base. The salient aspects covering short term and long term approaches are shown here under:

Short term	Long term
<ul style="list-style-type: none"> ○ District-wise / Circle-wise vegetation survey and, inventorying of H & MP be undertaken with their potential & regeneration status and, Creation of database at the village level for production and extraction of H & MP. ○ The disorganized and exploitative dealings related to collection and marketing which lacks transparency should be organized into a network of CBO's in each circle under the overall conceptual model of JFM; ○ H & MP trade be handed over to JFM Committees on locational basis and organized into a network through formation of clusters and federations; ○ Transit after sunrise and, before sunset should be reserved and left to Panchayats and JFM Committees for proper monitoring. ○ Propagation and cultivation of banned species on non-forest land should be given top-priority; ○ The JFM committees, their clusters and federations should be financially empowered by helping them create a revolving fund and acquiring necessary technical and management skills. ○ Capacity building models for the lower functionaries of the Forest Department / JFM Committee Members be devised for: greater awareness and motivating them to work more closely and cohesively. A suggestive module has been proposed in Annex 8.1 for consideration, along with 	<p>There has to be a comprehensive changes in the systems for extraction / cultivation, processing & storage, transportation with dependable market intelligence, outlets and, finally enhance the overall higher return from lesser volume of materials collected / utilised with much higher price to primary producers / collector's / cultivators by eliminating the hidden and distress dealings through middlemen this will have:</p> <ul style="list-style-type: none"> ○ A long term policy strategy and conceptual frame work for developing action plan; ○ A continuous plan for upgrading processing for value addition to match market demands; ○ A complimentary plan for R & D with market driven programme; ○ A continuous plan for updating capacity of primary stakeholders as well as others in the chain; ○ To abolish transit permit and licensing (TP & L) for Tree (fruit) species of H & MP and for others the TP & L should be handed over to <i>Panchayats</i> and JFM Committees both for administering as well as monitoring. ○ Undoubtedly, H&MP could work as miracle to boost economy of the forest areas if properly managed. The present system of harvesting, posts harvesting treatment and marketing are the constraints causing hindrance in its sustainable development and income generation. JFM could certainly be a right tool to improve the situation.

budgetary provisions.

Short term strategy (Contd.)

- Dissemination of information is through Brochures, Pamphlets and Bulletins by use of Vernacular language and appropriate technology to user groups.
 - Self Help Groups of women / JFM Committee
- Members of the JFM provided better and improvised practices in H & MP, for Promoting organic cultivation practices, Formulating Plan of Action for establishing H & MP Nurseries, Conservation of forest, Wasteland areas in region, Conservation in Forestlands, Selection of species for cultivation.
- The period of maximum collection period and maximum months of collection be identified.
- The market information for price details at the Block and District level be generated and, disseminated.
- List of main and small interested buyers with particular species be identified with the recording of monthly and annual demand.
- To generate employment opportunities for the JFM committee by increasing the vegetal cover on farmlands as well as forestland – would prevent seasonal migration.
- Strategy should include attaining self-sustainability in fuel wood, fodder and small timber for house use through Agro-forestry practices with intercropping of H & MP.
- The planting along farm bunds, on agricultural fallow land be encouraged – e.g. model of Poplar with Bach.
- The knowledge for each species has to be documented and disseminated to JFM committee in vernacular language.
- Collective marketing at a common place shall strengthen the community participation – e.g. by encouraging central sale-cum-storage godown.
- JFM committees can converge into a Federation of Committees and, Executive body can publish a monthly price bulletin.
- There is need to develop silviculture for H & MPs through a missionary zeal.
- The FD may establish District-wise

Long term strategy (Contd.)

- The prime reasons for linking H&MP and JFM as viewed by the stakeholders are summarized as under:
- It will minimize destructive harvesting due to close monitoring by JFM committee and members.
- Species wise extraction level will be defined on availability basis as they have fair idea of the resource availability and regeneration potential.
- Accelerate propagation level even on private lands as the JFM could take care of value addition and marketing aspects.
- Depleting and endangered species could be saved through protection and restrained harvesting level.
- Sharing mechanism will be well defined as it will become a community resource and stake level of every family and member will be fixed. It will ensure equitable distribution of products and income.
- JFM as an institution will have a better strength to receive institutional support and interact with the FDs for technical and financial assistance.
- It will help to reduce unemployment in the area and stop destruction to forests through uncontrolled head loading of fuel wood. JFM committee will be strengthened financially to take up in addition to forest development some community developmental activities also.
- JFM committee will have better bargaining strength to fetch better prices for H & MP based on market intelligence system and institutional support of FDA and NGOs.
- It will free the villagers from exploiting grip of traders, middlemen and industries.
- JFM will be able to get more institutional support and avail of governments development initiatives in the area.

The Principal Player:

- The Principle Player at State level could be constituted and, designated as "*Uttarakhand State Medicinal Plant Board (USMPB)*", under: a State Legislative Act called as "*Uttarakhand Herbal & Medicinal Plants (Regulation of Production and Processing) Act (UA H &*

<p>demonstration centres. The forest gene banks and other JFM areas can be used for establishing demonstration gardens.</p> <p align="center">Short term strategy (Contd.)</p> <ul style="list-style-type: none"> ○ Each district should have such 'Garden-cum-Interpretations Centre'. ○ The FUA-FD, with the help of "NRIF" could develop practical training Modules for the training of staff and villagers in the identification of threatened species and, in vegetation monitoring. ○ The UA-FD, with the help of "NRIF" could develop public education programme related to conservation of hers & medicinal plants. 	<p align="center">MP Act)".</p> <p align="center">Long term strategy (Contd.)</p> <ul style="list-style-type: none"> ○ The Act could specifically stipulate USMPB be re-constituted under the Chairmanship of Chief Minister, to act as Single Umbrella System. The USMPB should have a permanent Standing Advisory Committee (SAC) to provide direction on all the issues as listed at Paragraph 8.3. The composition of the Board should include Ministers in charge of Agriculture, Finance, Horticulture, Health, Industries, Cooperative, etc. and, ○ The USMPB should also have a Steering Implementation Committee (SIC) under the Chairmanship of Chief Secretary with In charge Forests Dept. as the convener of SIC. The SIC would be responsible to provide direction and modalities for coordination and collaboration for holistic and integrated planning implementation of entire action plan. The Act could also stipulate the aims and objects of the Board, and, its functions. Directors of HAPPRC, GBPIHED, NBPGR, ICFRE, CSIR; ICAR, Representative of MoEF, H & FW, GoI; Two nominated representatives each of H & MP Grower's-Pharmacies / Industries by the Govt. and, Two nominated members from CBOs involved in collection and cultivation of H & MPs could be nominated as members of the SIC. ○ This Act could provide the Regulation for Orderly Growth of H & MP Species: Conservation, Maintenance, Regeneration, Cultivation, Propagation, Protection, Production, Policies, Extraction, Harvesting, Post-harvesting, Semi-processing, Procurement, Marketing (Prices, Promotion, Product, Placement & Policies), Exports, Imports, thereof and for matters related therewith. ○ The act should clearly stipulate the Dept. of Forests as the Nodal agency with a direction to develop a special multidisciplinary and with specialized middle and senior level experts besides of forestry who can address to the specific task assigned in respect of H & MP along with its functions and partnership modes.
<ul style="list-style-type: none"> ○ SHORT TERM OR IMMEDIATE ACTION ORIENTED MODEL: Model-I: has been described as: PHARMACY-GATHERER / CULTIVATOR MODEL OR NTFP MODEL ○ In this model, optimization strategy should start immediately from bringing improvement in harvesting methods. The open system of harvesting appears to be 	<ul style="list-style-type: none"> ○ LONG TERM MODEL for Perspective Action Oriented Model. This has been defined as: HERBAL AND MEDICINAL PLANTS MODEL (<i>Silvo-ethno-socio-economic management Model - II gives the complete Implementation strategy</i>). ○ To achieve this long term conceptual model for comprehensive action plan that could be

<p>good from humanity point of view but is not able to serve its objective. Hence, optimized system should follow the sequence as involved in the first activity or collection and evaluation following JFM Models. This has been discussed in Chapter 6 & 8 and explained through Figures.</p>	<p>ushered through a considered study by the Standing Advisory Committee (SAC) of the Apex Body-Uttarakhand State Medicinal Plant Board and as discussed in Chapter-6 & 8 and explained through Figures.</p>
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- The declaring of Uttarakhand as a "**Herbal State**" by the State Govt. can yield desired dividends provided, FD develops a set of '**Criteria**' and '**Indicators**' (**C & I**), as proposed in Chapter-5. That would not only monitor the developments but also make significant difference to the overall trade. This is immediately required as there is no voluntary code of practice, complemented by education of both consumers, producers and, departmental personnel (specially in socio-economic issues). More so because there is a great extent of the illegal trade and, majority of gatherers are unidentified and, posing a great threat to conservation through unscientific / destructive harvesting, because they are keen on earning fast buck of profits. The '**Criteria**' & '**Indicators**' (**C & I**), can be developed in phased manner into a reliable tool for measuring the success of conservation and development measures. This can simultaneously indicate the social, economic and ecological contribution of medicinal plants. Quantifying of all indicators may have some limitations, as all of them cannot be measured immediately with reasonable reliability. Therefore, indicators can be grouped into three categories
 - The ones that can be measured from the existing secondary sources of information after developing appropriate scales;
 - The ones for which information can be gathered from the field with little effort; but designing the means and tools will have to precede; and,
 - For the ones which require long-term research to decide on the items for taking field observation and then means to transform these in useful streams. As resources develop and the potential of medicinal plants grows, the third category of indicators can also be measured through investment in research and development.
- Industries & Individuals within State is encouraged to channel percentage of their profits for D & D in H&MP sectors. Viable incentives can be offered for attracting such investments from private resources. A Committee may work out the related modalities.
- 'Total Quality Management' (TQM) mechanisms are set-up for monitoring the achievements at all the stages of the process-chain as indicated above.
- The industries within the State are encouraged to establish R & D Centres as "Centres of Excellence". A Committee should work out the modalities & norms.
- Independent **certification agencies** could monitor the indicators and certify the system as sustainable. For example, institutions like the GBPIHED / GBPUA&T / HNBSU / ICFRE within the State could act as an impartial agency for such work. They could further extend training in certification issues with the help of WWF/ World Bank Alliance initiative. A number of NGOs (Including NRIF) and other autonomous institutions in the State or outside could be identified to undertake certification. The development of group certification schemes will help to lower the cost of certification.

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- **Conservation and Development of NTFP (including H & MP):** can be promoted in degraded land with the willingness of the Village Forest Committees (VFC's) through a participatory approach or the concept of User Group within the Village Forest Development Committee (VFDC) for gradual adoption of the short, as well as, long-term model. A clue can be taken from the Centrally and State Govt. sponsored forestry and, forest-based programmes e.g. Ministry of Environment & Forests, Govt. of India, is promoting conservation and development of Non Timber Forest Produce (NTFP) including Medicinal Plants under National Afforestation Programme (NAP). The 100% Central Assistance Scheme and Projects sanctioned are being executed over a Five Year Period through Forest Development Agencies (FDA's), registered as societies under the State Societies Registration Act.
 - **Medicinal Plant Protected Areas (MPPA's):** Under this scheme, area having potential for production of H & MP can be selected and developed as Medicinal Plant Protected Areas (MPPA's) within the State, as has been successfully developed by the neighbouring hill State of Himachal Pradesh. The areas already included under Joint Forest Management (JFM) could also be included under this concept. In this pattern MPPA work allocated to a particular User Group within VFDC, can sign a written document or Memorandum of Understanding (MoU) for sharing the usufructs or other monetary benefits drawn and explained to all the stakeholders involved in the endeavour. This MoU could have the concurrence of State Dept. of Forest and, VFDC. In Chhatsgarh PPA or Peoples Protected Areas are being successfully used for the same purpose.
 - **Medicinal Plant Conservation Area (MPCA):** MPCAs already established within the protected areas or in the vicinity of protected areas more beneficial from ecological as well as economic point of view. It is reported that an area of 6,379 Sq. km. has been brought under protected area network in the State. This could be taken as a step towards the Medicinal Plant Conservation Area (MPCA).

CHAPTER I

INTRODUCTION

Chapter I:

INTRODUCTION

1-6

1.1 Background

- Selected Definitions related to Herbs, Medicinal & Aromatic Plants
- Map of Uttarakhand

1.2 Declaration of Uttarakhand as Herbal State:

1.3 The concerns on High value species:

1.4 Initiatives for Sustainable Development and Management of H & MP:

- Table: 1.1: Year-wise Seedlings availability (No.)

1.4 Over-exploitation wild H & MP resources in the State:

1.5 Relevance of the Study:

1.7 Outline of Report

.....Selected Terms & Definitions related to Herbs, Medicinal & Aromatic Plants.....

- **Medicinal plants up in Himalayas:** The oldest record of the use of plants as medicines is mentioned in the '*Rigveda*' (4,500-1600 B.C.) which contains many '*sholakas*' and hymns written in the praise of plants. The *Charaka Samhita* by Agnivesa; *Charaka* (1000-800 B.C.) and, *Susruta* (800-700 B.C.) describes Himalayas as the best habitat of medicinal plants.
- **Medicinal Plants:** The plants used for medicinal purposes throughout the world are clubbed under the category of Medicinal Plants. According to WHO, "a medicinal plant is any plant which, in one or more of its organs, contains substances that can be used for therapeutic purposes, or which are precursors for chemo-pharmaceutical semi-synthesis".
- **Source:** The supply of medicinal plants is from two sources: collected from wild and cultivated material. The bulk material is traded from wild harvesting and only few species from the cultivated areas. The wild harvesting includes the plant material as: *herba* (plant above ground), *folia* (leaves), *lignum* (wood) or *radix* (roots).
- **In-situ** conservation is defined as conservation of ecological, species and genetic diversity in their natural habitat so as to let the dynamic of eco-system take its natural course. This natural process can go unhindered indefinitely. Fortunately there are a number of protected areas rather six parks and six sanctuaries in the Uttarakhand State, which include the first National Park viz. Corbett National Park (formerly Hailey National Park) established in 1936, in Uttarakhand State. These are specifically delineated to conserve the biota along with natural ecological and eco-evolutionary processes.
- **Ex-situ** conservation means efforts made by research wing of forest department and other institutions to conserve artificial shelters e.g. aquaria, arboreta, botanical gardens, fern houses, zoological parks etc.
- **Ayurvedic system:** The traditional health care systems (such as *ayurveda*, *siddha*, *yoga* and, *unani*) have been recognised as the original health care systems of India, which have deserved respect from countries abroad. The name *ayurveda* comes from two Sanskrit words: *ayur* meaning 'life' and *veda* meaning 'knowledge'. According to *ayurvedic* teaching, everyone and everything in the universe consists of three basic forces or elements. In Sanskrit they are called *vata*, *pitta* and *kapha* (often pronounced *vat*, *pit* and *kaph*). They together control all physical and mental processes and are compared to the workings of the wind, the sun and the moon:
 - *Vata* is linked to the wind, which is constantly on the move, and controls the central nervous system;
 - *Pitta* is like the sun, a source of energy. It controls the digestive system and all biochemical processes;
 - *Kapha* governs the balance of tissue fluid, controlling cell growth and the firmness of the body - rather as the moon governs the tides.
- **Unani system:** Arabs and Persians coming from Greece evolved the Unani system of medicine in India. It is a modified system that had originated during 460 BC – 377 BC, perhaps. According to Hippocrates, disease is a normal process and its symptoms are the reaction of the body to the disease. The body has four humours namely Blood (Dam), Phlegm (Balgam), Yellow bile (Safra) and Black bile that keep the equilibrium.
- **Siddha & Yoga system:** *Siddha* means achievement of a process of perfection. *Siddhas*, saintly figures who achieve excellence in such process through the practice of *yoga*, promoted the system in Tamil Nadu. The manuscripts are in Tamil. It is believed that there are eighteen *Siddhas*, which contributed towards the development of *Siddha* medicine. It is largely therapeutic in nature.
- **Aromatic Plants** are essential oil yielding plants. They have volatile, odoriferous oils in special cells, glands or ducts located in different parts of a plant, such as, the leaves, barks, roots, flowers and fruits and sometimes in just one or two parts. The oils are usually present in very small amounts and comprise only a tiny fraction of the entire plant material. The oils are produced during some metabolic processes of the plant and are secreted or excreted as odoriferous by-products. The fragrant oils may not necessarily be present as such in the living plants but may occur as odourless compounds termed as glycosides. When the plant tissues are macerated, an enzyme reaction occurs which causes the glycosides to undergo a chemical change. This action in turn liberates the distinctive essential oil.

Selected Terms & Definitions related to Herbs, Medicinal & Aromatic Plants

(Contd.)

- **NTFP** [Earlier called as: Non Wood Forest Products (NWFP) / Minor Forest Produce (MFP)]: is defined as the forest products of biological origin other than wood as well as services from forests and allied land uses. FAO defines, "Non-Wood forest products consist of all goods of biological origin other than wood in all its form, as well as, services derived from forests or any land under similar use". Dr. M P Sniva defines: " All products obtained from plants of forest origin and host plant species yielding products in association with insects and animals, including their parts and, items of mineral origin except timber be defined as NTFP."Non-Timber Forest Product".

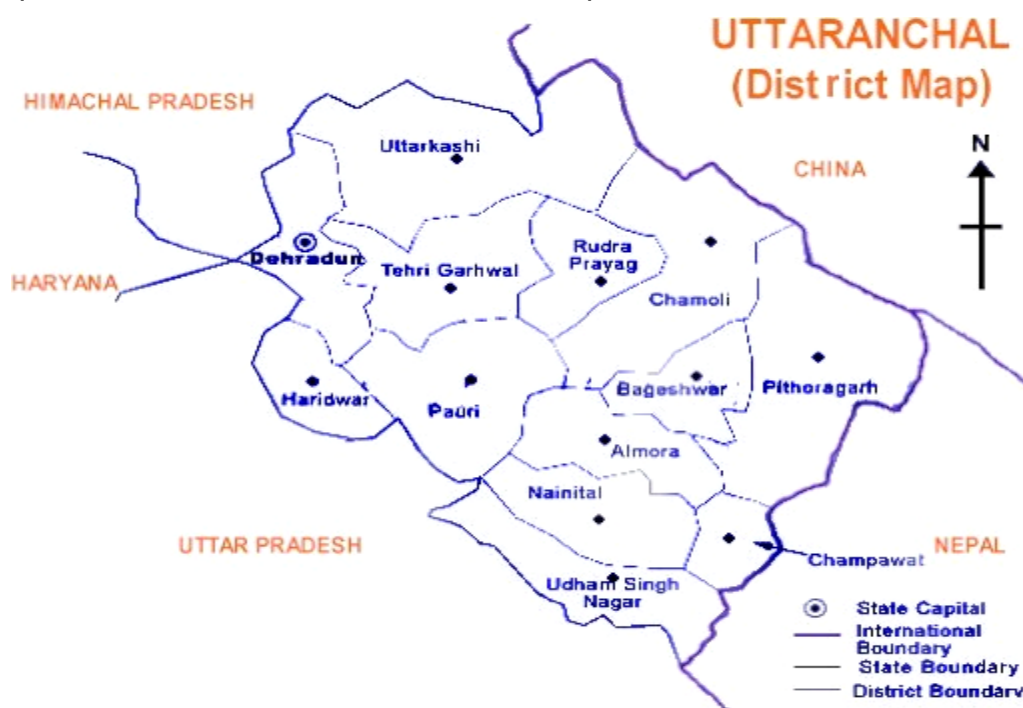
CHAPTER I

INTRODUCTION

1.1 Background:

Uttarakhand, the 27th State of the Republic of India, was formed on 9th Nov. 2000 and, carved in out of the hilly tracts of Uttar Pradesh. It is situated in west Himalayan zone and, has been traditionally known as a gold mine of herbs, medicinal and, aromatic, plants in the country. The State falls under the west Himalayan Bio-geographic zone and since time immemorial has been a rich repository of herbs and medicinal plants. Many of these herbs and plants are of high repute in *ayurveda*, *aromatherapy* and other systems of natural medicine. Even the ancient epics have recorded availability of rare species of medicinal plants in this part of the world.

The state with predominance of mountains and hills is spread over 13 Districts with an area of an area of 51,082 sq.kms. or about 5.5 percent of such terrain of India. Uttarakhand has two regions (*Kumaon & Garhwal*) and, can be divided into main three agro ecological zones, viz. (a) The Alpine Zone; (b) The Temperate zone; and, (c) The Sub-Tropical Zone. All these zones have significant physiographic differences mainly in terms of altitude, aspects, hill slope and soils, which have helped, developed riches for a set of specific varieties of herbal and medicinal plants.



1.2 Declaration of Uttarakhand as Herbal State:

The State is blessed with thousands of species, however; about 320 species have been identified in terms of their medicinal value. The Forest Department claims to have knowledge of about 175 species, which are being commercially extracted and traded. But the District-wise inventorization has yet to be completed. The experts, however, estimate that in terms of value, the state is well positioned to generate revenue of about Rs.1, 000 crores per annum through H & M P alone in raw form.

Management of H & MP has always been a question mark in Uttarakhand. Most of the species (about 95%) are found wild in the forests. The forest management has traditionally been timber oriented, and, tree centric. Hence H & MP sector has been deprived of the similar attention like shrubs and herbs vis-à-vis trees. However, due to ease of collection, the tree species of medicinal plants got an earlier attention, compared to their counterparts i.e. herbs and shrubs. Traditionally, the tribal population of Uttarakhand has been developing for H & MP with their livelihood. This resource not only provides them primary herbal medicines but also nutrition to cattle population in particular and also contributes substantially to their income. Even today majority of the population derive their income from H & MP. Besides, there has been a significant shift globally towards H & MP for medicines and Medicare materials with a concretion this is more patient friendly and environmentally agreeable. Hence, the state government has rightly declared it as "**Herbal State**" during early 2003. This has necessitated to defining the operational, functional mechanisms formulating action plan for sustainable development of H & MP Sector in the State.

1.3 The concerns on High value species:

In recent decades there has steady increase in the demand for H & MP. But the State is facing the situation of over exploitation of H & MP due to the growing demand. Hence many species (about 29) have been declared endangered and other few are restricted. In view of this, conservation and gene pool maintenance have become an immediate concern. Consequently, the National Medicinal Plant Board (NMPB)¹, and, Government have been emphasising on conserving source and production through cultivation of 32 species for which technologies are known. Accordingly, the state govt. has proposed to undertake immediate of 10 high value species viz. *Aconite, Chirata, Jatamansi, Kalihari, Kut, Kutki, Lavender, Sarpagandha, Tagar and, Van kakdi*.

¹ The National Medicinal Plant Board (NMPB), constituted through Gol resolution on 24th November 2000, has identified and prioritised 32 plants at the national level, which include: *Amla, Amlaki, Ashok, Aswagandha, Atees, Bael, Bhumi, Brahmi, Chandan, Chirata, Gileo, Gudmar, Guggal, Isbagol, Jatamansi, Kilihari, Kalmegh, Kokum, Kut, Makoy, Mulethi, Musali, Safaid, Pattarchur, chur, Pippla, Rasaut, Saffron, Sarpagandha, Senna, Shatavari, Tulsi, Vai Vannng and, Vatsnabh*.

1.4 Initiatives for Sustainable Development and Management of H & MP:

After declaration of Uttarakhand as *Herbal State*, the government has taken following initiatives for sustainable management in a phased manner as outlined below: -

- The government has appointed APEDA (Agriculture and Processed food products Development Authority), as the nodal agency to promote setting up of Agri Export Zones (AEZ's) in two phases. Under First Phase – I, six Districts **Chamoli, Dehradun, Haridwar, Pithoragarh, Udham Singh 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. In Phase- II, the area under cultivation would be increased and, additional Districts brought under the aegis of AEZ 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 appointed HDRI (Herbal Research & Development Institute / JBSS: Jodi Buti Shodh Sansthan, Gopeshwar, District Chamoli) as nodal agency in the State to monitor developmental issues and for inventorization of H & MP species in the state.
- The State FD has taken up the task of for inventorization / documentation of H & MP. The objective is to prepare inventories of altitudinal: zones, forest-circles, division, and, specie-wise. To accelerate the process of inventorization, FD has resorted to "Rapid Mapping Exercise" so as to complete the task at the earliest.
- Another initiative has been raising of seedlings of tropical, temperate and, alpine species such as: *Aonla, Beheda, Harad, Bael, Amaltas and others*. The year-wise summary of seedlings raised and made available to given in the Table 1.1.

Table: 1.1: Year-wise Seedlings availability (No.)

S. No.	For Year	Seedlings Availability (No.)
1.	2001- 2002	5,00,000
2.	2002- 2003	14,00,000
3.	2003- 2004	24,47,000
4.	2004- 2005	42,89,968

- However, region-wise, circle-wise, division-wise and, species-wise seedlings availability for the year: 2004-2005 (as on February 2004) have been provided and, discussed in Chapter-4. These include main Tropical species viz.: *Harad, Baheda, Amla, Tejpata, Satavar, Timru, Sarpaganda, Stivia, Ashwaganda, Kuth*. Temperate & Alpine, viz.: *Kutki, Salampanja, Atish, Doulu, Faran, Salammishri, Aatmesh, Jatamashi etc.*
- Institutionalisation and switching over of marketing of H & MP from *Bhesaj Sangh / KMVN* to Forest Development Corporation (FDC) has been another initiative. Though nothing concrete result is yet visible on the ground and but been of critical issues clustering around sustainable development and management need priority and should be addressed properly.

1.5 Over-exploitation wild H & MP resources in the State:

Most of the herbs and medicinal plants grow in the wild as natural component of vegetation. But this traditional base is shrinking due to informal supply chain, over exploitation, population pressure, unsustainable practices, and biodegradation. There are restrictions on extractions and procurement from wild, yet the trade is going on secretly and resulting on over exploitation of resource areas thus leading to unsustainable practices.

In the absence of scientific system of collection and fostering regeneration of such plants, several species have been completely lost or have become endangered and / or on the verge of extinction with varying degrees. This is serious genetic erosion and causing loss of biodiversity of resource areas. Research² in herbs and medicinal plants have focussed on their biologically active compounds and evaluating their remedial properties, but little attention has been paid to the sustainable management of these plants in the State. Uttarakhand Government has yet to take effective measures in providing a sustainable management for marketing system and appropriate policies for conservation, protection of H & MP. Resulting in lot of destructive harvesting.

Notwithstanding, the measures of propagation and cultivation of H & MP initiated extraction; rather collection from the wild sources through un-official trading systems is still going on unabatedly at a large scale. These are incurring heavy loss of revenues to the exchequer. For example, the state had clearly defined procurement and trading to be done by *Bhesaj Sangh* and KMVN, but they have not been able to generate revenue of more than Rs. 4, crores added together. This turnover is not even comparable to the volume of trade being handled by one of the terminal markets, such as, Tanakpur, Haridwar or Dehradun.

Therefore, efforts are immediately needed to cultivate and conserve these rare and precious herbs and plant species in a sustainable manner.

1.6 Relevance of the Study:

In this backdrop, the Planning Commission invited proposal, in March 2003 with a view to assess the present scenario of H & MP in relation to availability, cultivation, conservation, production (including harvesting and procurement), processing, transportation, marketing, related-policies, the socio-economic impact on people due to H & MP trade. The Study, among other things, was to explore strategic options for suitable policy-changes that would contribute to sustainable H & MP management and, promoting implementation measures through joint / community participatory forest management. The project assignment was proposed as a precursor for undertaking an exhaustive study in the States of *Chhatisgarh* and *Jharkhand* in future.

² Conducted by: Indian Institute of Ayurveda for Drug Research (IIADR), Tarikhet, Raniket.

The NRIF submitted a proposal with required details and was selected for conducting this study.

The Planning Commission, Govt. of India, finally approved ³ this "*Pilot Study of the Mechanism for Sustainable Development & Promotion of Herbal & Medicinal Plants*" for the State of Uttarakhand, in June 2003. The **Draft Summary Report (DSR)** was submitted on 19th January 2004. The DSR was based on five-months research by the NRIF Team ⁴ in extensive consultation with Forest Department, Govt. of Uttarakhand; FRI / GBPIHED / GBPUA&T / HDRI / ICFRE / HNBGU/ other institutions; local NGO's and, villagers involved in the promotional and development of Herbal & Medicinal Plants (H&MP), in Uttarakhand State. Subsequently presentation of the DSR was made in the meeting presided by Honourable Deputy Chairman, Planning Commission, held on 15th March 2004.

This **Final Report** is now being submitted after incorporating all the suggestions made by the expert's / officials present at the above-cited meeting.

1.7 Outline of Report

The Report is based on the detailed field investigation in each region of Uttarakhand State, mainly concentrating in Pithoragarh District (of *Kumaon Region*) and, Chamoli District (of *Garhwal Region*), [out of the 13 Districts], spread over in an area of 51,082 sq.kms.

It highlights strategies for networking amongst the key stakeholders, besides an overview of prevailing policy / legal environment and, likely measures and initiatives required for sustainable management of herbal and medicinal plants trade in Uttarakhand State as well as coordination efforts required to carry out the tasks identified.

Suggestions have been provided for the changes in the various existing Acts, Rules and Regulations (such as modifications, additions or deletions of provisions), which is likely to promote trade of herbs and medicinal plants within the state and beyond. Policies have been suggested that could promote and regulate conservation, cultivation of H & MPs and then domestication, marketing, trade including exports.

It makes short and long term recommendations for taking appropriate measures for improving productivity and production of herbal and, medicinal plants trade in the state.

This Report has been organised into eight chapters:

The Chapter-1: provides an overview of H & MP situation and, initiatives already taken by the Govt. in promoting cultivation and trade of H & MP after declaring Uttarakhand as a

³ Vide order No. O-15012 / 59 / 02-SER, dated 30th June 2003,

⁴ Comprising: R P MATTOO (*P A M & E, Project Management, Planning & Sector Analysis Expert*); DR. ANSHU SINGH (*NFTP & Forest Expert*); DHANANJAY KUMAR (*Forest Marketing & Management Expert*); MUDIT KUMAR, SINGH IFS, [*ADG (PF / JFM), ICFRE, Dehradun*].

'Herbal State'. It also highlights the approach adopted by **NRIF** in successfully completing the study within the time stipulated by the Planning Commission.

Chapter-2 deals with the **Objectives and Methodology** adopted for the study in two selected districts from each region of *Kumaon* and, *Garhwal*.

Chapter-3 describes briefly the basic principles of the ancient system and, wealth of the resource base of **H & MP status in India**. It gives an over view of prevalent cultivation practices, preservation norms, methods of harvesting & post-harvesting, marketing, processing techniques as well as forward linkages in place, export and, import details besides commenting on how they are affecting, supplementing and, supporting the production of H & MP of the country.

Chapter-4 presents a summary of the **H & MP status in Uttarakhand**, and the extent of available infrastructure being canalised for the sector. The chapter further describes the salient features of Uttarakhand's medicinal plants trade, through minor trading centres to the selected major urban markets, vis-à-vis attempts to estimate the scale of the transactions by volume and prices of plants traded. It also identifies the main actors in the chain of supply, from collectors to major manufacturers and exporters. Finally this section considers the scope for semi-processing and value addition at the local level.

Chapter-5, deals with **Policy Dimensions Analysis**, have been dealt at length under These relate to general National Level Policies and Legislations, their critical analysis, National Forest Policies / Legislations especially on H & MP in relation to new approach of participatory management or joint forest management – policy evolution vis-à-vis critical analysis of policy guidelines of JFM policies now in Uttarakhand in relation to former U.P State and, the Way Ahead – to handle operational issues

Chapter-6 covers the **Marketing Scenario** related to species under cultivation, existing marketing practices, international marketing scenario pricing, products delivery schedule to destination in India, marketing in Uttarakhand & other states besides giving suggestions about various alternative marketing Models.

Chapter-7 highlights the **Socio-Economic Linkages** in general and, role of H & MP in employment generation, extent of income generation through H & MP, vis-à-vis role of H & MP in social structure and, sharing mechanism of H & MP linkage with JFM. It also discusses whether cultivation is a feasible means of meeting the demand for some species, given that the livelihoods of the traditional collectors, often tribal, depend on collection of medicinal plants from the wild for their sustenance.

Chapter-8, presents the **Suggestions & recommendations** (Short-term; and, Long-term), which have emerged from study completed by **NRIF**.

Chapter-2:

OBJECTIVES & METHODOLOGY

7-14

2.1 Objectives of the Study

2.2 Methodology adopted for the study:

2.3 Approach of the methodology:

- Fig 2.1: The implementation approach of the study methodology

2.4 Components of the Methodology:

2.4.1 Secondary Research:

2.4.2 Primary Research

- Fig 2.2 (a) to (f): Associated steps of the primary research

2.5 Data Collection modes:

2.5.1 Contact with multiple stakeholders:

- Fig 2.3: Multiple Stakeholders in H MP in Uttranchal and, their linkages

2.5.2 Investigation Network:

- Table-2.1: Investigation Work Matrix (to whom Questionnaires were sent)

2.5.3 Participatory Rural Appraisal (PRA):

- Table-2.2: Name of village selected in different regions / ranges / altitudes
For Participatory rural appraisal (PRA) in Uttarakhand

2.5.4 Constraints:

*Annex-2.1: List OF Research Institutes / Medicinal Plants / Garden and Drug
Testing Laboratory in UTTRANCHAL*

Chapter-2

OBJECTIVES & METHODOLOGY

2.1 Objectives:

The objectives of the study were: -

- To assess the present scenario of herbs and medicinal plants in the State of Uttaranchal with relation to availability, production (including harvesting and procurement), processing, transportation and, marketing.
- To assess the socio-economic aspects of trade in herbs and medicinal plants, especially on the livelihood and income generation aspects of the community involved in its trade.
- To look at the policy environment to assess the degree to which present concerned policies promote sustainable management of herbs and medicinal plants.
- To identify and foster indigenous knowledge and practices of herbs and medicinal plants, emphasizing particularly the role of women in its conservation and use.
- To recommend policy reformulation and legislation of the ones evaluated to make them more users friendly.
- To identify the role and importance of herbs and medicinal plants of Uttaranchal as an instrument in successful implementation of Community Forest Management;
- To study the existing system of collection and, marketing of herbs and, medicinal plants in Uttaranchal;
- To prepare a list of pharmaceutical companies, viz. Govt. and, private pharmacies and, other agencies utilizing medicinal plants for herbal drugs and, products;
- To prepare a list of institutions having drug testing laboratories facilities, agro-techniques and, infrastructure for raising planting materials. Such organizations are universities, research wing of Forest Department, Herbals Research Development Institute, reputed NGOs etc. These centers could act as 'center of excellence' for not only ensuring quality planting materials but also for drug testing laboratory facilities, certification, validation etc.

The Study was divided into three phases:

Phase-I: An overview of the H & MP industry in Uttaranchal, especially in relation to its consumption of raw material;

Phase-II: Study of pricing, value addition and information flow mechanisms at different points in the supply chain ranging from the primary collector / cultivator to the processing industry;

Phase-III: Investigation of the potential application of market-based instruments to ensure both sustainable supply of medicinal plants to the *ayurvedic* pharmacies / industry as well as better returns for primary collectors / cultivators.

2.2 Methodology adopted for the study:

The methodology followed, had steps as under: -

- **Step-I:** Preparing an inventory as available in different regions / Districts of the State, based on primary survey, PRA & secondary sources, an assessment, availability, and, production of Herbal & Medicinal Plants (H & MP) of different species;

- **Step-II:** Study of existing Policy provisions covering all stakeholders with a view to replace the current working in isolation to an interactive and interdependent working that brings greater transparency in trading and removes secret and exploitative dealings and permits by bringing in appropriate scientific and management inputs;
- **Step-III:** Study of existing harvesting, post-harvest handling & processing techniques in use and assess need & scope for improvement as per available technology options;
- **Step-IV:** Study of existing pattern of production, collection, marketing and related management and Governance of H & MPs;
- **Step-V:** Study the efficiency of existing market operations / models in different States and, explore and suggest a strategy for the State to help in value addition at grass root by setting up H & MP processing units in different Districts of the Uttranchal State, with latest technology;
- **Step-VI:** Study of existing institutional & research support for conservation and development of H & MP, and livelihood based on these in the State despite many central & state research organizations within the State and, to suggest appropriate ways for convergence / synergy of available results and taking up further research works to promote and development of H MP sector;
- **Step-VII:** Study of existing economics of procurement, transportation and, other clustering variables;
- **Step-VIII:** Locating benefits accruing to producers, grass root level entrepreneurs as well as consumers and carrying our brief economic analysis;
- **Step-IX:** Making recommendations and suggestions.

2.3 Approach of the methodology:

From the steps given under paragraph 2.2, the study has been normative but conclusive in nature. The implementation has been made through a triangular approach (Fig 2.1)

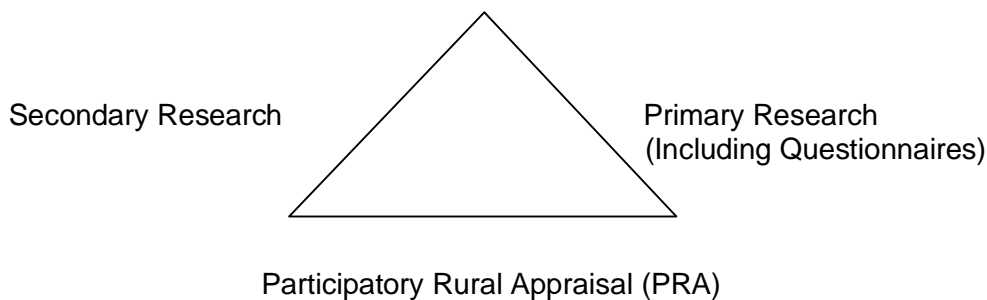


Fig 2.1: The implementation approach of the study methodology

2.4 Components of the Methodology:

2.4.1 Secondary Research:

Interestingly, even secondary research turned out to be a kind of primary research. The information on H & MP as even these are documented but not readily available at one place to cover all the stages from: wild collection to traditional healers (*Vaidyas*) / village level agents to wholesalers / commission agents / traders to industries within the country or to the industries in other countries. Therefore, efforts were made to use the published

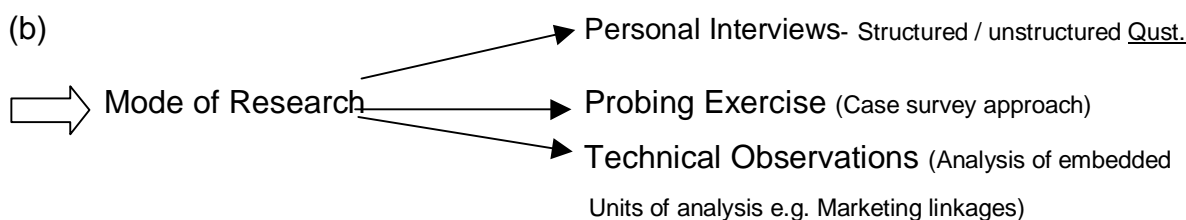
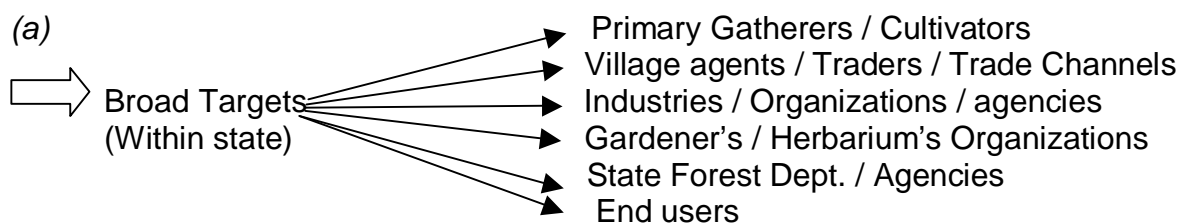
information available with different institutions within Uttaranchal are only a few other information sources through literature review.

The relevant sources have been thoroughly scanned through, analysed and used in the study after collecting and checking with the field findings. The analysis tools applied have been both qualitative as well as quantitative.

2.4.2 Primary Research

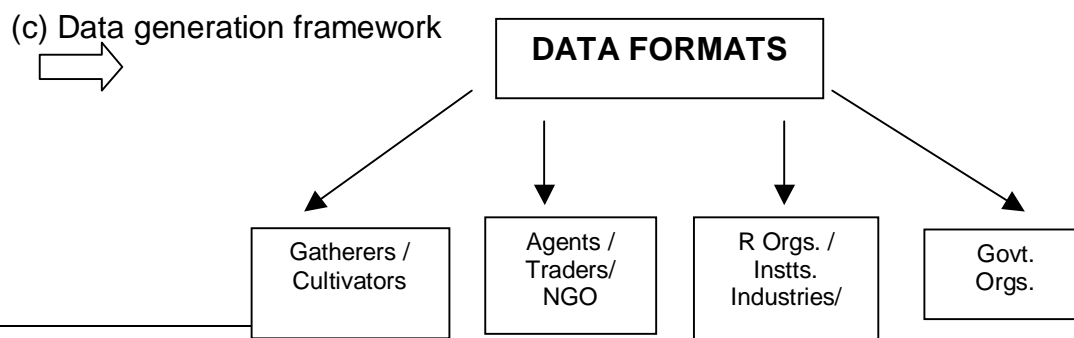
In view of limited information base in published form, the Study has been made to be dependent on primary research. The primary research exercise was designed to gather information from systematically and wrapping up manifold dimensions into relevance. Few of the major dimensions of the primary research have been discussed in succeeding paragraphs with illustrative diagrammatic presentation: -

Primary research dimensions associated with the cultivation and disposal of H & MP are w shown in Fig 2.2 (a) to (f)




Legend: Qust. = Questionnaires ¹

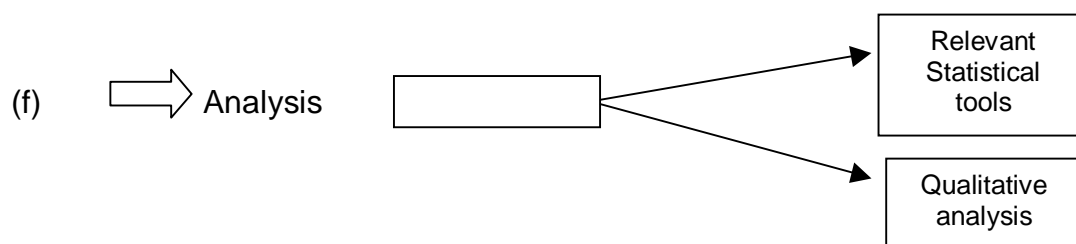
Medium of Research → from different stakeholders



¹ **Data Formats / Questionnaires** devised were submitted to PC for approval through "Inception Report", vide letter of even no. Dated 12th August 2003, These were canvassed **from**: Cultivators; Gatherer's / Collector's; Traditional Practitioner's / *Vaidya*'s; Gardener's; Herbarium's; Trader's; Transporters; Exporter's; Pharmacies; NGO's; JFM Group's / Committee Members through PRA Formats; Research Institutions; and, Other Stakeholders etc.

(d)  Data Format Designing: Through panel discussions, the panel comprising of a technical, market and statistical expert from NRIF.

(e)  Finalization of Data Format: Through pilot survey conducted in Pithoragarh / Delhi for each targeted segment.



Qualitative analysis has been followed for open-end questions, which emerged through probing exercises and did not have much of quantitative inputs. The resource consultants have separately analysed observatory remarks in case of raw material quality as flowing to the various end users within and outside the State.

2.5 Data Collection modes:

Collection of primary data was through three different modes such as: -

2.5.1 Contact with multiple stakeholders:

The H&MP sector-trade, at present, is secretive and exploitative, because there is not a **Single Owner or Principal Player or Master-of-Trade**, except for unsustainable practice going-on in the quest for profit. Another factor is the lack of appropriate scientific know-how for collection, fostering regeneration of plant species, which are gradually becoming endangered. Thus affecting conservation and gene-pool maintenance aspects of the state. The prevailing links of many stakeholders are shown in Fig 2.3. There is conspicuous absence of the form of linkages amongst various stakeholders. This created some problems in ensuring complete collection of data and their appropriate collation.

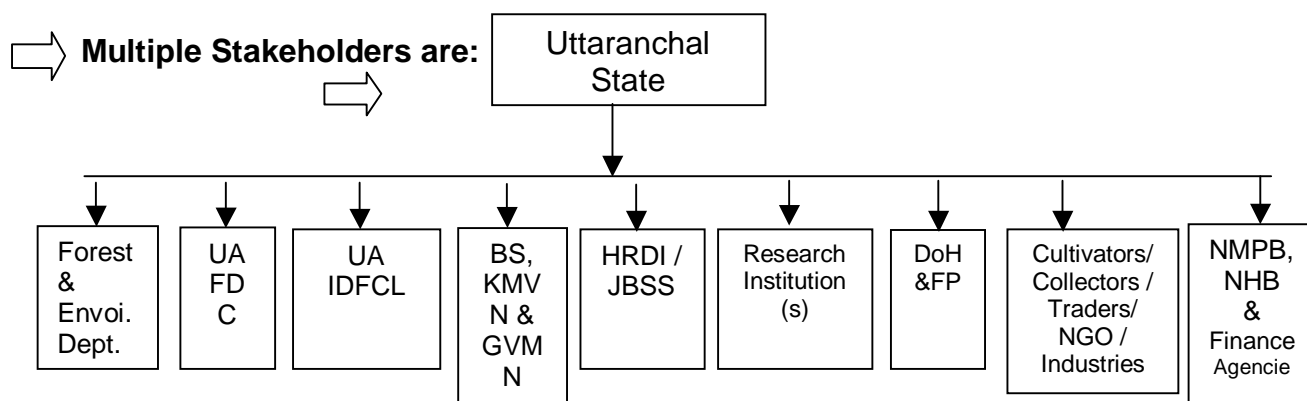


Fig 2.3: Multiple Stakeholders in H MP in Uttranchal and, their linkages

The multiple stakeholders, working in isolation, include the following: -

- Forest & Envoi. Dept., Govt. of Uttranchal;
- UAFDC : Uttranchal Forest Development Corporation, Dehradun;
- UAIDFCL: Uttranchal Infrastructure Development Finance Company Ltd. Dahrhadun
- BS; KMVN & GVMN: Bheshaj Sangh's (Cooperative societies); Kumaon Mandal Vikas Nigam and, Gharwal Vikas Mandal Nigam;
- HRDI: Herbal Research & Dev. Institute (JBSS: Jadi Buti Shodh Sansthan / Uttranchal State Medicinal Plant Board), Gopeshwar, Dist. Chamoli;
- Research Institutions include: - (Detailed list is given at the *Annex-2.1*)
 1. Dept. of Botany, HNB University Gharwal, Srinagar, Pauri Garhwal;
 2. High Altitude Plant Physiology Research Centre (HAPPRC), Srinagar, Gharwal, Pauri Garhwal;
 3. GB Pant Institute of Himalayan Environment & Development, Kosi-Katarmal, Almora;
 4. GB Pant University of Agriculture & Technology, Hill Campus Ranichauri, Tehri Garhwal;
 5. GB Pant University of Agriculture & Technology, Pantnagar, Udham Singh Nagar;
 6. National Bureau of Plant Genetic Resource (NBPGR), Regional Station, Bhowali, Dist. Nainital;
 7. HESCO (Gauchar);
 8. Defence Research & Development Organization (DRDO), DARL, Pithoragarh;
 9. Minor Forest Division and, Resource Survey & Management Division, FRI, Dehradun;
 10. Regional Research Institute (Ayurveda) Central Council for Research in Ayurveda & Siddha, (Govt. Ministry of Health & Family Welfare), Tarikhet (Ranikhet);
 11. Indian Council of Forestry Research & Education (ICFRE), FRI, Dehradun;
 12. Jai ma Pasu Sewa Sanstha, Uttarkashi;
 13. Centre of Minor Forest Products (COMFORPTS), Indrapuram, Dehradun;
 14. SHER (Society for Himalayan Environment Research), Chakrata Road, Vikas Nagar, Dehradun;
 15. Shantikunj, Haridwar; etc.
 16. Himalayan Consortium for Himalaya Conservation (HIMCON), Ranichuri, Tehri Gharwal;
 17. Central Institute of Medicinal and Aromatic Plants (CIMAP), Field Station, P.O. Nagla Dairy Farm, District Udham Singh Nagar, Nagla – 263149,
- DoH&FP: Dept. of Horticulture & Food Processing, Govt. of Uttranchal, Choti Muhani, Haldwani, Nainital;
- Cultivators; Collectors; Traders; NGO's; (who supply wild/ collected / cultivated raw-material: legally or informally to the) Industries;
- NMPB & NHB: National Medicinal Plant Board, Department of Indian Systems of Medicines & Homeopathy, Ministry of Health & Family Welfare, (Govt. of India) New Delhi;
- National Horticulture Board, Dept. of Agriculture & Cooperation, Ministry of Agriculture (Govt. of India) New Delhi;
- Other Financing Agencies;

Besides above organisations, the Ministry of Environment and Forests (MoEF); Ministry of Health (Department of Indian Systems of Medicine), TRAFFIC-India, as well as industry and research bodies were consulted for the purpose of the study.

2.5.2 Investigation Network:

Detailed investigations were carried out with respect to the main raw material catchments / source areas of few industrial units located in Uttar Pradesh. Primary market information

regarding volumes and prices of selected medicinal plants was collected from different markets. Investigation work matrix covered a cross-section of Multiple Stakeholders / End Users as is given in the Table 2.1

Table-2.1: Investigation Work Matrix (to whom Questionnaires were sent)

Category of Respondents contacted from different places	NCT of Delhi	Within Uttranchal State						Total
		Bhu-wali	Nainital / Ranikhet	Pithoragarh	Alm-ora	Srina-gar	Badri-nath	
Traders	57	-	10	2	6	-	-	75
Cultivators / JFM / Vaidyas	-	6	12	30	10	-	4	62
NGOs	3		2	5	3	-	4	17
Institutions	10	1	4	-	3	3	-	21
Industries	9	-	-	-	-	-	-	9
Total	79	7	28	37	22	3	8	184

Additional information from these markets was also obtained from other on-going studies. Field investigation was carried out in two Districts of the two Region viz. Kumaon (Pithoragarh) and, Garhwal (Chamoli). This included collection of information regarding medicinal plant collection, market(s) and cultivation Models, and visits to the Joint Forest Management (JFM) group in 10 villages of the two Districts located at different altitudes (Refer Table 2.2). The Districts selected in consultation with State FD / PC, have offered the opportunity to interact with representatives of all major players in the medicinal plants supply chain: collector, cultivator, trader and traditional practitioner.

Major companies manufacturing *ayurvedic* medicines and herbal cosmetics and the medicinal plant markets in and around Delhi were visited to learn about raw material consumption, processes and perceptions of industries involved, mechanisms of distribution and its economics.

2.5.3 Participatory Rural Appraisal (PRA):

As per methodology approved the PRA was conducted in one Districts of each region selected in consultation with the Planning Commission and, the State Govt. i.e. for Kumaon Region (District: Pithogarah) and, for Garhwal Himalayas Region (District: Chamoli). This was done, keeping in view, the relative importance of the selected species & varieties of medicinal herbs & plants in two regions, so that no important recorded variety is left out from the State. The selection of villages represented five distinct phyto-climatic zones in each District, covering the altitudinal ranges of: *up to 900 m; (900-1200) m; (1200-1500); (1500-2500) m; (2500 & above) m*. The name of selected villages, number of participants (including Gatherers / Cultivators / local community / women & others), species being gathered in the areas within the two Districts is given in Table 2.2.

Table-2.2: Name of village selected in different regions / ranges / altitudes for participatory rural appraisal (PRA) in Uttaranchal

Range	Village	Altitude (m)	PRA Participants included Cultivators/ Collectors	No. of Species
Kumaon Region				
Pithoragarh	Rani-khuti	Up to 900	50	50
Pithoragarh	Dharsi-Melku	1,200	54	58
Gangoli Haat	Chahaj	1,500	46	74
Didihaat	Sonakoti	2,000	60	82
Munsyari	Suring	2,700	72	60
Garhwal Region				
Alaknanda	Sonala	900	58	61
Tharali	Gotinda	1,200	50	50
Chamoli	Lassi	1,500	40	69
Lohna	Diwali Khal	2,000	42	61
Badrinath	Mana	3,500	35	47
Total			507	

Information gathered major companies manufacturing *ayurvedic* medicines and herbal cosmetics and the medicinal plant markets in and around Delhi were examined visited to learn about raw material consumption, processes and perceptions of industries involved mechanisms of distribution and its economics.

During PRA a video film was also prepared to illustrate the methods for inventorying all the trees, shrubs and herbs, which are commonly found near a village in Uttaranchal. This has been documented as a school package to sensitise children. It was also displayed at the end of the presentation, presided by Honourable Dy. Chairman. Planning Commission on 15th March 2004.

2.5.4 Constraints:

Despite repeated visits, reminders and, assurances given by the organizations, the responses were received only from 31% of the sample. Except for few, most of the institutions, and organizations associated with the cultivation of Herbal & Medicinal Plants, avoided to reveal the information even though they were informed that the Planning Commission, Govt. of India, funds the Study. This was perhaps because H & MP trade is being carried out secretly and used exploitative and unsustainable practices in the quest for profits.

Another constraint was the limited availability of H & MP species-wise details with the Forest Department about total resource vis-à-vis District-wise inventories on location-based and, area-specific-species in wild form / cultivation practices being followed by the grower's, besides location-wise identification of threatened and endangered species in the state. The NRIF, expert's persuasion could obtain this information.

Annex-2.1: List OF Research Institutes / Medicinal Plants / Garden and Drug Testing Laboratory in UTTARANCHAL

1. Forest Research Institute, Non-Wood forest Product Division (Medicinal Plant Garden) Chakrata, Uttarakhand.
2. Central Soil & Water Conservation Res. & Trg. Instt., (Research Farm) Selakui Village, Chakrata Road, Dehradun – 248195, Uttarakhand.
3. Lupin Herbal Research Centre (Medicinal Plant Garden) Shivanand Nagar, P.O. Tehri Garhwal District, Tapovan, Uttarakhand.
4. Horticultural Experiment & Training Centre, Almora District, Chaubatia P.O. – 263651, Uttarakhand.
5. Centre of Minor Forest Products for Rural Development & En. Hig – 2/8, General Mahadev Singh Road, Indrapuram, P.O. Kanwali, Dehradun – 248001, Uttarakhand.
6. Herbs Development Scheme Co-operative Department (Medicinal Plant Garden) Almora District, Ranikhet, Uttarakhand.
7. Bhagirathi Resorts Selakui Village, Chakrata Road, Dehradun, Uttarakhand.
8. Central Institute of Medicinal & Aromatic Plants Regional Centre (Demonstration Farm) P.O. Dairy Farm, Nainital Distt., Nagla – 263143, Uttarakhand.
9. High Altitude Plant Physiology Research Centre, Post Box – 14, HNB Garhwal University Botanical Garden, Srinagar – 246174, Uttarakhand.
10. Indian Institute of Ayurveda for Drug Research (Medicinal Plant Garden Saffron Farm) near Ranikhet, Ranikhet – 263645, Uttarakhand.
11. Forest Research Institute, Botany Division, Botanical Garden FRI Campus, P.O. New Forest, Dehradun – 248006 Uttarakhand.
12. Doon School Campus Botanical Garden, Dehradun, Uttarakhand.
13. Indian Medicines Pharmaceutical Corporation Ltd. (Medicinal Plant Garden) Almora District, Mohan Uttarakhand.
14. Botanical Survey of India Northern Circle, Gymnosperm Sancturay, Nagdev Block Pauri – 246001, Uttarakhand.
15. Botanical Survey of India, Northern Circle Garhwal, Khirsu – 246001, Uttarakhand.
16. Raj Bhawan Medicinal Plant Garden, Dehradun, Uttarakhand.
17. Indian Institute of Ayurveda for Drug Research (Medicinal Plant Garden) Chamba District, Tehri, Uttarakhand.
18. Botanical Survey of India Northern Circle, 192 Kaulagarh Road, Dehradun – 248195, Uttarakhand.
19. G.B. Pant Institute of Himalayan Environment & Development Kosi-Katarmal, Almora – 263613, U.A.
20. Herbal Research & Development Institute, Gopeshwar.
 21. G.B. Pant University of Agriculture & Technology, Pant Nagar, Uttarakhand (At Ranichora Station).
 22. High Altitude Plant Physiology Research Centre, HNB Garhwal University, Srinagar, Garhwal, Uttarakhand
 23. N.B.P.G.R., Regional Station, Bhowali, Uttarakhand
 24. Drug Testing Lab: Uttarakhand Government Ayurvedic Drug Resting Laboratory, Rishikul Ayurvedic College, Haridwar, Uttarakhand.
 25. State Medicinal Plant Board (SMPB) Dr. J.S. Rawat, Director, Herbal Research & Development Institute, Mandal, Gopeshwar, Uttarakhand
 26. Smt. Vibha Puri Das IAS, Principal Secretary (Rural Development / Horticulture) Secretariat – 248001 Dehra Dun, Uttarakhand.

CHAPTER – 3: HERBS AND MEDICINAL PLANTS – NATIONAL SCANNING

15-40

3.1 General

3.2 Species available by Phyto – climatic Zones in India

- Conservation, Production and Extension
- Introduction and Domestication
- Conservation and Promotion Efforts
- Conservation Strategies
- Future Thrust

3.3 Harvesting and Post harvesting Techniques

3.4 Plants being cultivated

3.5 Plants banned for Extraction

3.6 Institutional Support

3.7 Infrastructure Facilities

3.8 Marketing Techniques

- Fig 3.1: Major points of transaction for local collectors

3.9 Processing and Forward Linkages

- Processing of Traditional Medicines
- Fig 3.2 Industrial Uses of Medicinal Plants

-

- Value Added Products

3.10 International Trade

- Table-3.1: Global imports of vegetable alkaloids, glycosides and their

- Derivatives

- Table-3.2: India's Exports and Imports of Medicinal and Aromatic Commodities

Export & Import

- Table-3.3: Major supplying Countries & Regions

- Table-3.4: Leading Exporters of Medicinal plants

- Table-3.5: Leading Importers

3.11 Indian Trade

- Table – 3.6: Quantity of Medical Plants Exported and Imported during 1991-92

- Areas of Immediate Action:

- Linking Conservation to Business and Local Communities
- Transfer of Technology from Lab to Land

3.12 Indian Medicinal Plants and Herbs in International Context

3.13 Summary of Key Issues

3.13.1 Herbal Medicines

3.13.2 Herbal Medicinal Market

3.13.3 Herbal Market Scenario in India

3.13.4 Conservation

3.14 Emerging Trends

Annex-3.1: Notification prohibiting the export of medicinal plants

CHAPTER – 3

MEDICINAL PLANTS AND HERBS – NATIONAL SCANNING

3.1 General

India is endowed with a wide spectrum of bio-diversity in plants genetic resources and is to be recognized as one of the world’s top 12 mega diversity nations. It possesses rich flora¹ that include about 45, 000 species and many are accredited with medicinal value. Over 15, 000 species are used in different systems of health care in Asia (7, 000 in China and 8, 000 in India). However, available information shows that 1, 700 species are used in Classical Indian systems of medicines. *Ayurveda* uses 1, 200, *Siddha* – 900, *Unani* – 700, *Amchi* – 600, Tibetan – 450. These raw materials are obtained from the forests only, where only a few plants are under cultivation. Despite, the close relationship between the forest and pharmaceuticals, very little effort has been made to maintain, manage and develop technology for conservation of these medicinal plant resources of the Indian forests.

The estimated 95% of medicinal plants collected in India are from the wild and process of collection is said to be destructive because of the use of parts, like roots, barks, wood and whole plants. An estimate of the parts used by *Ayurvedic* industries are: roots – 29.6%, leaves – 25.8%, bark – 13.5%, wood – 2.8%, whole plant – 16.3% and rhizome – 4% and rest: seeds, flowers etc. A major part of the high range Himalayan plants are wild harvested and many of these are close to extinction due to over-harvesting or unskilled harvesting, e.g, *Nardostachys jatamansi*, *Aconitum* species. Due to over-harvesting, several medicinal plants occurring in the forest areas of tropical, sub-tropical, temperate and alpine zones have either become extinct or endangered. Consequently efforts are needed to develop methods for *in-situ* and *ex-situ* cultivation / propagation of such medicinal plants which have been over-harvested resulting in low density of these species in nature. It is, therefore, argued that cultivation of such species could relieve the pressure on the natural habitat and will meet the market demand.

Concerted efforts are lacking in the area of biotechnology and agro-technology for encouraging cultivation on private or Government land. Similarly marketing, which is one of the most important aspects in the development of any product of medicinal herbs be given adequate attention in formalizing and organizing the disposals.

Quality control and standardization are integrals to boosting export. The quality of medicinal plant also depends on the geographical origin, time and stage of growth. Thus time of collection, post harvest handling and their completing are important. The villagers/ tribals mostly residing in the vicinity of

¹ Fauna: 65,000 to 75,000, as reports BSI.

forest and in forest fringe areas do the collection in their spare time. The plant part is collected without paying attention to the stage of maturity, is dried haphazardly and stored for long periods under unsuitable conditions. Thus the quality of collected material as such is often deteriorated.

3.2 Species available in Phyto-climatic Zones in India

Our country is divided into Tropical, Sub-Tropical, Temperate and Alpine zones. The following medicinal plants are found in different Phyto-climatic zones: -

1. **Tropical zone:** *Acorus calamus, Adhatoda vasica, Aristolochia indica, Azadirachta indica, Cassia fistula, Commiphora mukul, Datura metel, Evolvulus alsinoides, Gloriosa superba, Mucuna prurita, Psoralea corylifolia, Pueraria tuberosa, Tinospora cordifolia, Tylophora indica, Withania somnifera, Chlorophyton arundinaceum, Strychnos nux-vomica.*
2. **Sub-tropical zone:** *Acorus calamus, Alpinia galanga, Asparagus adscendens, Curcuma zedoaria, Holarrhena antidysenterica, Uginca indica.*
3. **Temperate zone:** *Aconitum chasmanthum, Artemisia maritima, Berberis aristata, Bergenia ciliata, Colchicum luteum, Daphne papyracea, Datura stramonium, Dioscorea deltoidea, Fagopyrum esculentum, Heracleum candicans, Podophyllum hexandrum, Rheum emodi, Swertia chirata, Urginea indica, Viola odorata, etc.*
4. **Alpine zone:** *Nardostachys jatamansi, Picrorrhiza kurroa, Dactylorhiza hatagirea, Hyssopus officinalis, Aconitum heterophyllum, A. balfourii, Dictamnus albus, Ephadra geraradiana, Gentiana kurroa, Jurinea dolomiaea, etc.*

Conservation, Production and Extension

The natural wealth of medicinal plants is fast depleting which makes it difficult to maintain sustained supply of raw materials to the drug industries. The challenges of conservation has led to domestication and growing of valuable plants on a scientific basis. For this, it is also essential to motivate the farmers with assured market.

There are a large number of plants, which find regular use in Indian System of medicines. These can be domesticated and brought into cultivation at suitable locations where conditions are favourable for their growth and development. But it is difficult to advocate cultivation of any particular plant in a region as a permanent feature due to the fluctuation in demand. Therefore, it is important to keep a watch on the demands and regulate the cultivation accordingly.

Introduction and Domestication

In the face of decreasing availability efforts are needed to introduce and domesticate the following important species: *Aconitum heterophyllum*, *Acorus calamus*, *Adhatoda vasica*, *Berberis aristata*, *Carum bulbocastanum*, *Digitalis lanata*, *D. purpurea*, *D. grandiflora*, *D. lutea*, *Dioscorea deltoidea*, *Glaucium flavum*, *Glycyrrhiza glabra*, *Matricaria chamomilla*, *Melissa officinalis*, *Mentha spp.*, *Ocimum spp.*, *Podophyllum emodi*, *Rauvolfia serpentina*, *Saussurea lappa*, *Solanum khasianum*, *Valeriana wallichii*, *Viola spp.*, *Withania somnifera*, *Swertia chirata*, *Spilentes acmella*, *Gentiana kurroa*, *Mucuna pruriens*, *Podophyllum hexandrum*, *Pelargonium graveolens* and *Tagetes minuta*, etc.

Conservation and Promotional Efforts:

There is no planned approach to re-popularise traditional health care system at the grass-root level with the emphasis on village level herbal remedies for common ailments, like common cold and cough, bronchitis, tonsillitis, diarrhea, constipation, piles, etc. Similarly, providing practical technical know-how on modern nursery techniques for raising (medicinal and aromatic plant) MAPs, cultivation packages of medicinal plants at household and community level, should be provided to the growers in the form of processing and preparation of educational material. Thus there is felt need to fill these gaps and result in spreading awareness on utility of local health care. On the other hand the growers should be provided scientific training in identification and use of plant and plant parts, proper collection time and season, diagnosis of common diseases, preparation of drugs and its application, storage, preservation and about the use of plants for various illness.

Conservation Strategies: In view of the state of affairs observed above two basic approaches of conservation have been identified –

- (A) **Ex-situ conservation:** It requires creation of germ plasm outside their original home. But it lacks the natural evolution process that is always operative in nature.
- (i) **Field Genebank:** The clones are maintained *in-vivo* in green houses or as field planting.
 - (ii) **Botanical Gardens:** It involves substantial investments in terms of facilities and maintenance, so the scope is limited.
 - (iii) **Herbal Gardens:** Such herbal gardens help in conservation of important medicinal plants and create public awareness by holding short-term training for students, farmers and growers.
 - (iv) **Seed Gene bank:** A major global emphasis on conservation of germ-plasm diversity has been to conserve *ex-situ* in long term repositories called genebank. The Workshop on “National concern

for management conservation and use of agro-biodiversity" held recently at Shimla (October, 15 - 16, 1997), recommended that the National Genebank be declared as national heritage. All the participants were requested to deposit germ-plasm of different crops (including medicinal plants) in the National Genebank at NBPGR.

- (v) **"In-vitro" Conservation:** This technology has tremendous advancement during the last four decades. Every plant part (root, stem, leaf, hypocotyls, axillary buds, embryo, single cell and naked protoplast) can be grown successfully in culture under completely aseptic conditions. Therefore, tropical, temperate herbs can be maintained in normal or modified culture media, in normal culture room for a number of years. Concerted efforts should be made towards evolving, simple, efficient and economically viable technique that ensure rapid multiplication and genetic stability of germ plasm.
 - (vi) **Cryo-banks and Conservation of Germ-plasm:** This strategy for long term conservation is still in its infancy. But NBPGR conserves 220 accessions of different crops belonging to 85 genera and about 100 species. This strategy is required to be standardized.
- (B) **In-situ Conservation:** It requires prevention of the destruction of populations and their habitats; maintenance and / or enhancement of the population level and variability; prevention of collection and excessive commercial exploitation.

Future Thrust: A well-planned National Action Plan on management, conservation and use of medicinal and aromatic plants needs a system approach encompassing these as components like agro-biodiversity. The system should focus these plants as key players while implementation of action plan should have mission-mode-approach; national information networking; documentation; backup of biotechnology and DNA fingerprinting; national community gene-funds; equitable sharing public awareness campaign, etc.

Conservation strategy would not succeed unless we do not involve the target groups such as the rural or tribal communities, medicinal plant experts, government policy makers, the indigenous and modern pharmaceutical and perfumery industries, the exporters of medicinal plants and the NGO's. The central theme should be with shared concerns and actions on participatory modes.

3.3 Harvesting and Post harvesting Techniques

Villagers and tribals living in and around the forests usually do the collection of medicinal plants from the forest areas. They collect the material in small

lots in their spare time and store it till these are sold or bartered at a nearby market. The tribals are usually the right holders to collect the medicinal and aromatic plant (MAP) raw material along with other NWFPs.

Restrictions have now been imposed on collection of such material growing in the reserved forests as well as the collection of some more H & MPs, which have been completely banned, by the State or Central Government, due to poor density of certain species in the nature.

Efficacy of crude drug depends on the age of the plant source and the vegetative growth-stage when the required part of the plant is collected. It has great importance in *Ayurvedic*, *Unani* and other traditional systems of medicine as well as modern pharmacopoeia for example, fruits of *Terminalia chebula* should be harvested at a stage when these attain full size but are still unripe; the fruits of *Aegle marmelos* are harvested when raw; anthers of *Mesua ferrea* constituting the drug "Nagkesar" are harvested from flowers when still in bud stage; root of *Withania somnifera* is harvested from 6 - 7 months old plants; root of *Rauvolfia serpentina* is collected when the root bark constitutes one-fourth of the total biomass of the root, while stem of *Tinospora cordifolia* should consist of mature stems collected at the time when the climber is leafless.

There is great seasonal variation in the active chemical content of crude medicinal plant material. Physiological conditions also reveal variation in chemical constituents. It is also reported that the resin content of *Podophyllum hexandrum* root have maximum when the plant flowers in the month of May. But the percentage of *podophyllotoxin*, the chemical compound responsible for anti-tumor activity of the drug is highest during the months of September – October when the fruits are fully mature. Likewise, total alkaloid content of the leaves of *Adhatoda zeylanica* (dry 'Vasaca') during different seasons and physiological conditions of the plant revealed that highest yield of total alkaloids is obtained during the months of July to October when the flowering is over and the fruits are at different stages of maturation, for example, maximum alkaloid content is found in *Holarrhena antidysenterica* at a stage when the plants are in full bloom. There are lot of literatures on harvesting and should be used while standardizing harvest techniques.

Post-harvest processing involves reduction in bulk through cutting, chipping, drying to remove moisture and storage to maintain the therapeutic efficacy of the raw material. Drying of collected material is necessary at suitable temperature and exposure differs from species to species. The crude drugs containing glycosides, flavanoids and essential oils should be dried under low temperatures preferably in shade within a short period after harvesting. For example, root of *Valeriana jatamansi* if dried at temperature above 25 °C, loses much of its valpatriate content, which is the main chemical constituent responsible for sedative and tranquillizing properties of the drug. Though *Colchicum luteum* corms and *Gloriosa superba* tubers show high content of

the alkaloid colchicines if dried quickly under high temperature, but *Emblica officinalis* fruit is used fresh to obtain maximum concentration of ascorbic acid (source of Vitamin C).

Harvesting and post-harvesting technologies have been standardized for only small number of raw materials, which are used for large-scale production of phyto-pharmaceuticals. But there is a great demand to develop suitable technologies for other crude drugs used for the manufacture of drugs based on Indian systems of medicine. The methods should be simple which could be easily understood and adopted by the collectors. This will help in avoiding indiscriminate removal of plant, supply of good quality material to the consumer and enabling the collector in getting a better price of the produce.

3.4 Plants being cultivated

Sixty-eight plants are cultivated as ornamental or as cereal, fruit, vegetable, spice, oilseed, essential oil or other cash crop, which are the source of medicinal raw materials. These are being cultivated for cloves, cinnamon, castor seed, turmeric or cumin or a by-product such as Bel fruit, Ashoka bark, Jamun seed and Papain, etc.

Nearly thirty medicinal plants are cultivated on large scale. The main medicinal crops are *Plantago ovata* (Isabgol), *Cassia angustifolia* (Senna leaves), *Withania somnifera* (Ashwagandha), *Saussurea costus* (Kuth) and a number of *Cinchona* sp. The farmers mainly cultivate these plants. Domestication and cultivation of about 50 medicinal plants are in progress at various government, non-government and academic organizations but a few have been adopted on small-scale cultivation. *Podophyllum hexandrum*, *Picrorrhiza kurroa*, *Aconitum heterophyllum*, *Pterocarpus marsupium* and *Asperagus racemosus* have been successfully cultivated.

3.5 Plants banned for Extraction

Conservation of International Trade in Endangered Species (CITES) of wild Fauna and flora (CITES) and Botanical survey of India has identified 75 plants under these categories. Out of which 34 have been marked as critically endangered. In view of this, such species are banned for extraction.² The State level medicinal plants extraction committee of Uttarakhand has proposed the ban on 27 species in three different categories as follow: -

(A) Complete ban on Extraction

1. *Dactylorrhiza hatagiara*
2. *Habenaria* spp.

² Gol, however, have banned 29 Species for exports, as per notification No.24 (RE-98)/ 1997-2002, dated 14th October 1998. Refer Annex 8.1, for details.

3. *Swertia chirata*
4. *Podophyllum hexandrum*
5. *Gentiana kurroa*
6. *Nardostachys jatamansi*
7. *Dioscorea deltoidea*
8. *Berberis aristata*
9. *Fritilaria roylei*
10. *Lilium polyphyllum*
11. *Pamelia spp.*

(B) Ban on Extraction from Wild but not for Cultivation

1. *Aconitum hetrophyllum*
2. *Aconitum balfourii*
3. *Picrorrhiza kurroa*
4. *Rauvolfia serpentina*
5. *Gloriosa superba*
6. *Tinospora cordifolia*
7. *Angelica glauca*
8. *Arnebica benthamii*
9. *Rheum spp.*
10. *Allium spp.*
11. *Valeriana wallichii*
12. *Bergenia ligulata*
13. *Coleus barbatus*

(C) Species open for Restriction

1. *Saussurea costus*
2. *Cinnamomum tamala*
3. All *Terminalia spp.*

3.6 Institutional Support

To overcome problems of medicinal and aromatic plants (MAPs) conservation, institutional support has to be developed. Non-government organizations (NGOs), central and state Governments, research institutions and funding Agencies as the key players in this field, if coordinated well can play a vital role for Inventriozation, germplasam, and policy for regenerative cultivation. The institutions, which can take responsibility for both stakes and management of forest resources, are:

(1) Forest Departments (Gol & SFD), (2) local institutions, (3) NGOs, (4) industries, (5) international communities, (6) International funding organizations.

The international conventions on bio-diversity conservation combating desertification, climate change and disposal of hazardous substances have

drawn support of institutions like, IUCN, WWF, UNDP, FAO, SIDA, WB, IDRC, JICA, etc., to work together for conservation of medicinal herbs.

A number of donor agencies are assisting forestry development in developing countries through social forestry, bio-diversity conservation, productivity and livelihood enhancement programmes, natural resources management for watershed development, draught proofing etc.

Forest based industries are facing acute shortage of raw material supply. The availability of wastelands outside forest areas could be a land resource for raising such plants in meeting industrial demand of raw materials supply. The mechanisms could be growing these plants directly by the industries or through individuals, SHGs, or other community based organizations (CBOs) or cooperatives under buy-back system. This will make units self-reliant or have assured supply besides providing necessary environmental and social security.

NGOs have the pivotal role in motivating and providing training facilities to villagers and farmers interested in growing medicinal plants on their field or around homestead for diversifying their existing livelihood on offering alternatives for their economic development. But the funding agencies should come forward to support their endeavor to start with and till the individuals / CBOs develop a sustainable financial base and arrangements of their own.

Recently Central Government has established a National Medicinal Plants Board (NMPB) to create awareness to the people regarding importance of cultivating medicinal plants along with providing funds for this cause. It has also promoted setting up of State Medicinal Plant Boards (SMPBs) throughout the country to meet the challenge of increase of production and degradation of medicinal plants bio-diversity. Such arrangements are doing well and some significant results are also coming out.

At the state level and block level, some co-operative societies based on medicinal plant cultivation and its trading are required to be established so that the problem of demand and supply of medicinal plants could be met. Cultivation on private and government lands will also decrease the pressure on the wild extraction resulting in conservation of MAPs in its natural habitat, along with the improvement of socio-economic status of growers. In this respect state or central government should provide training facilities in the villages to generate awareness of medicinal plants, their cultivation, harvesting, drying, storage and marketing.

Research institutions and State Forest Departments have a larger role in sustainable development of medicinal plants. Efforts have to be made for preserving these plants *in-situ* by way of controlling over-exploitation, unscientific harvesting, protecting the plants in reserved forests and by enforcing legal channels so that endangered species do not become extinct.

On the other hand efforts should also be made to undertake propagation and cultivation of such plants by raising planting materials in the forest nurseries while encouraging local people to undertake cultivation in their field with some initial financial support and assured marketing opportunities. Besides this, the perception of tribal and local people should be updated to the renewed and enlarged with importance and H & MPs and motivate them for preservation and growth of such plants.

Regional Research Laboratory, Jammu (RRL) has experience of last 60 years in the field of medicinal plants and they have been constantly updating their know-how. They have inventorised 75 species in the Himalayan region. RRL has undertaken ethno-botanical studies and can match international standards and has also been recognized as one of the four gene banks for *ex-situ* conservation. This laboratory can help in chemical analysis of the plant material.

The Government of India has delineated areas of operation between the Department of Biotechnology and National Medicinal Plant Board related to sanctioning of the projects on medicinal plants. It is now as a policy that the Projects related to the research and development of medicinal plants have to be submitted to the department of Biotechnology and the Project related to cultivation, value addition, marketing and preparation of quality planting material and for capacity building has to be submitted to the National Medicinal Plants Board.

3.7 Infrastructure Facilities

All the state and centrally governed research institutions have reasonable infrastructure facilities to conduct research on MAPs for their conservation and preservation. Even state forest departments were having a research wing in the past headed by the State Silviculturist, which seems to have become unoperative in some of the states. But still there are several well established nurseries under the forest departments. This infrastructure can be utilized to produce quality-planting materials of important MAPs and supplied to interested growers on subsidized rates, but not free, for mass cultivation in their fields. This will encourage natural regeneration of the plants, which are of relatively in abundance, and in areas having poor plant density within or outside the forests and help reduce wild harvesting.

It is the urgent need for developing medi-culture techniques of endangered and, rare species. This could be very well done by the research institutions, under Indian Council of Forestry Research & Education (ICFRE) / Forest Research Institute (FRI), Dehra Dun; Council of Indian Medicinal and Aromatic Plants, (CIMA), Lucknow; Council of Scientific and Industrial Research (CSIR); Indian Council of Agriculture Research (ICAR), and Regional Research Laboratory, Jammu, similar ones in some other states. etc. These Institutions have well qualified personnel and expertise in

development of medicinal plants and should be utilized to standardize cultivation techniques of such species and provide technical know-how to forest departments and other growers of planting materials so that these species could be multiplied for mass cultivation to meet the ever-increasing demand by the drug industries based on plants.

3.8 Marketing Techniques

Medicinal plants are generally marketed in private sector where intermediaries / middlemen keep a strong control in the market because they provide the collectors' three essential source, viz. quick credit, quick and non-bureaucratic payment and good organization. Middlemen also play an important role by centralizing supply among dispersed producers and help to absorb risk in markets that require product volumes too large for individual produce to provide.

The middlemen, on the other hand, often exploit collectors' ignorance of market factors and claim a disproportionate share of producer's value for themselves. With increased availability of market information, producers will have the potential to strengthen their position in markets and possibly get higher prices. Access to market information, therefore, crucial and will result in increased awareness of marketing practices in general. Therefore, a system is needed that can help local communities as well as others involved in collection and cultivation of medicinal plants to access market information regularly, reliably, timely and at a lowest possible cost.

Due to the inherent limitations of different *Bheshaj Sanghs*, co-operative societies to provide marketing assistance to producers, the collected plants are sold without any values addition, directly in the markets at very low rates. The societies have no source of any kind of market information. Now, Forest Research Institute, Dehra Dun has started sending market information on prevailing prices in important market, list of buyers, cultivation techniques, etc., in the form of a quarterly Marketing Information System newsletter to these societies. The newsletter is also sent to *Bheshaj Sanghs*, Forest Department and other agencies.

But in reality, traders at the road head and along the main trails are the critical link between medicinal plants and the market. They receive market information on species and price along with cash advances from big wholesalers from the plains and they are the first **major point of transaction for local collectors**. This is illustrated in Fig 3.1.



Fig 3.1: Major points of transaction for local collectors

A number of opportunistic buyers from outside or owners of Companies / Industries periodically visit the region in search of more direct supplies.

Resident traders have their own territories based on kin relationship. The road-head prices can be competitive and a collector is free to sell as he pleases. Traders can play a very important role in village economy by providing a much-required credit, cash and marketing assistance. Traders and collectors may also be bound together by a mutually beneficial ritual brotherhood. But some traders may force collectors to sell exclusively to them for which safe guards are needed.

Under these circumstances, producer is the worst sufferer because he gets very little amount of his produce, whereas, the village traders get ten times more profit than the collectors. When the same produce goes to big traders, he sells at still higher cost. The wholesale traders sells it to industries and the industry owner sells with a very big profit after processing and some value addition. Therefore, to develop marketing systems that provide greater benefits to the producers, the following is needed:

- Local management of medicinal plants.

- Co-operative system.
- Removal of restrictions.
- Facilities for first hand processing and value addition.
- Market analysis and dynamic producers-buyers arrangements.

In this respect, Government should set certain norms and safeguards so that producers may not be exploited rather they could be benefited. This will increase the interest of growers and they will adopt cultivation of medicinal plants at a large scale and will also conserve this natural resource in public interest. The cultivation of species, which are banned for collection, should be encouraged, as prices are high for such species in the market.

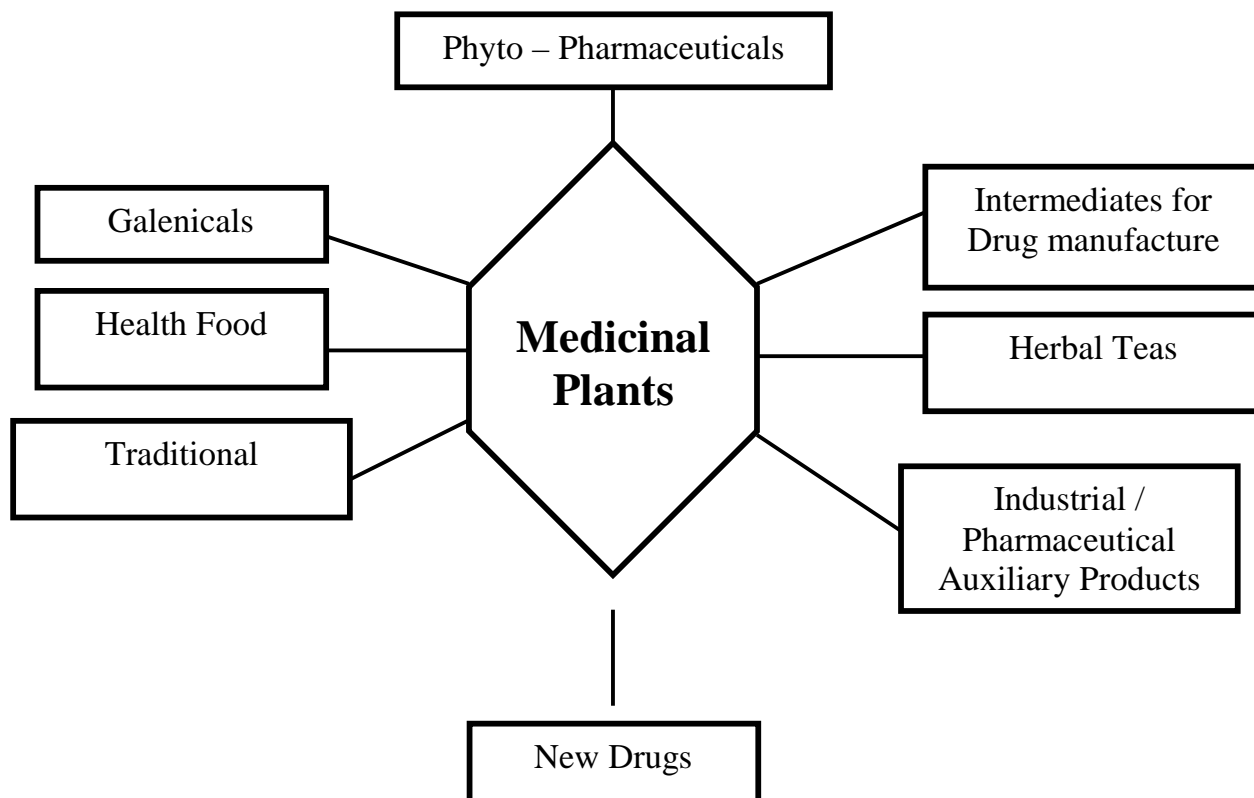
3.9 Processing and Forward Linkages

Establishment of processing and first level or semi-processing units in the form of small cottage industries based on medicinal plants at the village level in the inaccessible, remote and far-flung areas will ensure better profit to the primary growers or collectors. It will not only reduce the transportation, cartage and packing costs of raw materials but will also get higher benefit along with employment to local people. Semi-processing unit will perform cleaning and grading at the collectors / growers level which will enhance the price and also improve the quality of the materials. The value addition of medicinal plants may involve activities like drying, powdering, making concentrates, boiling and distilling, etc., which may be done at village level but it must ensure the quality of the final material.

The semi-processing and value addition at the grower / collector level might become acceptable provided there is an assured buy-back arrangement with an industry, exporter or big traders.

Processing of Traditional Medicines: The medicines for internal use prepared in the traditional manner involve simple methods such as hot or cold-water treatment, extraction of juice after crushing, powdering of dried material, and formulation of powder into pastes via a medium such as water, oil or honey, and even fermentation after adding sugar sauce. The range of products that could be obtained from medicinal plants is shown in Fig 3.2.

Fig 3.2 Industrial Uses of Medicinal Plants



Source: FAO Bull. No. 11, 1997

The *Vaidyas* themselves who were able to identify the authentic plant species produced traditional herbal medicines using age-old methods. This practice of the traditional practitioner dispensing his own medicines is being gradually shifted to herbal drug stores, which are profit-oriented. As a result, there is no guarantee of the authenticity and quantity of plant material used in the preparation. The quality of traditional medicines so produced varies widely and may not even be effective. There is an urgent need to select proper and appropriate technologies for the industrial production of traditional medicines so that the effectiveness of the drug is maintained. Thus, modified and improved technologies, which are available these days, should be employed to make them more effective, stable, and reproducible as per set standard, controlled in dosage form that can easily be transported.

Therefore, simple and low-cost technologies could immediately employed with labour-intensive nature along with activities for conservation of bio-diversity through traditional knowledge and skill of small-scale production and preservation of the products.

Value Added Products: The value of medicinal plants as a source of foreign exchange for developing countries depends on the use of those plants as raw materials in the pharmaceutical industry. The raw materials are used to:

- Isolate pure active ingredients for formulation into drugs, e.g. reserpine, taxol, diosgenin, etc.
- Isolate intermediate for the production of semi-synthetic drugs.
- Prepare standardized galenicals (extracts, powders, tinctures, etc).

If one is to produce known pure phyto-pharmaceuticals used in modern medicines, more processing stages and more sophisticated machinery would be required, which could be capital intensive. The drug produced will be more expensive which will be beyond the buying capacity of the poor.

Certain medicinal plants are rich source of intermediates used in the production of drugs. The primary processing of plant parts containing intermediates could be carried out in our country, thus retaining some value of the resource material, such as, diosgenin (from *Dioscorea* spp.) and hecogenin (from *Agave sisilana*) used in the production of steroids can be commercially produced in the countries of origin where there are steady supplies of sufficient raw materials could be sustained.

3.10 International Trade

Volume Traded

Table – 3.1: Global Imports of Vegetable Alkaloids, Glycosides and their Derivatives

Year	Imports of vegetable alkaloids and derivatives standards (Million kg)	Imports of glycosides and derivatives standards (Million kg)
1988	13, 839, 193	1, 984, 916
1990	12, 516, 068	3, 016, 647
1991	11, 412, 323	2, 929, 112

Source: United Nations Statistical Division (1992)

Table – 3.2: India's Exports and Imports of Medicinal and Aromatic Commodities

Export

2000 – 2001		2001 – 2002		2002 – 2003	
Quantity (Kg)	Value (Rs)	Quantity (Kg)	Value (Rs)	Quantity (Kg)	Value (Rs)
41991185	3395364545	47352814	3616045887	43168427	3164513210

Import

2000 – 2001		2001 – 2002		2002 – 2003	
Quantity (Kg)	Value (Rs)	Quantity (Kg)	Value (Rs)	Quantity (Kg)	Value (Rs)
6134391	235088947	5370815	25509801	6673467	385784977

The above table reveals that the export has increased during 2001 – 2002 but declined during 2002 – 2003. While import has declined during 2001 – 2002 but increased during 2002 – 2003. Therefore, it is essential to devise such measures to boost cultivation of such medicinal plants, which have export value and also potential to reduce imports. This can be only achieved if people's participation will be encouraged from village to state level by giving incentives to the farmers and growers. Thus reducing import will reduce the burden on the exchequer of the country and improve country's economy through export.

The main geographical areas supplying medicinal plants to Germany are listed below which provide an understanding of the source of material used in Europe and North America.

Table – 3.3: Major supplying Countries and Regions

Geographical Areas	1993	1994
Europe (+ regions of former USSR)	11, 932.4	14, 062.9
Asia	7, 518.1	7, 708.1
Africa	6, 047.7	7, 374.8
America	6, 258.4	5, 065.0
Australia & New Zealand	419.3	416.5
Others	129.8	734.9

Volume Tones

Table – 3.4: Leading Exporters of Medicinal Plants

Country	Value in excess of US \$ 10, 000, 000	
	Unit US \$ ' 000, 1995	Index 1995 / 1991
SUM WORLD	879, 757	136
China	337, 162	204
Germany	49, 887	89
USA, Puerto Rico, US Virgin Islands	36, 269	146
France	23, 505	84
OTHER ASIA	23, 148	84
Korea Rep.	20, 125	112
Bulgaria	16, 049	111
Italy	15, 865	125
Thailand	15, 806	100
Vietnam	15, 237	283
Egypt	13, 789	109
Hong Kong	12, 767	103
Chile	10, 582	239
Morocco	10, 558	89
Albania	10, 036	102

Major Importing Countries and Regions

Germany: During the last three years, 40, 000 tones of medicinal plants were imported annually into Germany with a value of US \$ 109 million (DM 160 million). These were from 109 countries and one-third of the material was re-exported as finished plant based products, mainly to western Europe and the United States.

North America: The annual turnover of the plant derived pharmaceutical industry in the US is US \$ 10 billion. Retail sales of the herbal medicines industry in 1994 were estimated at US \$ 1.6 billion. The major part of material is sourced from Europe and Asia. Over the last four years, demand in North America for Latin American herbs and Chinese and Indian materials have also been significant.

Asia: The major importers of medicinal plant material are Germany, China (via Hong Kong and Singapore) and Japan.

Table – 3.5: Leading Importers
Value in excess of US \$ 10, 000, 000

Country	Unit US \$ ' 000, 1994	Index 1995 / 1991
SUM WORLD	824, 212	227
Hong Kong	125, 277	1, 092
Germany	86, 496	166
Japan	73, 927	328
Singapore	60, 519	729
OTHER ASIA	57, 004	232
Korea Rep.	49, 884	2, 219
France	49, 748	206
USA, PR, US VI	47, 787	110
Malaysia	36, 068	244
Italy	22, 629	140
Switzerland	17, 649	144
United Kingdom	17, 504	150
Spain	15, 636	121
Saudi Arabia	15, 314	192
United Arab Emirates	12, 572	237
Canada	12, 507	147
Belgium / Luxemburg	11, 396	100
Netherlands	11, 104	108

3.11 Indian Trade

The trade in crude drug is largely unorganized and statistics on their production and utilization are generally not available. Medicinal plants / crude drugs are good foreign exchange earners involving low transportation cost. To boost indigenous production and to avoid imports of crude drugs, the cultivation and exploitation of indigenous and exotic medicinal plants should be encouraged in various land based programmes, such as forest development action plans, integrated watershed development projects, programmes for draught proofing or flood moderation, eco-development or regeneration. The models like farm forestry, multi-tier or multi-canopy forests in forest and non-forest areas.

The demand of plant based raw materials for pharmaceuticals are increasing enormously day by day. Yet the value of medicinal plants related trade in India is only Rs. 5.5 billion per year (as per report of the Export - Import Bank of India, 1997) while world trade is over US \$ 60 billion and is rapidly growing. Thus India has only 0.5% share in the global export market of medicinal plants. It has been projected by the Planning Commission of India that there is a need to enhance our export by Rs. 5000 crores annually which can generate employment and income to approximately 2 crores families. The details of the export and import of medicinal plants is given in Table– 3.6.

Table – 3.6: Quantity of Medical Plants Exported and Imported
during 1991-92 to 1996-97

Year	Exported		Imported	
	Qty. (Tonnes)	Value (Rs. In Lakhs)	Qty. (Tonnes)	Value (Rs. In Lakhs)
1991-92	387444.43	19485.66	3566.97	1426.16
1992-93	37405.18	20030.82	2987.97	1629.02
1993-94	32948.78	22391.03	4341.92	1346.36
1994-95	35953.07	28280.73	4467.34	1662.13
1995-96	35493.85	31301.50	2623.70	2032.45
1996-97	42592.97	40814.00	5977.38	4428.09

Areas of Immediate Action:

In view of the current scenario analyzed in the preceding paragraphs, and in order to boost the production and productivity coupled with conservation of India's rich natural resources of H & MP, besides providing employment / income opportunities to large number of rural and urban families, the areas for action are: -

1. Increasing awareness regarding biodiversity conservation and importance of medicinal plants and its sustainable use.
2. Conducting survey through a competent agency in order to assess the availability, demand and supply of medicinal herbs & plants both from the wild and cultivated sources.
3. Devoting special attention on endangered, vulnerable and threatened species and on their conservation by evolving regulatory system to impose ban in phases on harvesting these from their natural homes or habitats.
4. Conducting research on all aspects of medicinal herbs & plants with special emphasis on improving their productivity, medicinal qualities, availability of appropriate planting materials, storages, processing and value addition and adaptability, to grow under various *ex-situ* conditions.
5. Co-ordinating multi-locational trials in developing cultivation techniques of important medicinal plants.
6. Studying marketing chain with a view to increase profitability to growers.
7. Marketing and Trade issues.

Linking Conservation to Business and Local Communities

The approach of enterprise-based conservation can positively link enterprise to biodiversity conservation. Community enterprises are effective at biodiversity conservation when these are directly linked to multiple uses of *in-situ* bio-diversity; this generates awareness of communities as stakeholders and of short-term and long-term benefits; and the enterprises link to an appropriate rights system. It is important to establish enterprises that add value to the resources, change destructive practices and allow communities to feel that they are earning decent income and the intervention either of promotional or regulatory ones are needed to sustain the incomes. NMPB in collaboration with counterparts, industrial communities, CSIR etc. can bring this sea change in approach and build-up a firm linkage between business and local communities.

Transfer of Technology from Lab to Land

The Indian Council of Forestry Research and Education, Dehra Dun, Regional Research Laboratories, Central Institute of Medicinal and Aromatic Plants, other Universities and certain private research labs of major *Ayurvedic* Firms have developed standardized propagation techniques for medicinal herbs. Efforts should be made to transfer such technologies to the grass root level. A large number of species of medicinal herbs & plants are in great demand but due to lack of standardized propagation materials and, techniques, are gradually getting threatened in the wild. Efforts should to sponsor research and development programmes on efficient propagation techniques of such species and their adoption by the foresters, JFM committees, primary co-operatives, private industries and farmers / growers.

3.12 Indian Medicinal Plants and Herbs in International Context

In spite of tremendous development in the field of synthetic drugs and antibiotics during the 20th century, plants still continue to be a major source of drugs in modern as well as traditional systems of medicine throughout the world.

India is a veritable emporium of medicinal plants, because of varied physiography, soil and climatic conditions. The number of medicinal plants in India, both indigenous and exotic, has been variously put at between 3, 000 to 3, 500 species. Sixteen medicinal plants of exotic origin, introduced in India years back, are now considered as a part of India's medicinal plants resources. Notable among these are, *Senna*, *Psyllium*, *Belladonna*, *Cinchona*, *Eucalyptus*, *Ipecac*, *Digitalis* and *Mexican Dioscorea*. The number of plants having confirmed therapeutic properties or yielding a useful chemical compound thus lays around 700 species. Out of these the plants providing

largely or regularly used raw materials by Indian Drug and Pharmaceutical Industry are about 335, including those whose materials are imported from other countries. Some of which are liquorices, henbane, cassia bark, galangal, ephedra, long pepper and star anise are used in large quantities.

India ranks foremost after South Korea in the supply of medicinal plants to the industrialized countries of the west, where demand for natural drug has been on the increase in recent years. Nearly three fourth of the drugs mentioned in the various pharmacopoeia are found in their natural state in India, since the climate and geographical conditions are congenial for commercial growing of indigenous and exotic medicinal plants.

The Chinese government has prioritized "The Chinese System Medicine" (TCM) as an important area of development. The policy of the Chinese Ministry of Public Health is to strengthen the village doctors' network and increase the extent to which TCM is used in western medicinal hospitals as well as increase the number of TCM hospitals.

Chinese policy for the industry is implemented by the State Administration of Traditional Chinese Medicine and has been defined as follows:

- Establishing comprehensive scientific research facilities.
- Expanding R & D of new and improved Chinese medicines.
- Improving the industrial quality of Chinese medicine through technological progression.
- Raising the industry' s standards to western level.
- Increasing exports to western markets.
- Expanding the use of Chinese medicines in emergency care.

Out of the Total number of medicinal plants in China, 1000 are in common use. Of these, 200 are cultivated and the remaining, 800 are wild harvested. Chinese consider wild harvested materials as medically more effective.

In India too, some corrective actions at national, state and grass-root levels are needed to develop markets, raise and standardize the norms of exportable items with a view to mount an aggressive drive to capture international market.

3.13 Summary of Key Issues

3.13.1 Herbal Medicines

Due to increase in health care costs, government is encouraging the use of indigenous system of traditional medicine rather than expensive synthetic drugs. It is reported that around 80% of the world's population have still trust on traditional system of medicine. Herbal medicines include herbs, herbal

preparations and finished herbal products that contain active principles of plant parts, or other plant materials, or combinations. Traditional use of herbal medicines has a long historical use of these medicines. Their use is well established and widely acknowledged to be safe and effective and is globally accepted. The chemical composition present in them is a part of the physiological function of living flora and hence they are believed to have better compatibility with the human body. The earliest recorded evidence of their use in Indian texts dates back to about 5000 years. The classical Indian texts include **Rig Veda**, **Atharva Veda**, **Charaka Samhita** and **Shushruta Samhita**. The herbal health care have therefore, been derived from rich traditions or ancient civilizations and scientific heritage which came to the present generations through primarily oral traditions.

Medicinal plant parts should be authentic and free from pesticides, heavy materials, microbial or radioactive contamination, etc. The extract should be got checked for indicated biological activity on animals. The bioactive extract should be standardized on the basis of active constituents or major compounds.

The raw herbal material used for value added products must be used for:

- Isolation of active principles for formulation into drugs.
- Isolation of Intermediates for the production of semi – synthetic drugs.
- Preparation of standardized galenicals (extracts, powders, tinctures, etc).

India is a gold mine of herbal medicines with well-recorded and well practiced knowledge of traditional system of herbal medicines. But India has not been able to capitalize on this herbal wealth like China by promoting its use in the developed world despite their renewed interest in herbal medicines. This can be achieved by judicious product identification based on diseases found in the developed world for which no medicine or therapy is available. Therefore, the quality control measures of the raw materials, finished and processed products are very essential to compete in the international market.

3.13.2 Herbal Medicinal Market

World Health organization (WHO) has estimated that the present demand of medicinal plants is about US \$ 14 billion a year and the projected demand by the year 2050 is US \$ 5 trillion. Medicinal plant related trade in India is estimated to be around Rs. 550 crores per year. While the value of global trade in medicinal plants has been put at over \$ 60 billion per year, of which India's total turnover of Rs. 2300 crores (US \$ 551 million) of *Ayurvedic* herbal products, major over-the-counter (OTC) products contribute around Rs. 1200 crores, other formulations fetch around Rs. 650 crores, while the classical *Ayurvedic* formulations contribute the remaining Rs. 450 crores. The export market for herbal medicines appears to be growing faster than the Indian

domestic market, especially with encouraging magnitudes resulting from contract farming of species in demand in foreign markets. Again considering demand of individual species from export and domestic market also has a huge untapped potential for more than 500 species. The domestic market comprises of the formal industrial or pharmaceutical demand, and the demand of traditional practitioners. There is a consistent demand for the natural resources over long periods when they are used in domestic markets; while the demand for export markets have shown fluctuations. This has direct impact on the socio-economic conditions of the medicinal plant suppliers and cultivators. Therefore, it is urgently required to evolve appropriate strategies for supply linkages based on market tendencies.

3.13.3 Herbal Market Scenario in India

One of the important steps required is to ensure better economic returns to collectors and cultivators of medicinal plants. These people, while very knowledgeable of the different species growing in their areas, are often not sufficiently aware of the markets. Usually traders or their representatives, visiting local areas are the only source of market information used by the local collectors. Availability and access of market information is key to improving returns to producers of medicinal plants. The information is needed on demand, supply, end uses, distribution channels, product promotion, prices, marketing environment and institutions related to marketing. Even simple interventions, such as, better method of collection, storage, grading and local level value addition can substantially improve returns to local people. Therefore, a system is required that can help local people as well as others involved in collection and cultivation of herbal plants, to access market information regularly, reliably, timely and at a lowest possible cost.

3.14.4 Conservation

Due to rapid expansion of pharmaceutical industries, the ever-increasing demand of raw materials of better quality and quantity, it is urgently required to preserve and conserve the rare, vulnerable, threatened and likely to be extinct medicinal plants. Thus an urgent attention is also needed to bring domestication and commercial cultivation under different agro-climatic condition of their survival and to meet the present demand of the industries. It will favour to unregulated collection of the medicinal plant which has resulted depletion of our natural resources of several important drug yielding plants. Therefore, to meet the ever increasing demand of medicinal raw materials for the industries, it is the prime time for their systematic cultivation on large scale. Thus industries can get genuine raw material and the practice of adulteration will be checked. The major bottleneck in the Indian system of medicine is the procurement of authentic medicinal plants harvested at an appropriate time and season having adequate active principles to get maximum efficacy of the drug. Keeping in view, the increasing demand of

medicinal plants, the answer lies in the cultivation, exploitation and preservation vs. conservation of medicinal plants on scientific lines.

If concrete steps are not taken immediately, we may lose their gene-pool and also, they will not be available to mankind forever. The problem of total extinction of these plants can be tackled in the following ways:

- (i) Creation of germ plasm of medicinal plants for their conservation in different Himalayan zone and their proper identification.
- (ii) Mass propagation of medicinal plants through vegetative propagation or tissue culture so that demand can be met.
- (iii) Developing technique of mass propagation to reduce pressure on their exploitation from its natural habitat.
- (iv) Provenance trials of important medicinal plants to identify and propagate the best genotype.

In addition to above, it is recommended to observe the following measures to conserve the biodiversity of medicinal plants of our country:

- (i) The Bio-diversity of medicinal plants exists not only in different species but also within species. If bio-diversity is to be conserved then quantitative and qualitative assessment of bio-diversity should be priority of research.
- (ii) Continuous inventory system of assessment of bio-diversity of medicinal plants should be attempted and monitoring of biodiversity should be done.
- (iii) Central act of bio-diversity of medicinal plants should be made incorporating Forest Acts of different States.
- (iv) Promotion of sustainable use of bio-diversity of medicinal plants in sectors, such as agriculture, animal husbandry, fisheries, forestry and for exports.
- (v) *Ex-situ* conservation of bio-diversity of medicinal plants should be enhanced keeping in view bio-relevance and bio-diversity significance of resource management at all levels.
- (vi) Participation of communities, people and other stakeholders do have lot of role to play. If participation is to be made effective then capital bio-diversity resource of medicinal plants should be harvested from wasteland areas on sustainable basis and equity should be shared equally among the participants.

3.14 Emerging Trends:

In spite of tremendous development in the field of modern system of treatment, vegetable drugs in modern as well as in Indian systems of medicine are playing major role in health care of the human being throughout the world. As a result of this new trend doctors have now turned to alternative treatments, and in particular treatments that make use of medicinal plants. They are now quite willing to place their trust in the competence of phytotherapists.

Though there is a close relationship between the forest and the pharmaceuticals, very little effort has been made to maintain, manage and conserve our richest bio-diversity of medicinal plant. Now it is well known that the plant remedies are harmless, provided they are selected and harvested at proper time and development of medicines is under the expert medical guidance of herbalist.

A number of important and efficacious medicinal plants have become rare and nearly extinct because of indiscriminate exploitation, deforestation and also due to biotic interference. This has not only disturbed the ecology of a particular region, but also resulted in the non-availability of important raw materials for the pharmaceutical industries. The responsibility, therefore, lies on the scientists and the foresters to maintain the richness of bio-diversity of medicinal plants of this planet and especially of India.

Annex-3.1: Notification prohibiting the export of medicinal plants

Ministry of Commerce, Government of India

Notification No. 24 (RE-98)/1997-2002

New Delhi, dated 14 October 1998

S.O. (E) Attention is invited to para 4 of Notification no. 2(RE098)/1997-2002 dated the 13th April, 1998 relating to export of plants, plant portion and their derivatives and extracts obtained from the wild.

In exercise of the powers conferred under Section 5 of the Foreign Trade Development & Regulation Act, 1992 (No. 22 of 1992) read with paragraph 4.1 of the Export and Import Policy 1997-2002, the Central Government hereby makes the following amendment in the Schedule 2 Appendix 2 of the book titled “ITO (HS) classification of Export and Import items 1997-2002” relating to export of plants, plant portions and their derivatives and extracts obtained from the wild.

The export of under-mentioned 29 plants, plant portions and their derivatives and extracts as such obtained from the wild except the formulations* made therefrom, is prohibited.

Cycas beddomei (Beddomes cycad)
Vanda coerulea (Blue Vanda)
Saussurea costus
Paphiopedilium species (Ladies slipper orchids)
Nepenthes khasiana (Pitcher plant)
Renanthera imschootiana (Red Vanda)
Rauwolfia serpentina (Sarpagandha)
Ceropegia species
Frerea indica (Shindal Mankundi)
Podophyllum hexandrum (emodi) (Indian Podophyllum)
Cyatheaceae species (Tree Ferns)
Cycadaceae species
Dioscorea deltoidea (Elephant’s foot)
Euphorbia species (Euphorbias)
Orchidaceae species (Orchids)
Pterocarpus santalinus (Red Sanders)
Taxus wallichiana (Common Yew or Birmi leaves)
Aquilaria malaccensis (Agarwood)
Acibitum species
Coptis teeta
Coscinium Fenestratum (Calumba wood)
Dactylorhiza hatagirea
Gentiana kurroo (Kuru, Kutki)
Gnetum species
Kamphergia galenga
Nardostachys grandiflora
Panax pseudoginseng
Picrorrhiza kurroa
Swertia chirata (Charayatah)

*"Pilot Study of the Mechanism for Sustainable Development & Promotion of
Herbal & Medicinal Plants" In the State of Uttarakhand*
FINAL REPORT

*The term "formulation" used here shall include products, which may contain portions/extracts of plants on the prohibited list but only in unrecognisable and physically inseparable form.

Plants and plant portions, derivatives and extracts of the cultivated varieties on the above plant species (excluding Sl. No. 16) will be allowed for export subject to production of Certificate of Cultivation from the Regional Deputy Director (Wildlife), or Chief Conservator of Forests or Divisional Forest Officers of the State concerned from where these plants and plant portions have been procured. However, in respect of the cultivated varieties of the species as covered by Appendix 1 (Sl.No.1 of 6 of Paragraph 2 (1) above and Appendix 2 (Sl. No. 7 to 18 and Sl. No. 26 & 28) of Para 2 (1) above, CITES permit for export will also be required.

The value added formulations, as defined under sub-para (1) of paragraph 2 above, made out of imported species of plants and plant portions as specified in Sub-para (1) Paragraph 2 will now be allowed to be exported freely without any restriction subject to furnishing of an affidavit to the Customs authorities at the time of export that only the imported plant species as above have been used for the manufacture of value added formulations being exported. In the event of affidavit proving to be false, on the basis of random sample tests, actions would be initiated against the firm under the Foreign Trade (Development & Regulation) Act, 1992.

All formulations - herbal/ *ayurvedic* medicines, where the label does not mention any ingredients extracted from these prohibited plants shall be freely exportable without the requirement of any certification from any authorities whatsoever.

Export allowed only through the ports of Mumbai, Calcutta, Cochin, Delhi, Chennai, Tuticorin and Amritsar.

This is issued in public interest.

Sd/-
(N.L. Lakhanpal)
Director General of Foreign Trade

sdfas

CHAPTER – 4: HERBS AND MEDICINAL PLANTS – THE UTTARANCHAL SCENARIO 41-74

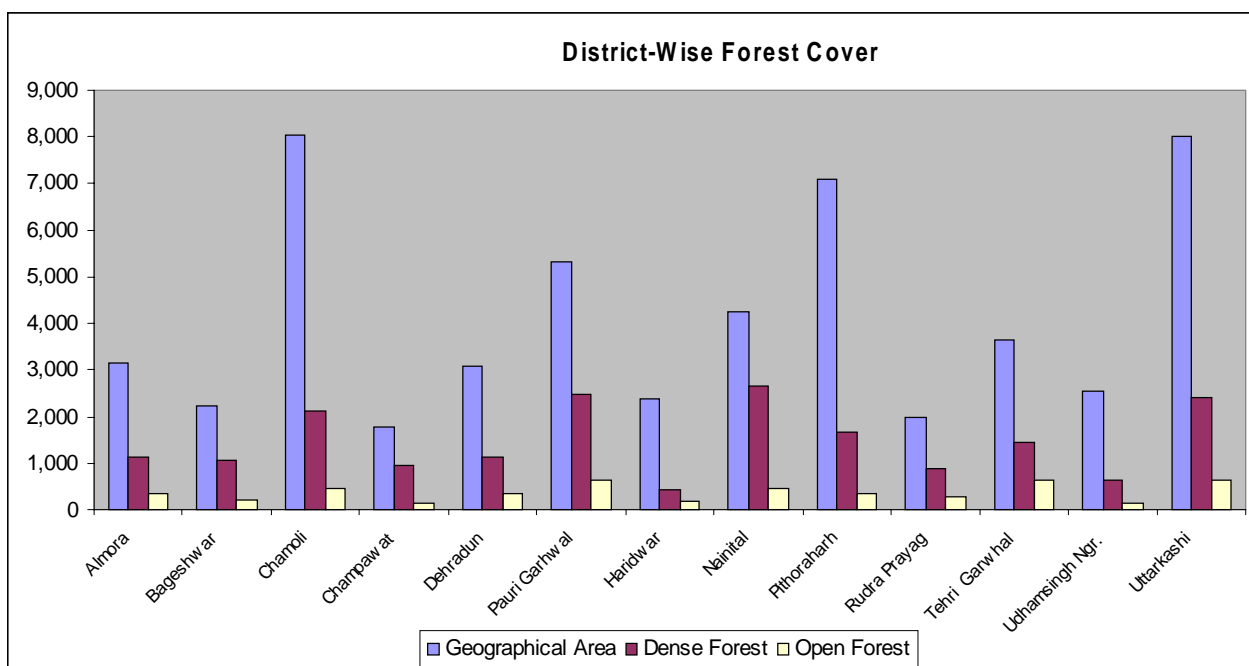
- 4.1 Demographic Profile of the State
 - Table-4.1: District-wise Forest Cover
- 4.2 Forest Description
- 4.2 Recorded Forest Area:
 - Table 4.2: Forest area under different types
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- 4.6 Zonal Availability of Flora in the State
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 - Cultivation Practices
 - Implications

Annex-4.1: Available Seedlings of Medicinal Plants species with Forest Department in Garhwal Mandal (As at end of February 2004)

Annex 4.2: Available Seedlings Medicinal Plant Species with Forest Department in Kumaon Mandal (As at end of February 2004)



District-wise Forest Cover

(Area in sq. Km)

District	Geographical Area	Forest Cover				
		Dense forest	Open forest	Total	Percentage	Scrub
01. Almora	3,139	1,143	352	1,495	47.63	10
02. Bageshwar	2,246	1,079	218	1,297	57.75	11
03. Chamoli	8,030	2,115	468	2,583	32.17	24
04. Champawat	1,766	973	152	1,125	63.70	9
05. Dehradun	3,088	1,124	362	1,486	48.12	71
06. P Garhwal	5,329	2,492	650	3,142	58.96	95
07. Haridwar	2,360	418	194	612	25.93	0
08. Nainital	4,251	2,645	463	3,108	73.11	14
09. Pithoraharh	7,090	1,670	363	2,033	28.67	71
10. Rudra Prayag	1,984	880	273	1,153	58.11	16
11. Tehri Garwhal	3,642	1,437	627	2,064	56.67	176
12. Udham Singh Ngr.	2,542	623	146	769	30.25	0
13. Uttarkashi	8,016	2,424	647	3,071	38.31	101
Total	53,483	19,023	4,915	23,938	44.76	598

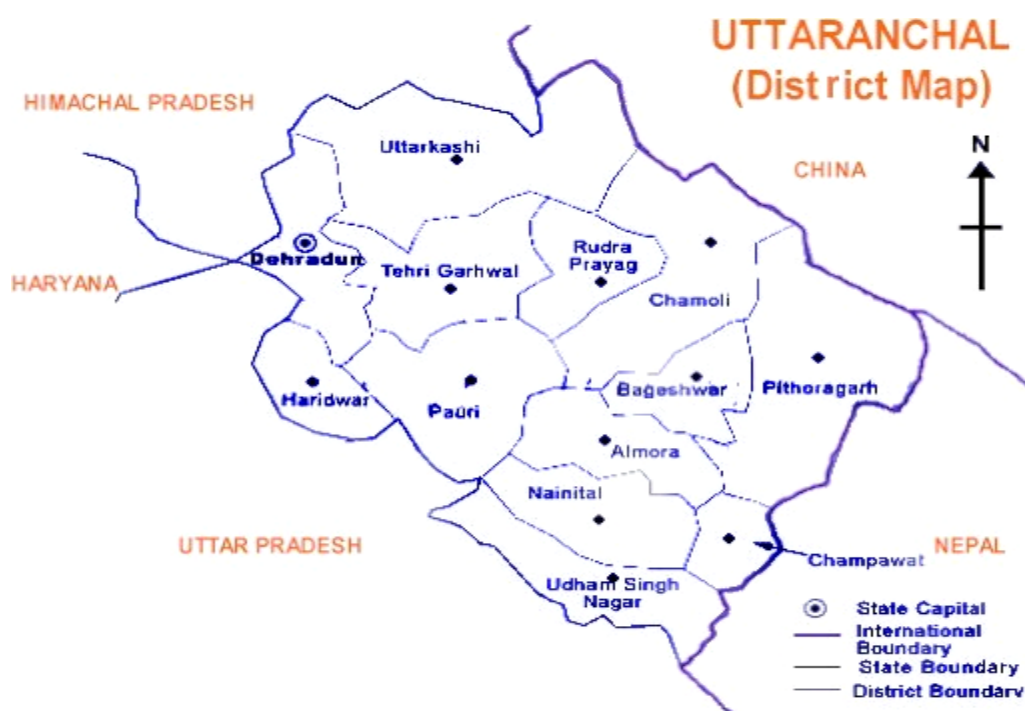
Source: State of Forest Report – 2001, Forest Survey of India, MoEF, GoI

CHAPTER – 4

MEDICINAL PLANTS AND HERBS – THE UTTARANCHAL SCENARIO

4.1 Demographic Profile of the State

There are 13 Districts in Uttarakhand, mostly located in hilly region having an overwhelming rural bias. The State has a rich repository of herbal and medicinal plants (H & MP). Many of these herbs and plants are of high repute in *Ayurveda* and other systems of natural medicine. The total geographical area of the State is 53,483 sq. km. having 23,938 sq. km. forest cover. The forest cover is over 44.73 percent of geographical area and of country's forest area is 4.50 percent.



The District-wise forest cover is given in the Table – 4.1 and, chart on the opposite page.

Table – 4.1: District-wise Forest Cover

(Area in sq. Km)

District	Geographical Area	Forest Cover				
		Dense forest	Open forest	Total	Percentage	S crub
01. Almora	3,139	1,143	352	1,495	47.63	10
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05. Dehradun	3,088	1,124	362	1,486	487.12	71
06. P Garhwal	5,329	2,492	650	3,142	58.96	95
07. Haridwar	2,360	418	194	612	25.93	0
08. Nainital	4,251	2,645	463	3,108	73.11	14
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Total	53,483	19,023	4,915	23,938	44.76	598

Source: State of Forest Report – 2001, Forest Survey of India, MoEF, Gol

Tree Cover

Culturable Non-forest Area (CNFA)	13, 180 sq. km.
No. of tree per ha of CNFA	15.0
• Tree cover (Sq.km)	448
• Of State's Geographical area	0.8%
Of CNFA	3.40%

Forest and Tree Cover

Total Forest & tree cover	24, 386 sq. km.
Of States Geographical Area	45.60%
Of country's Forest and Tree cover	3.2%
Per capita Forest and Tree cover	0.29 ha.

This State is situated in the western Himalayan zone, traditionally called as a gold mine of medicinal and aromatic plants in the country. The State is mostly hilly with two regions, Kumaon and Garhwal, which can be divided into three main climatic zones:

- The Alpine zone.
- The Temperate zone and,
- The Sub-Tropical zone.

All three zones with altitudinal variations accommodate variety of Medicinal plants. The State is blessed with thousand of species; however, about 320 species have been identified having medicinal value. The forest department has reported about 175 species being commercially extracted and traded. It is estimated that the State is well positioned to generate revenue of about

Rs. 1, 000 crores per annum through medicinal plants trade.

Traditionally, the tribal population of Uttarakhand links Medicinal plants with their socio-economic development. These resources provide them primary herbal medicine and substantial part of their income. Even today, majority of the population living in and around the forest derive their income from Medicinal plants and hence the State Government has rightly declared it as "**Herbal State**" during early 2003.

4.2 Forest Description

The State is divided into the following eco-climatic zones:-

- Sub-tropical (< 1500m)
- Warm temperate (1500m – 2500m)
- Cool temperate (2500m – 3000m)
- Sub-alpine (3000m – 3500m)
- Alpine (3500m – 5500m)
- Nival (> 5500m)

According to Champion and Seth (1968), several forest types represent different climate zone:

In sub-tropical zone, the dominance of moist and dry Sal forests, dry reverine (*Acacia – Dalbergia*) forest, dry deciduous (*Acacia – Anogeissus – Aegla – Dalbergia*) forest and dry Bamboo brakes are the major forest types.

In warm temperate zone, Chir Pine forms the forest with several associates: Chir Pine – *Terminalia*, Chir Pine – Ban Oak (*Quercus leucotricophora*), Chir Pine – *Acacia – Mallotus – Lannea* and Chir Pine – *Wendlandia*, while in moist reverine forest *Alnus – Toona, Aesculus – Juglans* form the major communities.

In cool temperature zone, all the Oaks (*Quercus floribunda*) and *Quercus lanuginosa* form pure forests and in some localities mixed broad leaved (many Oaks), while moist Deodar (*Cedrus deodara*), Cypress (*Cupressus torulosa*) and deciduous (*Aesculus – Acer – Juglans*) forests also occupy the similar altitude in the zone. Silver Fir (*Abies pindrow*), Kharsu Oak (*Quercus semecarpifolia*), mixed Silver Fir – Kharsu Oak, Silver Fir – Birch (*Betula utilis*) and Birch forest predominate in sub-alpine zone. The sub-alpine region terminates at tree line where species of Juniper (*Juniperus*), Salix and Birch are commonly found. The herbaceous and shrubby vegetation dominates the alpine region.

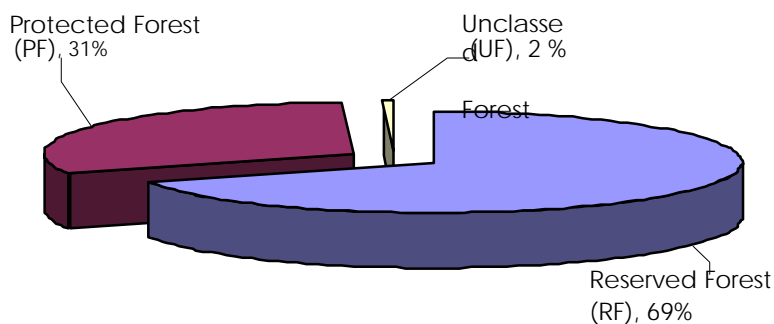
In all, there are 6 National Parks and 6 Wildlife sanctuaries in the State, which cover 12.1% of the total geographical area. The State harbours one of the premier biosphere reserves of the country, which has two core zones, i.e, Nanda Devi National Park and Valley of Flowers National Park.

4.3 Recorded Forest Area:

The distribution of forest areas under different types of forests is given in Table-4.2. Table 4.2: Forest area under different types

Reserved Forest (RF)	23,627 sq. Km
Protected Forest (PF)	10,673 sq. Km
Un-classed Forest (UF)	162 sq. Km
Total	34,662 sq. Km
Of State's Geographical Area	64.80%
Of Country's Forest Area	4.50%

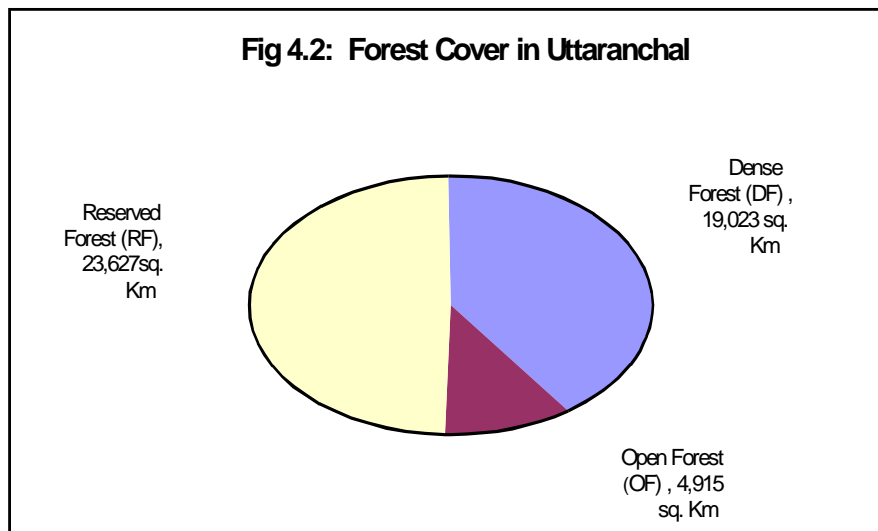
Fig 4.1 Recorded Forest Area



4.4 Areas under various cover conditions:

According to the status of cover the forest areas have been distributed into class shown Table 4.3: Break-up of forest areas as per cover conditions

Dense Forest (DF)	19,023 sq. Km
Open Forest (OF)	4,915 sq. Km
Reserved Forest (RF)	23,627 sq. Km
Of State's Geographical Area	44.80%
Of Country's Forest Area	3.50%



Shown in Table 4.3 and percentage distribution is shown in Fig 4.3. Uttaranchal has 3.5% of the country's forest area.

Table 4.4: Tree Cover and Forest & Tree Cover

Culturable Non- Forest Area (CNFA)	13,180 sq. Km
No. of trees per ha. of CNFA	15.0
Tree Cover (sq. km.) Of State's Geographical Area of CNFA	44.8%
	3.40%

Total Forest * Tree Cover	24,386 sq. Km
Of State's Geographical Area	45.60%
Of Country's Forest & Tree Cover	3.2%
Per capita Forest & Tree Cover	0.29 ha.

Though forest area comes to 64.80% of States geographical area, forest area varies and, come to 44.8%, remaining 20percent seem to be only legal forests. Again culturable non-forest area is 13,180 sq.km. and, represents 0.8% of the state's geographical area. These areas have about 15 trees / ha. and, tree cover comes to 45.60%. Per capita forest-cum-tree cover area is 0.29ha. is given in Table 4.4.

4.5 Phyto-climatic Zones

The major Phyto-climatic zones are as follows:

- **Sub-Tropical Zone:** The majority of the population resides in this zone that extends upto 1, 400 m and is characterized by heavy biotic pressure in the form of habitation, grazing and agriculture. Hot summers, occasionally crossing 40 °C, cold winters down to 4 °C and high precipitation between 1, 600 to 2, 500 mm rainfall in the monsoon are typical of the area. The forest comprises of Tropical dry deciduous forest at the lower reaches of this zone and sub-tropical Pine forests in the higher areas.
- **Temperate Zone:** This zone extends upto the tree line that varies greatly according to the aspect and rainfall and averages at 3, 700 m. The forest

types are Himalayan moist temperate forest and Himalayan dry temperate forests that comprises of evergreen Oaks, Conifers and Birch.

Pleasant and cool summers and very cold winters with snowfall characterize the climate of this region. Bhatwari, Harsil and Gangotri in Uttarkashi District and Chamba, Kaddukhal, Chirbatiya, Budhakedar and Gangi to Kharsoli in Tehri District are typical to this zone. These areas are very rich in medicinal plants.

- **Alpine Zone:** This zone extends from the tree line upto the line of permanent snow and consists of the *Bugyals* (alpine meadows, along with rocky out crops), which host some of very important medicinal plants.

The alpine meadows also host a large number of other rear flowering plants.

4.6 Zonal Availability of Flora in the State

Based on the distribution and potential values of medicinal plants as an income generating resources, the following species have been prioritized for cultivation at different altitude zone of the Uttarakhand State.

1. Tropical and Sub-tropical Zone (< 1, 800m)

Rauvolfia serpentina, *Saraca ashoka*, *Gymnema sylvestre*, *Azadirachta indica*, *Bacopa mannieri*, *Withania somnifera*, *Emblica officinalis*, *Agele marmelos*, *Tinospora cordifolia*, *Solanum nigrum*, *Gloriosa superba*, *Asparagus racemosus*, *Terminalia chebula*, *T. arjuna*, *T. bellirica*, *Bergenia ligulata*, *Coleus forskohlii*, *Acorus calamus*, *Valeriana wallichii*, *Hedychium spicatum*, *Evolvulus alsinoides*, *Zanthoxylum armatum*, *Mentha piperita*, *Cinnamomum tamala* and *Thalictrum foliolosum*, *Glycyrrhiza glabra* and *Emblica ribes*.

2. Temperate Zone (1, 801 – 2, 800m)

Plantago ovata, *Swertia angustifolia*, *Taxus baccata* ssp. *wallichiana*, *Valeriana wallichii*, *Berberis aristata*, *Hedychium spicatum*, *Heracleum candicans*, *Bergenia ligulata*, *Paris polyphylla*, *Curculigo orchioides* and *Carum carvi*.

3. Sub-alpine and Alpine Zones (> 2, 800m)

Aconitum heterophyllum, *Angelica glauca*, *Allium stracheyi*, *Carum carvi*, *Dactylorrhiza hatagirea*, *Nardostachys grandiflora*, *Podophyllum hexadrum*, *Pleurospermum angelicoides*, *Saussurea costus*, *Swertia chirata*, *Picrorrhiza kurroo*, *Polygonatum verticillatum*, *Rheum australe* and *Jurinella macrocephala*.

The National Medicinal Plants Board, constituted by the Central Government, has also prioritized most of the above species.

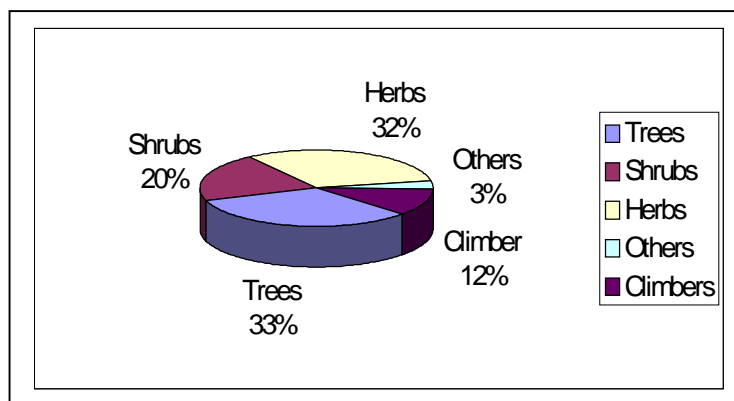
4.7 Species of Medicinal Plants & Herbs Available and their Volume

Around 70% of India's medicinal plants are found in tropical areas mostly in the various forest types. Less than 30% of the medicinal plants are found in the

temperate and alpine areas and higher altitudes; they include some species of high medicinal value. The distribution is shown in Fig 4.4

Fig 4.3 The distribution of medicinal plants by their habit in Uttarakhand.

- Herbs – 32%
- Shrubs – 20%
- Trees – 33%
- Climbers – 12%
- Others – 3%



4.8 Traditional Knowledge vis-à-vis Modern Practices

The plants have been used to cure diseases since antiquity. In **Rigveda**, which is one of the oldest repositories of human knowledge and supposed to have been written between 4, 500 and 1, 600 B.C., mention has been made of the medicinal plants. By and large in India, medicinal needs of the rural population are catered mostly by the Indian systems of Medicine – *Ayurveda*, *Siddha* and *Unani*.

Modern medicine, as taught in most medical colleges around the world, has largely switched from natural to manufactured drugs, but plant products are still of paramount importance in traditional health care systems of developing countries. In tradition therapies of certain indigenous communities, herbs are administered along with chants, dance and spiritual ceremonies to expel evil spirits and to help re-harmonizing the sick person with his or her environment. Plants, however, also serve a less metaphysical role, as anti-contraceptives in indigenous system of medicines or to counteract tangible pathogenics, such as fungi and parasites. In developing countries, like India medicine men and women are particularly knowledgeable about the recognition and treatment of common diseases. Traditional healers in India have a great talent for locating the requisite plant from the wild that makes up their natural pharmacy. In India, this knowledge has largely remained undocumented and is passed on orally from father to son or from mother to daughter. Today's younger generation often have very different ambitions and therefore, these traditional skills are getting lost even faster than plants themselves.

The modern medicine has been integrated to some extent with ancient health care system in our country. It has become the dominant method in most of the large hospitals. In non-hospital care in most developing countries, traditional and modern system operates independently without a clear hierarchy, e.g; Government Hospitals. In rural areas only traditional healing and herbal health care is very much in practice.

About half a billion people on the Indian sub-continent use traditional medicines, and 75% of the world population cannot afford the expensive modern medicines. The

health problems that plague modern society are well known in medical world, but rapid strides being made in pharmacology are barely able to keep pace with them, and even the vast range of drug available is often far from satisfactory in giving complete care. Underlying the praises heaped upon such products for their efficacy there are more cautious note of warning. This propaganda voiced in a low key, invites the consumer to turn to more natural alternative medicine, many of which are once widely, but have long since been abandoned in favour of better ones.

As a result of this new trend, a number of people who are perhaps skeptical or apprehensive about "conventional" drugs have now turned to alternative treatment, and in particular systems that make use of the medicinal plants. They are quite willing to place their trust in the competence of herbalist. The advantage of plants remedies is that these are harmless, provided selected carefully and taken under medical guidance of expert herbalist.

4.9 Present Cultivation Pattern

Medicinal plants are in great demand by the pharmaceutical industries based on the Indian system of medicine. At present, medicines of vegetative origin are also prepared in the Homoeopathic system of medicine, which are in great demand in our country. Due to over-exploitation, several medicinal plants occurring in the forest areas of tropical, sub-tropical, temperate and alpine zones have either become extinct or endangered.

Most of the herbs are collected from the wild. The cultivation technology for some species have been perfected and employed in the field. Using seeds, stem and root cutting does domestication of some species. The most occurring H & MP and, the major species by their habits are given in *Annex-4.1*, to this Chapter for information. Likewise, *Annex-4.2*: Provides the information on NTFPs (including H & MPs), which are being collected from the Forests in selected Districts viz. Chamoli (Garhwal Region) and Pithoragarh (Kumaon Region) in the State. The Annex also shows the type of plant (habit), parts used, season of collection and uses.

To meet the ever-increasing demand of medicinal plants, *in-situ* and *ex-situ* conservation is the only alternative.

Ex-situ Cultivation: High value medicinal plants have poor density and required to be cultivated *ex-situ* on a larger scale and over extensive areas so that the pressure of collection from the wild is reduced. This is the safe bet for enhancing the economic level of our people and also a conservation strategy for the preservation of our natural resources. Uttarakhand can play a major role in meeting the rising global demand for herbal products and benefit greatly from the proceeds. It is, however, most important that the species should be chosen for cultivation after careful consideration of the site conditions, market and should also have an easy agro-technique.

The present availability of medicinal plant seedlings with the forest department in Uttarakhand is given in the *Annexes 4.4 & 4.5*. These reveal that seedlings of 9 tropical and 9 temperate & alpine species are being raised at nurseries of Forest Dept. and, total numbers of seedlings available are 2.67×10^6 and 1.61×10^6 in Garhwal and Kumaon regions respectively.

It is, therefore, possible that instead of growing multitudes of species in every area, only a few medicinal and aromatic plants suited to that micro-watershed could be grown in appropriately selected micro-watersheds for cultivation so that the market may access it readily for bulk.

4.10 Harvesting and Post Harvesting Practices

The harvesting in present context is not administratively defined practice on paper. The *Bhesaj Sangh* and KMVN were supposed to harvest medicinal plants through trained agents. However, contrary to this harvesting is practically handled by untrained and unskilled daily wagers. This practice is resulting in substantial amount of destructive harvesting and loss of earnings.

Post-harvesting also has a direct link with marketing. It normally includes either direct local consumption of the collected product or meant for marketing at down stream locations. The minimum post-harvest steps required are shown in Fig 4.4.

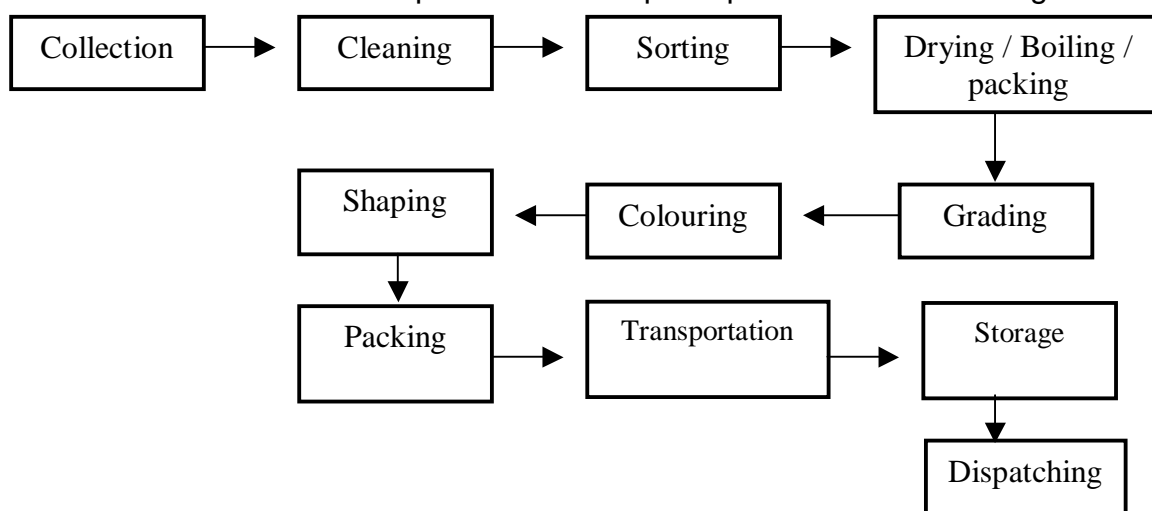


Fig 4.4: Minimum post-harvest steps required for marketing of H & MPs

The post-harvesting process as per scientific norms can be separating shells, bark, seeds, shredding, pulping, powdering in which physical shape is changed but original characteristics are not changed. Some Medicinal plants are boiled and beaten to separate fibers, or to take out extracts as per market demand. This can change consistency and colour. At the end of packing exercise, it is marked indicating the identity of gatherers, quantity, place and time of collection. It is then handed over either for local storage or transportation to end users for further processing.

In the context of Uttarakhand, the harvesting and post-harvesting techniques applied are primitive. The post-harvesting techniques applied are limited to few species and that too mostly for self-consumption.

4.11 Role of Women in Conservation and Use

Forestry institutions have been working closely with women on many interfaces, for instance labour in nursery plantations and weeding operations. Women have been

the major gatherers of forest resources like, herbal medicines and other NTFPs. Institutions involved in forest management need is to develop an empathetic view on the involvement of women in planning, implementation, monitoring and review of any activity. Their opinion and active participation is essential to evolve a realistic management objective and approach, which can be achievable.

In addition to household works, women of hilly tracts of Uttarakhand perform most of the farming work. Drudgery is a very common phenomenon in Uttarakhand hills. If they are given field training in cultivation, exploitation and storage of medicinal plants, these hard task-performing women will be able to conserve medicinal plants in their fields. This will enhance their economy as well as our natural resources will be also preserved resulting in reducing the pressure on wild collection.

4.12 Marketing Pattern:

Marketing of Medicinal plants attract several linkage variables, major being conservation, propagation, cultivation, harvesting, post-harvesting, semi-processing and selling.

In Uttarakhand, marketing of medicinal plants is done in a haphazard way and is admixture of multiple practices. Officially the marketing is executed as per system shown in the diagram (Fig 4.5)

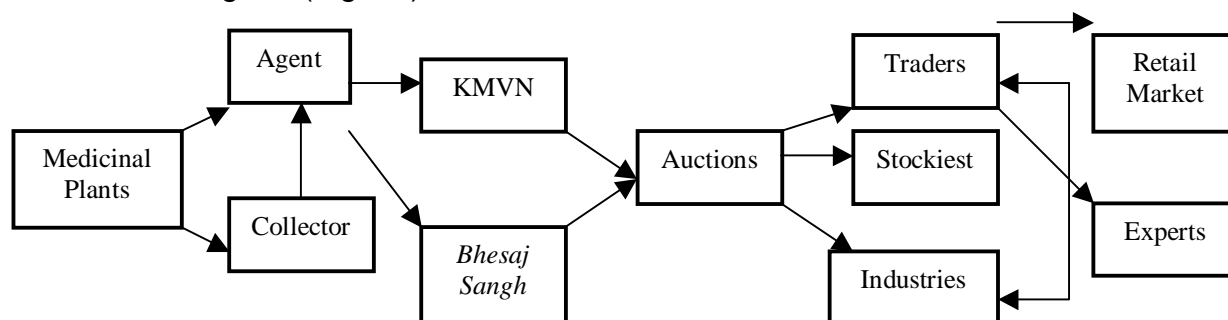


Fig 4.5: Officially perceived system and steps of marketing of H & MP in UA

The officially accepted and recorded practice accounts, for hardly 5% of total trade. However, in practice, bulk of the produce is marketed as shown in schematic diagram Fig 4.6.

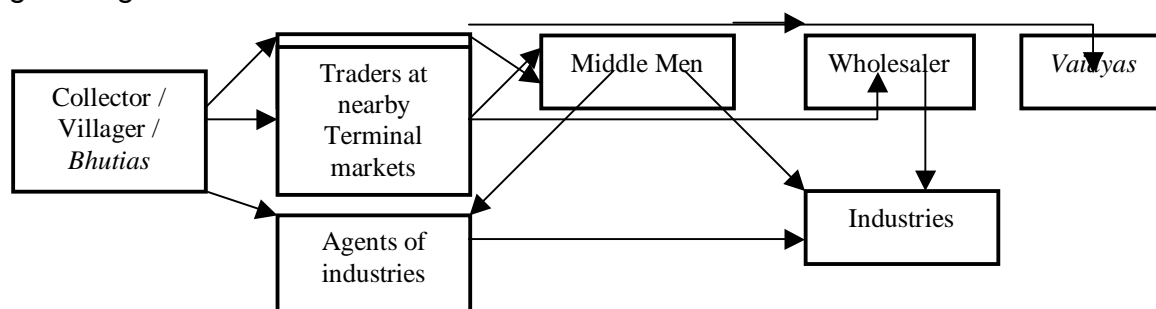


Fig 4.6: Actual system and steps of marketing of H & MP prevailing in UA

Parallel trading is prominently visible in the entire State as revealed through interaction with the stakeholder and, these have been put together in Table 4.7.

Table – 4.7: Predominant handling of Medicinal Plant Trading within the State of Uttarakhand

Handling of H & MP Trading	Percentage of Stakeholders
a. On spot cash payment by private traders	90
b. Purchase of limited species by Govt. agencies	75
c. Advance payment receipts from traders	75
d. Procedural hassles in selling to Govt. agencies	95
e. Payment problem by Govt. agencies	70

Practice of direct sales to the consuming industries has not been noticed except from a couple of cultivators in Uttarakhand's upper Himalayas for some specific species. The reasons quoted by the industries are:

- Too much control by the government on products movement.
- Expensive procurement on account of lack of infrastructure, skilled manpower deployment, logistics and overheads.
- Quality standards are not guaranteed, as quick *in-situ* quality inspection is not possible.
- Procurement through middlemen, traders and government auctions are much cheaper and less time consuming.

It has been confirmed by the villagers that main reason for non-development of the H & MP is the lack of marketing avenues. About 96% of the gatherers / villagers do not know the exact final destination of their products. The only awareness quotient about market centers has been about the terminal markets like Kathgodam, Kotdwara, Haldwani, Rishikesh, Hardwar, Dehradun, Varanasi, Tanakpur, etc. Similarly, the awareness quotient about prices is totally missing. The multi-dimensional shortfalls in marketing of H & MP are summarized below:

- Lack of transparency in all steps down the line.
- Legislation not allowing free trade resulting in pilferage, bribery and lower price realization.
- Un-defined markets – even *Bhesaj Sangh* and KMVN do not know where the products will find its last destination and at what price.
- Agent system resulting in substantial amount of revenue lost in between. PRA reveals that the agents pocket up to 50% of the price of the products.
- Totally missing market intelligence system is the most critical shortcoming. None of the stakeholders excepting traders and the industry are aware of on-going price trend in major domestic, as well as international markets. As a result, the price realization at the source of origin remains substantially low. In a State like Uttarakhand, total tradable availability of medicinal plants and herbs is valued at Rs. 1000

crore per annum but the recorded turnover of *Bhesaj Sangh* is hardly Rs. 3.50 crores.

- Un-identified market opportunities in lack of market need assessment.
- Market competitions are not analyzed and forced / distress sales are engineered.
- Proper marketing starts with linking the resource and product development to market preferences. In sustainable forestry the role of marketing to create effective linkage amongst growers, resource managers, processors and the end users is vital. No initiatives have been made in this direction.
- Poorly designed price mechanism, based on previous years sales price resulting in least remuneration to the people in gathering and cultivation of H & MP.
- Un-organized market channels leading to monopoly of few individuals and industries controlling and dictating the market.
- Absence of certification of products (especially certification of source of produce) or prescribed standards to guide the quality and price linkages.
- Institutional efforts are confined up to cultivation and propagation but are totally absent for marketing.

Some of these reasons could be visualized from some live cases such as of Andhra Pradesh as discussed hereunder.

In Andhra Pradesh marketing of NTFP including medicinal plant is a matter of monopolistic right for the Girijan Co-operative Corporation in the scheduled area. Such monopolies restrict opportunities for the *Vana Samrakshana Samithi* members in the scheduled / tribal areas as markets are not competitive. A detailed analysis of legal framework of collection, pricing, transport, information access and infrastructure, including the state control over marketing of nationalized NTFPs through Girijan Co-operative Corporation has been proposed to offer suggestions on mitigation measures and to evolve suitable clues.

Constraints in Andhra Pradesh: Lack of alternative market centres nearby, lack of transport facilities and the perishable nature of the produce are the biggest constraints for the villagers in medicinal plant trade. There is no organized marketing network as in the agriculture sector like *Mandi Parishads* where collectors can come and sell the produce.

Challenges in Andhra Pradesh: The organisation of co-operatives, development of market information system and quantification of demand and supply locally will help in strengthening the market knowledge of the co-operative members. Market extension and research information has to be improved at the local level.

4.13 Processing and Value Addition Practices

The Study also looks at pricing, value addition and information flow mechanisms at different points in the supply chain, ranging from the primary collector / cultivator to the processing industry. The supply chains tend to be long, and in the worst case it was found that **collector / cultivator gets as little as 3 percent of the final price.** Information flow along the chain is linear, with no direct contacts between collectors / cultivators and final consumers. However, there appears to be limited scope for first level semi-processing at village level.

Medicinal Plants are processed in two stages:

- (a) Semi-processing; and
- (b) Conversion into formulations.

In Uttarakhand, incidence of semi-processing *in-situ* is confined only up to self-consumption for selected species. The semi-processing for commercial purposes is in infancy and no efforts are being made to develop the practice through micro-enterprise development. On the contrary, the State accommodates at least 12 of the renowned pharmacies located within its boundary involved in the preparation of formulations through organized processing. The gap between semi-processing and dispatches to the factory sites provide negative linkages between logistics and price realization as substantial amount of price is lost on ground of immature harvesting and absence of semi-processing.

4.14 Employment Generation at Different Functional Level

The entire Uttarakhand State has heavy dependence on the forests and they form a major source of livelihood in this region. Collection and trade of medicinal plants is the major wage generator. The collection, processing plays an important role in the subsistence economy of the people living in and around the forest area. At the same time, the collection of medicinal plants contributes to the income of the people engaged in extraction, local processing and trading of the same. It provides sustainable and assured employment opportunities to the villagers throughout the year. From cultivation to collection, processing, packing and transportation, there is ample opportunity of employment to the villagers.

Regression analysis of employment and income series shows that the annual income of a household in village is dependent on income from herbal and medicinal plants (on an average 32 percent).

4.15 Revenue to Exchequer

Officially about 175 species are being commercially extracted and traded. If all 320 identified species are taken into consideration, the stage of commercial extraction in the State could generate revenue of about Rs. 1, 000 crores per annum through medicinal plants alone.

4.16 Dimensions of Institutional Support:

Several Central, State, and Non-Govt. Sector Institutions / agencies are governing the business of H&MP in the State. Location of the institute has no barriers even though issues related to H&MP have implications at the national as well as location-status-specific. The institutions collectively ought to have addressed the issues of S&T related to H&MP to cover indicators like: -

- Conservation; ● Propagation; ● Cultivation; ● Germ plasma; ● Inventorisation;
- Nursery development & supply of quality planting material;
- Certification / Standardization of production; ● Harvesting /Post- harvesting Management; ● Semi-processing / Process; ● Procurement;
- Marketing;
- Training, extension, information, communication & capacity building;
- R&D; and, ● other issues connected with it.

Most of the institutions are being run and funded by the Central-State Governments besides some of them being funded by national and international agencies. The mandate given to these institutions right from their inception have been clear. However, a critical review of these institutions reveals an altogether different picture, as is shown in the Table 4.8 below.

Table 4.8: Institutional Prime responsibility in relation to H & MP sector

Name of the Institute	Prime responsibility	Remarks in relation to H&MP in the state
1. Dept. of Forest	Conservation, afforestation, bio-diversity, plantation, propagation, maintenance of gene-pool, harvesting, policy, administration, training, training, inventory (ization) & related matters to forestry	So far scanty role for H&MP, Yet to play a key role on conservation, un-defined policies; achievements confine to; - <ul style="list-style-type: none"> ▪ Training to 150 cultivators; ▪ Establishment of 24 nurseries; ▪ Assistance in cultivation of H&MP in 120 ha.; ▪ Study tours to Sikkim; ▪ Distribution of saplings to farmers;
2. UA Forest Dev. Corporation	Harvesting-marketing of timber-selected NTFP' s	A new entrant to H&MP sector since Sept. 2003. Success & failure yet to be seen.
3. UA Infrastructure Development Finance Co. Ltd.	Financing of cultivation & processing of H&MP in the state. Promote the sector through subsidy-low-cost finance. Private consultancy for the sector.	Their services have been requisitioned by APEDA for the preparation of Agro-Export Zones (AEZ).. A beginner but has been able to attract 70 farmers, has signed MoU with one private industry for processing and conducting few seminars & workshop.
4. Bhesaj Sangh (Gharwal Region)	Conservation, cultivation, harvesting, marketing of H&MP & related issues thereof.	Could not handle marketing to the desired extent. Ignorantly used at places unskilled labourers (as reported Nepalese), that has lead to destructive harvesting. Of late have promoted cultivation and forced to withdraw from

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		the harvesting & marketing operations as per the recent State Govt. orders.
5. Kumaon Mandal Vikas Nigam (KMVN)	Development of tourism & lending support to other sectors for promoting its business in Kumaon region.	In 1970 was given the responsibility of harvesting & marketing operations of H&MP for the region. Incurred losses and slowly withdrew from the scene.
6. Gharwal Mandal Vikas Nigam (GMVN)	Development of tourism & lending support to other sectors for promoting its business in Gharwal region.	Given responsibility of harvesting & marketing operations of H&MP for the region during 1999. Taking lessons from the KMVN did not initiate operations and coolly withdrew from the scene.
7. HRDI: Herbal Research & Dev. Institute (JBSS: Jadi Buti Shodh Sansthan / Uttrakhand State Medicinal Plant Board), Gopeshwar, Chamoli.	Promotion of H&MP through multiple intervention including R&D and, inventory (iozation) of altitudinal-area-specific- species.	Governed by the DoH&FP, GoUA, The dept. has yet to gear-up itself and develop vision for the sector. However, HRDI has been able to help in cultivation to a little extent. Inventory (iozation) yet is not fully visible.
8. Dept. of Horticulture & Food Processing (DoH&FP), GoUA	Development of horticulture in the state. H&MP is supposed to be horticulture specific. area.	Missing development mechanism for H&MP sector.
Research Institutions		
1. Dept. of Botany, HNB University, Srinagar	Promote, propagate & cultivation practices through Lab-to-Land concept.	An able institution, helped cultivators in terms of training, extension, information and, capacity building. However, fund s is a major constraint.
Name of the Institute	Prime responsibility	Remarks in relation to H&MP in the state
2. High Altitude Plant Physiology Research Centre (HAPPRC), Srinagar, Gharwal, Pauri Garhwal	Engaged in botanical research for mountain areas.	Ha developed & diffused cultivation technology to the farmers. Promoting Kutki cultivation in different areas with a guarantee of minimum price support through a tripartite agreement with private companies. Noe considering promotion of Atis, Jatamasi and, Chiraita.
3. GB Pant Institute of Himalayan Environment & Development (GBIHED), Kosi-Katarmal, Almora	Generate commitment, competence in the youth of the area, provide knowledge-user in the mountains-package of practices for the future in mountains, through undertaking applied 7 fundamental studies in mountain plants inventory, genotype environment & plants, soil intervention, conservation, multiplication of plant species and dissemination of information.	Activities are confined to research, seminars, workshops / trainings, publications independently. Lab-to-land has less visibility in commercial terms. Could play a key role, for Medicinal plant taxonomy; ecology (habitat requirements, distribution patterns, etc), reproductive and seed biology, propagation and cultivation, phyto-chemistry, pharmacognosy, post harvest and packaging technology, market economics, etc. Being funded by more than 21 organizations including core funding from MoEF, Gol.
4. GB Pant UA&T, Hill Campus Ranichauri, Tehri Garhwal and, Pantnagar,	Basically an agriculture university with H&MP as an added Dept.	Activities are confined to classroom-teachings & experiment station / demonstration within campus. No defined vision and, objectives for H&MP.

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Udhamsingh Nagar		
5. National Bureau of Plant Genetic Resource (NBPGR), Regional Station, Bhowali, Dist. Nainital;	The Germplasm, Collection, Plant identification, Publication, Cultivation, Agro-technology.	A moderate role has been seen related Agro-technology, Technical support, Consultancy, Planting material and, Germplasm Collection.
6. Defence Research & Development Organization (DRDO), DARL, Pithoragarh;	Developing technology for defence personnel living in high altitudinal areas through R&D in agriculture and allied sectors including H&MP	The centre has three altitudinal research campuses viz. Panda (5,500ft.); Auli Joshimat (9,500ft.); and, Harsil Uttarkashi (10,500ft.). Has developed & cultivating few species of H&MP & their processing technology. So far Four patents are to their credit on: Luke derma; Eczema; Sunburns; Auto-toothache. Also helping the rural masses in multiplication of plants through technical support.

4.15 Implications

4.16.1 Multiple stakeholders:

The H&MP Sector-Trade, at present is not conducive to enrich exchequer as it, is secretive and exploitative, because there is not a Single Owner or Master-of-Trade, and because of unsustainable practice opted from profit. Another factor is the lack of appropriate scientific know-how for collection, fostering regeneration of plant species, which are gradually becoming endangered, thus affecting conservation and gene-pool maintenance aspects of the State. The last impediment is multiple stakeholders and total absence of any sort of linkages amongst them.

The Study reveals a paradoxical situation that organizations have not been able to develop an appropriate mechanism for inter and intra co-ordination among themselves. There lacks a synergy of internal and external monitoring information system for the State as a whole. These have been detrimental to sustainable growth of medicinal plants sector in the State, and thus require critical redressal on six major fronts as under: -

- Conservation.
- Propagation / cultivation / nursery development and supply of quality planting materials.
- Harvestings.
- Post – harvesting.
- Semi – processing and.
- Marketing.

4.16.2 Nodal agency:

It reflects that the sector lacks a nodal agency for all the above variables or fronts under medicinal plants in the State. However, few of other states have taken some useful measures to successfully handle the medicinal plant sectoral situation through some intervention or the other. There is no Commissioner for medicinal plants, which is a specialized sector in itself.

The sanctity of best habitats or ecological riches of medicinal plants in Himalayas can be maintained provided the State Government declares a **Principal Player** in the State, who could be vested with powers to oversee the Conservation and Cultivation of medicinal plants sector in the State for orderly growth, development and, operation of activities aimed at: -

- *In-situ* conservation.
- *Ex-situ* conservation.
- Production of quality planting material.
- Cultivation.
- Collection from wild source.
- R & D.
- Policies and strategies formulation.
- Implementation.
- Post-harvesting.
- Semi-processing.
- Extraction.
- Procurement.
- Prices.
- Marketing.
- Processing.
- Exports.
- Imports.

The State Government could promote this under a Principal Player or a Nodal Agency as appropriate implementing arm of Uttaranchal State Medicinal Plants Board. This would help sustain the centuries old traditional systems of medicinal plant sector in the State, through development of an integrated and holistic plan for H & MP sector and synergising the policies through optimized clustering of activities and developing responsibilities to right stakeholder at levels from grass root to State level. Otherwise, the resources will shrink further due to over-exploitation, destructive harvesting, unsustainable practices, bio-degradation, biotic and commercial pressures.

4.17 Summary of Key Issues

Uttaranchal State came into existence as the 27th State of Republic of India on November, 9, 2000, which was carved out from the erstwhile Uttar Pradesh. It lies between 28° 53' 24" and 31° 24' 50" N latitudes and between 77° 34' 27" and 81° 02' 22" E longitudes. It covers an area of 53, 483 sq km, of which 51, 000 sq km comes under the Himalayan region. The State has 13 Districts with catchment areas of three major rivers, Yamuna, Ganga and Kali. Among the mountain peaks are Nanda Devi (7816 m, the highest peak of the State), Gauri Parvat, Kamet, Trishul,

Chaukhamba, Daunagiri, Panchchuli and Nandakot. Gaumukh, Pandari and Milam are the major glaciers in the State.

The climate of Uttarakhand is strongly influenced by South-West and North-East monsoons. There are mainly three seasons, winter, summer and rainy, while a short period of autumn and spring is noticeable. The State is divisible into four major geological formations: Siwalik (outer) Himalayas, lesser (lower) Himalayas, Greater (main) Himalayas and Trans-Himalayas. Different soil types ranging from alluvial soil, podsollic soil, mountain and hill soil and high altitude meadow soil represent it.

The State is divisible into four eco-climatic zone: Sub-tropical (< 1500 m), Warm temperate (1500 – 2500 m), Cool temperate (2500 – 3000 m), Sub-alpine (3000 – 3500 m), Alpine (3500 – 5500 m) and Nival (> 5500 m).

There are 6 National Parks and 6 Wildlife Sanctuaries in this state, which cover 12.1% of the total geographical area. It also harbours one of the premier biosphere reserves of the country, which has two core zone, Nanda Devi national Park and Valley of Flowers National Park.

Medicinal Herbs

Uttarakhand has a very rich diversity of medicinal plants. These are distributed over all the ecological zones of alpine, temperate, sub-tropical and tropical regions. The State is blessed with thousands of species. About 320 species have been identified having medicinal value. The forest department has reported about 175 species being commercially exploited and traded. It is estimated that the State is well positioned to generate revenue of about Rs. 1, 000 crores annually through medicinal herbs trade.

Traditional Health Care

Uttarakhand has most diverse cultural traditions associated with the use of medicinal herbs. It has intimate link between bio-diversity and cultural diversity. There still exist around numerous traditional, village-based carriers of traditional birth attendants, bone-setters, herbal healers, etc. Apart from this, there are many households, women and elders who have traditional knowledge of herbal home remedies.

Cultivation Practices

There have not been any serious efforts in Uttarakhand to promote the cultivation of important medicinal herbs in the past. Recently, the Government of India has taken some progressive step by establishing Medicinal Plant Board at National and State level so that medicinal plants of high demand and trade can be grown on government and private lands. This will lead to meet the demand and supply to the industries and other user groups without disturbing the natural habitat of the medicinal herbs.

Harvesting and post-harvesting practices required to be standardized so that the efficacy of the herbs may be maintained. In this endeavor, women participation in the hilly areas will be useful in view of herbal conservation and economic upliftment of the rural poor.

Marketing trends of medicinal herbs is erratic in Uttaranchal. Policy intervention for medicinal plants & herb cultivation has to consider marketing as a major component and developing medicinal plant information bulletins similar to horticultural information bulletins to collect, compile and disseminate the production, processing and consumption of these high value products. Such initiatives will require not only government mobilization but also participation of all stakeholders in the marketing chain.

Medicinal plants are processed in two stages: (a) semi-processing; and (b) conversion into formulations. In Uttaranchal, semi-processing *in-situ* is confined only up to self-consumption for selected species. But the semi-processing for commercial proposes is in infancy and no efforts are being made to develop the practice through micro-enterprise development. The State has at least 12 renowned pharmacies involved in the preparation of formulation through organized processing.

Rural people of Uttaranchal are dependent on the forest resources for their sustenance by collection and trade of medicinal plants. Experts estimate that the State is well positioned to generate revenue of about Rs. 1, 000 crores annually through medicinal herbs trade. Therefore, the strategy, planning and implementation of the activities should start from grassroots' level and with the greatest extent of transparency at all levels.

Implications

There are many stakeholders with no linkages amongst them and their activities of efforts, co-ordination and, there are serious gaps in balancing external and internal information due to absence of a monitoring system. These need to be addressed on six major variables as under: -

- Conservation.
- Propagation / cultivation / nursery development and supply of quality planting material.
- Harvesting.
- Post – harvesting.
- Semi – processing and,
- Marketing.

A Principal Player or a nodal agency for the state is needed for H & MP sector, which should be the exclusive arm of Uttaranchal State Medicinal Plant Board.

Annex-4.1: Inventory of Medicinal by HABITS Occurring in Utaranchal

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Botanical Names	Vernacular names	Families	Habit	Part used	Status
<i>Acacia concinna</i> DC.	Shikakai	Mimosaceae	Tree	Pods / leaves	Endangered
<i>Cassia fistula</i> Linn.	Amaltas	Caesalpiaceae	Tree	Fruit pulp	Cultivated
<i>Cedrus deodara</i> (Roxb. ex Lamb.) G. Don	Deodar	Pinaceae	Tree	Wood oil	Common
<i>Hydnocarpus laurifolia</i> (Dennst.) Sleumer	Rowti / Taurella	Flacourtiaceae	Tree	Seeds	Rare
<i>Mesua ferrea</i> L.	Nagkesar	Clusiaceae (Guttiferae)	Tree	Flowers	Cultivated
<i>Pistacia integerrima</i> Stewart ex Brandis	Kakarasinghi	Pistaciaceae	Tree	Leaf galls / wood	Scarce
<i>Prunus cerasoides</i> D. Don	Padam	Rosaceae	Tree	Heartwood/ Fruit / endocrp	Common
<i>Rhododendron arbore - um</i> Sm.	Burans	Ericaceae	Tree	Flowers/ba rk./ tender leaves	Common
<i>Strychnos nux-vomica</i> L.	Karaskara / Kuchla	Strychnaceae	Tree	Seeds	Scarce
<i>Symplocos racemosa</i> Roxb.	Lodhra	Symplocaceae	Tree	Bark	Scarce
<i>Taxus baccata</i> Linn. sp wallichiana (Zucc.) Pilger	Thuner / Talishpatra	Taxaceae	Tree	Leaves / Bark	Scarce
<i>Zanthoxylum armatum</i> DC.	Tejphal/Darmar	Rutaceae	Tree	Wood / seeds	Scarce
<i>Aconitum atrox</i> Stapf	Mithavish	Ranunculaceae	Herb	Roots	Threatened
<i>A. heterophyllum</i> Wall. Ex Royle	Ativish	Ranunculaceae	Herb	Roots	Threatened
<i>A. violaceum</i> Jacq.	Patish/ Dudhia vish	Ranunculaceae	Herb	Roots	Endangered
<i>Acorus calamus</i> L.	Vacha/vach	Araceae	Herb	Rhizomes	Common
<i>Anacyclus pyrethrum</i> DC.	Akarkara	Apiaceae	Herb	Roots	Scarce
<i>Angelica archangelica</i> L.	Chora	Apiaceae	Herb	Roots / seeds	Scarce
<i>A. glauca</i> Edgew.	Gandrayani	Apiaceae	Herb	Roots/fruits	Endangered
<i>Apium graveolens</i>	Ajmada / Solari	Apiaceae	Herb	Roots	Cultivated
<i>Artemisia maritima</i> L.	Kirmala	Asteraceae	Herb	Whole plant	Common
<i>Asparagus adscendens</i> Roxb.	Shatavar	Liliaceae	Herb	Roots	Cultivated
<i>Bacopa monnieri</i> (Linn.) Pennell	Brahmi	Scrophulariaceae	Herb	Whole plant	Common
<i>Berginia ciliata</i> Sternb	Pashanbhed/ Silphori	Saxifragaceae	Herb	Roots	Rare
<i>Cannabis sativa</i> Linn.	Bhang	Cannabinaceae	Herb	Leaves	Abundant
<i>Centella asiatica</i> (L.) Urban	Mandukparni	Hydrocotylaceae	Herb	Whole plant	Common
<i>Citrullus colocynthis</i> (L.) Kuntze	Indrayan	Cucurbitaceae	Herb	Whole plant	Cultivated
<i>Colchicum luteum</i> Baker	Hirantutiya	Liliaceae	Herb	Whole plant	Cultivated
<i>Coptis teeta</i> Wall.	Mamira/Mishmi	Ranunculaceae	Herb	Rhizomes	Rare
<i>Curculigo orchiodes</i> Gaertn.	Kalimusli	Hypoxidaceae	Herb	Roots	Scarce
<i>Curcuma amada</i> Roxb.	Amahaldi	Zingiberaceae	Herb	Roots/ rhizomes	Common
<i>Cyperus rotundus</i> Linn.	Motha	Cyperaceae	Herb	Rhizomes	Common
<i>Dactylorhiza hatagirea</i> (Don.) Soo	Hathjari	Orchidaceae	Herb	Roots	Rare, now cultivated
<i>Delphinium denudatum</i> Wall.	Nirbishi	Ranunculaceae	Herb	Roots	Rare
<i>Didymorarpus pedicellata</i> R.	Pathar laung/	Gentianaceae	Herb	Leaves	Rare

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Botanical Names	Vernacular names	Families	Habit	Part used	Status
Br.	Patthar Phori				
<i>Dioscorea deltoidea</i> Wall. ex Kunth	Gainthie	Dioscoreaceae	Herb	Tubers	Cultivated
<i>Eulophia campestris</i> Wall.	Salibmisri	Orchidaceae	Herb	Roots/ tubers	Endangered
<i>Fumaria officinalis</i> L.	Pitt Papara	Fumariaceae	Herb	Whole plant	Common
<i>Gentiana kurroo</i> Royle	Nilkanthi, Kurn/ Kutki	Gentianaceae	Herb	Whole plant	Common
<i>Gloriosa superba</i> Royle	Kalihari	Liliaceae	Herb	Tubers/ leaves	Rare
<i>Hedychium spicatum</i> Buch.–Ham. Smith	Kapur kachri/ Sitruti	Zingiberaceae	Herb	Rhizomes	Scarce
<i>Hyoscyamus niger</i> L.	Khurasani ajvayan	Solanaceae	Herb	Leaves	Cultivated
<i>Mucuna pruriens</i> (L.) DC.	Konch / Kawunch	Fabaceae	Herb	Seeds/ fruits	Common
<i>Nardostachys jatamansi</i> (D. Don) DC	Jatamasi/ Balchhar	Valerianaceae	Herb	Rhizomes	Endangered
<i>Nelumbo nucifera</i> Gaertn.	Kamal	Nelumbonaceae	Herb	Stem/ Seeds	Common
<i>Orchis latifolia</i> L.	Salammisri / Salap	Orchidaceae	Herb	Leaves	Rare
<i>Papaver somniferum</i> L.	Aphim	Papaveraceae	Herb	Capsules	Cultivated
<i>Plantago ovata</i> Forsk	Isabgol	Plantaginaceae	Herb	Seed husk	Common
<i>Podophyllum hexandrum</i> Royle	Bankakri/ Vankakri	Podophyllaceae	Herb	Roots	Endangered
<i>Polygala chnensis</i> Ham.	Miragu	Polygalaceae	Herb	Roots	Common
<i>Rheum emodi</i> Wall. ex Miers.	Archu/ Revandchini	Polygonaceae	Herb	Roots	Endangered
<i>Rubia cordifolia</i> Linn.	Manjeeth/Manjeet	Rubiaceae	Herb	Roots	Common
<i>Saussurea costus</i> (Falc.) Lipsch	Kuth	Asteraceae	Herb	Roots	Common/ Cultivated
<i>S. obvallata</i> Wall. ex C.B. Clarke	Brahmakamal	Asteraceae	Herb	Roots	Common
<i>S. lappa</i> C.B. Clarke	Kuth	Asteraceae	Herb	Roots	Common
<i>Swertia chirayita</i> (Roxb. ex Flem.) Karst	Chirayita	Gentianaceae	Herb	Whole plant	Roadside plantation
<i>Tephrosia purpurea</i> (L) Pers.	Sharepunkha	Fabaceae	Herb	Leaves	Common/ Cultivated
<i>Tinospora cordifolia</i> Miers ex Hook F. & Thoms.	Giloi/ Gurach	Menispermaceae	Climbing - shrub	Whole plant	Common
<i>Urginea indica</i> (Roxb.) Kunth.	Jangli piyaz/ Banpiyaj	Liliaceae	Herb	Whole plant	Common
<i>Valeriana hardwickii</i> Wall.	Sugandhbala/ Tagger	Valerianaceae	Herb	Roots	Scarce
<i>V. jatamansi</i> Jones	Tagar/ Sameva	Valerianaceae	Herb	Rhizomes	Rare
<i>Viola odorata</i> L.	Vanafsa/ Banafola/ Banafsa	Violaceae	Herb	Flower/ fruit	Common/ Cultivated
<i>Berberis aristata</i> DC.	Daruharidra	Berberidaceae	Shrub	Roots/ bark	Rare
<i>B. asiatica</i> Roxb.	Kilmora/ kingora	Berberidaceae	Shrub	Roots/ bark	Rare
<i>Calotropis giganteum</i> Linn.	Madder/ Madar	Asclepiadaceae	Shrub	Whole plant	Common
<i>Cephaelis ipecacuanha</i> (Brot.) A. Rich.	Ipecac	Rubiaceae	Shrub	Whole plant	Rare
<i>Ephedra gangetica</i> Wall.	Som	Ephedraceae	Shrub	Stem	Scarce
<i>E. gerardiana</i> Wall.	Som/Asmania	Ephedraceae	Shrub	Whole plant	Rare
<i>Glycyrrhiza glabra</i> Linn.	Mulethi	Fabaceae	Shrub	Roots/ stems	Cultivated
<i>Juniperus communis</i> Linn.	Dhup lakri	Cupressaceae	Shrub	Whole plant	Common
<i>Plumbago indica</i> L.	Lal Chitra	Plumbaginaceae	Shrub	Roots	Grown in gardens
<i>P. zeylanica</i> L.	Chitter/ Chitrak	Plumbaginaceae	Shrub	Roots	Rare, now Cultivated
<i>Pueraria tuberosa</i> (Roxb. ex	Vadarikand, Siari	Fabaceae	Shrub	Tuber/	Scarce

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Botanical Names	Vernacular names	Families	Habit	Part used	Status
Willd.) DC.				leaves	
<i>Tylophora indica</i> (Burm. F.) Merr.	Anantmool	Asclepiadaceae	Climbers	Leaves/ roots	Endangered
<i>Uncaria gambier</i> (Hunt.) Roxb.	Math-kuntha, Kath-Kuntha	Rubiaceae	Climbing , Shrub	Leaves/ branches	Rare
<i>Withania somnifera</i> (L.) Dunal	Ashagandha/ Asgandha	Solanaceae	Shrub	Roots	Rare
<i>Dioscorea bulbifera</i> L.	Ratalu/ Gainthie	Dioscoreaceae	Climbing	Aerial tubers	Common
<i>Entada phaseoloides</i> (L.) Merr.	Gadbig/ Gadbig/ Birabi/ Chian	Mimosaceae	Huge climbing shrub	Seeds/stem/ bark	Common
<i>Smilax glabra</i> Roxb.	Bari Chobcheeni	Smilacaceae	Climber	Roots/bulb	Common
<i>Trichosanthes dioica</i> Roxb.	Potala/ Parwal	Cucurbitaceae	Climber	Fruits	Cultivated

The State Forest Dept. has Prioritised Ten Medicinal Species in Uttarakhand viz.

Atis, Chirata, Daruharidra, Jatamansi, Kala Jira, Kutki, Kuth, Shatavari, Sarpagandha, Van kakdi..

Annex-4.2: NTFPs (including H & MPs) Information Collected from the Forests in Selected Districts viz. Chamoli (Garhwal Region) and Pithoragarh (Kumaon Region) (UTTARANCHAL STATE)

S.No.	Botanical Names (Families)	Local Names	Habits	Parts Used	Season of Collection	Uses
1.	<i>Aconitum atrox</i> Stapf. (Ranunculaceae)	Vatsnam/ Meetha Vish	Herb	Roots/ Rhizome	Sep. – Oct.	Whooping cough and asthma. <i>Ayurvedic</i> and <i>Yunani</i> medicines.
2.	<i>A. falconeri</i> Stapf. (Ranunculaceae)	Meetha Vish/ Vatsnam	Herb	Roots/ Rhizome	Sep. – Oct.	Whooping cough and asthma. <i>Ayurvedic</i> and <i>Yunani</i> medicines; roots used for nervous and digestive diseases; also for rheumatism and fevers
3.	<i>heterophyllum</i> Wall. ex	Atis Ativisha	Herbs	Roots/	Sep. – Oct.	For cough, strength and as

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S.No.	Botanical Names (Families)	Local Names	Habits	Parts Used	Season of Collection	Uses
	Royle (Ranunculaceae)			Rhizome		tonic, astringent, stoma chic. Used in powder form aphrodisiac roots considered a valuable febrifuge and bitter tonic. Also used for hysteria, throat infection and diabetes.
4.	<i>A. laciniatum</i> Stapf. (Ranunculaceae)	Murilla	Herb	Roots	Sep. – Oct.	Root extract used in cure of ailment locally.
5.	<i>Acorus calamus</i> L. (Araceae)	Bach/ Vacha/ Safed bach	Herb	Roots, root- stem transition	Sep. – Oct.	Stimulant, carminative, tonic and stoma chic, useful in dyspepsia, flatulence, loss of appetite, hysteria, epilepsy and insanity. Also used for glandular and abdominal tumors; alcoholic extract of the rhizome has sedative and analgesic properties.
6.	<i>Adiantum venustum</i> G. Don (Adiantaceae)	Hansraj	Herb	Leaves and whole plant	Oct. – Mar.	Skin diseases and treatment of bronchitis. Also used against tumors, biliousness, inflammatory diseases of the chest and ophthalmic.
7.	<i>Aesculus indica</i> Colebr. ex Camb. (Hippocastanaceae)	Pangan / Pangar/ Bankhor/ Pangla	Tree	Fruit and seeds	Jul. – Aug.	In stomach disorder of horses, arthritis. In allopathic medicines, cure for skin diseases; roots used in leucorrhoea; bark made into a paste and applied to dislocated joints.
8.	<i>Allium stracheyi</i> L. (Liliaceae)	Jambu	Herb	Leaves and flowers	Sep. – Oct.	Used as spice for flavoring and spluttering food items.
9.	<i>Angelica glauca</i> Edgew. (Apiaceae)	Gandrayan / Chora	Herb	Roots / Seeds	Sep. – Oct.	As spice and root oil has demand in international market for scenting the food items. Also used as a cardio active, carmi-native, expectorant, diaphoretic.
10.	<i>Artemesia maritima</i> L. (Asteraceae)	Pati / Chamur/ Kirmala / Afsanthin	Shrub	Leaves flowers	Sep. – Oct.	Leaves scented. In preparation of <i>Ayurvedic</i> medicine Naglona. Possesses antihelmi-nitic, antiseptic properties. Also used for asthma and psychological diseases and is recommend-ed for chronic fever and swellings; yields an essential oil called wormwood oil which has a tonic effect on digestive organs; also used externally for rheumatism.
11.	<i>Asparagus racemosus</i> Willd. (Liliaceae)	Satawar/ Shatawar/ Satmata / Phusar	Herb	Roots and leaves	Throughout the year	Gives cooling effect. Roots demulcent, diuretic, aphrodisiac, antispasmodic and alterative tonic. Leaves used for treatment of boils, smallpox. Fresh root juice is mixed with honey and given for dyspepsia; these also form a constituent of medicinal oils used for nervous and rheumatic complaints; roots also used

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S.No.	Botanical Names (Families)	Local Names	Habits	Parts Used	Season of Collection	Uses
						as demulcent, aphrodisiac, diuretic, anti-dysenteric, and in veterinary medicines.
12	<i>Berberis asiatica</i> DC (Berberidaceae)	Kilmoda, Rasaut, Daru-haldi	Bush	Roots and bark	Oct. – Mar.	Recommended in excess urethral discharge, eye diseases, jaundice, and fevers. Root bark used for skin diseases, eye ailments and malaria. Roots useful in healing of wounds.
13.	<i>Berberis aristata</i> DC. (Berberidaceae)	Dar-haldi	Shrub	All parts especially root bark / stem	Jul. Aug.	Malaria, jaundice, eye disease, skin and stomach diseases. In <i>Ayurvedic</i> and <i>Yunani</i> system it is used for preparation of <i>Berberis hydrochloride</i> ;
14	<i>Berginia ciliata</i> Sternb (Saxifragaceae)	Pashanabheda/ Shailagarbhaja / Silphori	Herb	Rhizome	Sep. – Mar.	The drug Pashanabheda is extracted from dried rhizomes. It possesses astringent, tonic, antiscorbutic and laxative properties. Useful in pulmonary infection, dysentery, ulcers, spleen enlargement, cough and fever.
15.	<i>Cannabis sativa</i> L. (Cannabinaceae)	Bhang / Ganja	Shrub	Seeds, dried leaves	Sep. – Oct.	As intoxicant, stomachic, analgesic, narcotic, sedative, pain killer, and anodyne.
16.	<i>Centella asiatica</i> (L.) Urban (Hydrocotylaceae)	Mandukparni	Herb	Leaves/ Stem	Sep. – Oct.	Treatment of cold and useful for improving brainpower also. Used in <i>Ayurvedic</i> and <i>Yunani</i> systems of medicines as diuretic, alterative and tonic and has demand in International market also. A decoction of the whole plant is used in treatment of leprosy.
17.	<i>Chenopodium album</i> L. (Chenopodiaceae)	Bathua	Herb	Leaves	Jun. – Sept.	Appetizer and laxative
18.	<i>Cinnamomum tamala</i> (Buch.- Ham.) T. Nees & Eberm. (Lauraceae)	Tejpat	Tree	Leaves	Oct. – onward	Leaves used as Tejpat or Tejhatta leaf. Useful in scabies, disease of the anus and rectum such as piles (in <i>Ayurveda</i>), colic and diarrhea.
19.	<i>C. zeylanicum</i> Blume (Lauraceae)	Dalchini	Tree	Inner bark	Sep. – Nov.	Bark used as Dalchini (a spice). It has a sharp hot taste, tonic; used as alexiteric, stimulant, carminative, expectorant, aphrodisiac and for headache, etc. Used in <i>Ayurvedic</i> and <i>Yunani</i> systems of medicines.
20.	<i>Citrullus colocynthis</i> (L.) Kuntze (Cucurbitaceae)	Indrayan	A perennial herb	Fruits, roots	June – July	<i>Ayurvedic</i> and <i>Yunani</i> medicines for blood pressure, stomachache, jaundice, urinary diseases and rheumatism. Fruit and roots antidote to snake poison, extract from fruit pulp

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S.No.	Botanical Names (Families)	Local Names	Habits	Parts Used	Season of Collection	Uses
						is highly effective against bacteria.
21.	<i>Coleus forskohlii</i> (Willd.) Briq. (Lamiaceae)	Coleus	Herb	Roots	Sep.-Oct.	Blood pressure and glaucoma, in allopathic medicines.
22.	<i>Corydalis govaniana</i> Wall. (Fumariaceae)	Bhutkeshi/ Jatamansh	Herb	Root	Sep.-Oct.	Insecticide, strength, blood purifier. Roots locally used as incense; also recommended against syphilis and coetaneous affections.
23.	<i>Datura stramonium</i> L. (Solanaceae)	Dhatura	Herb	Flower, leaves, fruit, seeds	Oct.-Nov.	Sleepiness, intoxicant, skin diseases, fever leprosy and asthma. In <i>Ayurvedic</i> , allopathic and <i>Yunani</i> medicines; alkaloid atropine used as stimulant for the central nervous system and as sulphate for dilating pupil.
24.	<i>Delphinium denudatum</i> Wall. (Ranunculaceae)	Nirbishi	Herb	Root	Sep.-Nov.	The root is bitter and considered as stimulant, alternative and tonic. Also useful as tonic for toothache and an adulterant for aconite.
25.	<i>Didymocarpus pedicellata</i> R. Br. (Gesneriaceae)	Patthar Phori	Herb	Leaves and bud		As scent and in <i>Ayurvedic</i> medicines as remedy for kidney and bladder.
26.	<i>Dioscorea bulbifera</i> L. (Dioscoreaceae)	Vangenthi/ Gainthi / Ratalu	Herb (Climber)	Tuber	Oct. – Jan.	For strength and nutrition in <i>Ayurvedic</i> medicine e.g. Chyvanparash. Tuber used in piles, syphilis and applied to ulcers.
27.	<i>D. deltoidea</i> Wall. ex Kunth. (Dioscoreaceae)	Kathparun / Kithi	Climber	Tuber (stem)	Oct. – Jan.	In cortisone hormones and Allopathic medicines, tubers yield steroidal sapogenins, which are sources of oral contraceptives.
28.	<i>Diploknema butyracea</i> (Roxb.) H.J. Lam. (Sapotaceae)	Chyura (Indian Butter Tree)	Tree	Fruit	Jun.-Jul.	Edible oil used as butter and in preparation of chocolate and hair pomade.
29.	<i>Embolia officinalis</i> Gaertn. (Euphorbiaceae)	Amla / Aonla	Tree	Flower, Fruits, roots	Oct. – Nov.	Fruits used as diuretic, laxative and for treatment of jaundice, cough stomach disorders, anemia and eye ailments; rich source of vitamin c; fruits have antibiotic activity against a variety of micro-organisms.
30.	<i>Ephedra gerardiana</i> Wall. (Ephedraceae)	Soam	Shrub	Twigs	August	Cure of syphilis (genital diseases), asthma, cold, hay fever and rashes of allergic origin; nasal spray is used against inflammation of mucous membrane.
31.	<i>Fritillaria roylei</i> Hook. (Liliaceae)	Kakoli	Herb	Root tuber	Oct.-Nov.	In <i>Ayurvedic</i> and <i>Yunani</i> medicines roots used for healing of wounds, corns are used for asthma and bronchitis.
32.	<i>Hebenaria comme-linifolia</i> Wall. ex Lindl. (Orchidaceae)	Vridhi	Herb	Roots	Jun.-Oct.	Used in <i>Ayurvedic</i> preparation as chyavanprash and for strength as a source of

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S.No.	Botanical Names (Families)	Local Names	Habits	Parts Used	Season of Collection	Uses
						salep.
33.	<i>Hedychium spicatum</i> <i>Buch.- Ham. ex. Smith</i> (<i>Zingiberaceae</i>)	Kapur kachari/ Kapoor kesri/ Ban Haldi	Herb	Rhizomes	Oct. – Dec.	Stomachic, carminative, tonic, stimulant, Useful in liver complaints, vomiting, diarrhea, inflammations and pain as well as snakebite.
34.	<i>Indigofera pulchella</i> <i>Roxb.</i> (<i>Fabaceae</i>)	Sakina / Hakna	Shrub	Roots	May-June	Used for treatment of cough and chest pain .
35.	<i>Juglans regia</i> <i>L.</i> (<i>Juglandaceae</i>)	Akhrot	Tree	Fruit, bark and leaves; roots	Nov.-Jan.	Bark possesses insecti-cidal properties, toothpaste making, fruit edible; leaves astringent, tonic and anathematic.
36.	<i>Juniperus communis</i> <i>L.</i> (<i>Cupressaceae</i>)	Haubera/ Aaraar	Shrub or small tree	Leaves and fruit	Sep.-Oct.	Yields essences, scent and havan material. Fruit used as Hauber in <i>Ayurvedic</i> , also used for flavouring gin.
37.	<i>Adhatoela vaxiea</i> <i>Nees</i> (<i>Acanthaceae</i>)	Adulasa/ Arusa	Peren- nial herb	Leaves	Jun.-Sep.	In cough as expectorant bronchitis and other respiratory ailments. In allopathic, <i>Ayurvedic</i> and <i>Yunani</i> medicines; leaves also possess anthelmintic properties.
38	<i>Lyonia ovalifolia</i> <i>Wall.</i>) <i>Drude</i> (<i>Ericaceae</i>)	Ayar	Tree	Leaves and buds	Jan.-Feb.	Insecticidal used in skin ailments. Also in folklore medicine in Kumaon and Garwal, traditional treatment of diseases.
39.	<i>Macrotomia benthami</i> <i>A.</i> <i>DC.</i> (<i>Boraginaceae</i>)	Ratanyot or Laljadhi Kashmiri Goozaban	Herb	Root and root bark	Sep.-Oct.	Roots paste mixed with milk used for healing of internal wounds and soars. Good for vomiting and digestion. As colour-ing agent in spices; aqueous extract of flowering shoots is used in making sherbet and jams that are recommended for troubles of tongue and throat and for cardiac disorders.
40.	<i>Mallotus philippensis</i> (<i>Lamk.</i>) <i>Muell. – Arg.</i> (<i>Euphorbiaceae</i>)	Rohini/ Kamala/ roli/ Sindhuri	Tree	Fruit (oil glands and hair on fruits) seeds	Mar.-May	Bitter, possesses wormicidal and insecticidal properties, fruits yield a red dye used as an anathematic and for coetaneous affections; seed oil is used for making hair fixers and ointments.
41.	<i>Mentha longifolia</i> (<i>L.</i>) <i>Huds.</i> (<i>Lamiaceae</i>)	Jungli Pudina	Perre- nial herb	Leaves/ flowers	Sep.-Oct.	Carminative, stimulant and cooling medicines.
42.	<i>Myrica esculenta</i> <i>Buch.-</i> <i>Ham. ex D. Don</i> (<i>Myricaceae</i>)	Kafal, Katfal	Tree	Bark	Sep.-Oct.	Bark carminative <i>Ayur-vedic</i> and <i>Yunani</i> system of medicine for cough, dysentery and dieresis; chewed for toothache.
43.	<i>Nardostachys jatamansi</i> (<i>D. Don</i>) <i>Dc.</i> (<i>Valerianaceae</i>)	Jatamansi/ Balchhar	Herb	Rhizome	Sep.-Oct.	Stimulant, strength as antiseptic, epilepsy and intestinal pain, source of an essential oil supposed to improve hair growth and black colour; its tincture is use for epilepsy and hysteria; also used as a

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S.No.	Botanical Names (Families)	Local Names	Habits	Parts Used	Season of Collection	Uses
						laxative for improving urination, menstruation and digestion.
44.	<i>Orchis latifolia</i> L. (<i>Orchidaceae</i>)	Hathandi/ Salammishri/ Salap	Herb	Stem, root	Sep.-Oct.	Tonic for digestive system, Cough, heart ailment and healing agent of wound in <i>Ayurvedic</i> and <i>Yunani</i> System of medicine.
45	<i>Paris polyphylla</i> Sm. (<i>Liliaceae</i>)	Satua	Herb	Root and tuber	Oct.-Mar.	Used in <i>Ayurvedic</i> medicine. The rhizome is possessing antihelmintic properties and also used as tonic.
46	<i>Picrorhiza kurrooa</i> <i>Royl ex Benth.</i> (<i>Scrophulariaceae</i>)	Kutki, Katki	Herb	Root	Sep.-Oct. and May.-Jun.	Roots are used for treatment of fever, dysentery scorpion bite, eczema, cathartic, stoma chic, purgative.
47.	<i>Pinus roxburghii</i> Sarg. (<i>Pinaceae</i>)	Chir	Tree	Stem	Throughout the year	Resin extract is used in manufacture of turpentine oil, varnish and paints industry. Also mixed in artificial essences, camphor and scent preparations.
48	<i>Podophyllum hexandrum</i> <i>Royle</i> (<i>Podophyllaceae</i>)	Bankakri/ Papda	Herb	Roots	Sep.-Oct.	Liver ailment, digestive and purgative; the drug also checks growth of cancerous cells.
49.	<i>Polygonatum multiflorum</i> (L.) All. (<i>Liliaceae</i>)	Mahameda	Herb	Rhizomes	Sep.-Oct.	<i>Ayurvedic</i> medicine especially in Chavanprash; also used for treatment of piles and discolouration of skin resulting from blows.
50.	<i>P. verticillatum</i> All. (<i>Liliaceae</i>)	Meda/ Mitha dudhia	Herb	Roots	Sep.-Oct.	<i>Ayurvedic</i> medicine especially in Chavanprash
51.	<i>Potentilla fulgens</i> Hook. (<i>Rosaceae</i>)	Vajradanti	Perennial herb	Root	Sep.-Mar.	Liver related diseases; roots used in diarrhoea
52.	<i>Prunus cerasoides</i> D. Don (<i>Rosaceae</i>)	Padam	Tree	Bark and fruit	Nov.-Jan.	Bark in <i>Ayurvedic</i> medicine and fruit for colouring the medicines. The stem is bitter, acrid, antipyretic, refrigerant, causes flatulence, cures leprosy, hallucinations, burning of the body, etc.
53.	<i>Rheum emodi</i> Wall. ex Meissn. (<i>Polygonaceae</i>)	Dolu/uvan tantora	Herb	Root, root-stem transition zone	Sep.-Nov.	For strength and also ingredient in digestive medicines; powdered roots also used in healing ulcers.
54.	<i>Rhododendron arboreum</i> Sm. (<i>Ericaceae</i>)	Burans	Tree	Flower	Mar.-Jun.	Flowers yields juice used in making squash for cold drinks; also used in diarrhea and dysentery.
55.	<i>Rhus succedanea</i> L. (<i>Anacardiaceae</i>)	Kakrasingi	Shrub	Insect galls	Sep.-Oct.	As tonic, expectorant, cough, phthisis, asthma, fever, want of appetite and irritability of stomach; galls are astringent and expectorant.
56.	<i>Rubia cordifolia</i> L. (<i>Rubiaceae</i>)	Manjishtha, Manjit	Herb (climber)	Roots/ fruit		Used in <i>Ayurvedic</i> medicines for rheumatism; roots yield a red dye. Fruit, useful in hepatic obstruction.
57.	<i>Schima laureola</i> (DC.) Choisy	Nettpati/ Kasturpatti	Herb	Leaves	Sep.-Oct.	Incense and as scent.

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S.No.	Botanical Names (Families)	Local Names	Habits	Parts Used	Season of Collection	Uses
	(<i>Theaceae</i>)					
58	<i>Stephania glabra</i> (Roxb.) <i>Miers</i> (<i>Menispermaceae</i>)	Gindaru	Climbing shrub	Roots / tubers	Sep.-Jan.	Burn and blood pressure; tubers are used in pulmonary tuberculosis, asthma and dysentery.
59.	<i>Swertia chirayita</i> (Roxb. ex. Flem.) Karst. (<i>Gentianaceae</i>)	Chirayita	Herb	Whole plant	Sep.-Oct.	Ingredient in medicines of chronic fever and stomach ailments; tonic in bronchial asthma, anemia, liver disorders and also laxative.
60.	<i>Symplocos paniculata</i> Miq. (<i>Symplocaceae</i>)	Lodh	A large shrub or tree	Bark	Feb.-Mar.	Eye ailment, coolant gum ailments. Useful in bowel complaints, diarrhea and ulcers, etc.
61.	<i>Syzygium cuminii</i> (L.) Skeels (<i>Myrtaceae</i>)	Jamun, Jambu	Tree	Bark, fruit, seeds	Apr.-June.	Bark bitter, used in bleeding asthma and healing of wounds, fruits edible; seeds recommended for diabetic patients.
62.	<i>Taxus baccata</i> L. ssp. <i>wallichiana</i> (Zucc.) Pilger (<i>Taxaceae</i>)	Thuner, Birumi, Dhurai, Talishpatra	Tree	Leaves and bark	May.-Nov.	Asthma, epilepsy, insanity. Bark is used for <i>Ayurvedic</i> and <i>Yunani</i> medicines against headache, giddiness, diarrhea and biliousness.
63.	<i>Thalictrum foliolosum</i> DC. (<i>Ranunculaceae</i>)	Pinjari, Mamira	A tall herb	Roots	Sep.-Oct.	Used as a purgative, diuretic, febrifuge and dyspepsia in <i>Ayurvedic</i> medicines and ophthalmic as well as for making kajal sticks.
64.	<i>Thymus serpyllum</i> L. (<i>Lamiaceae</i>)	Banajwain	Herb	Whole plant seeds especially	Jul.-Aug.	Poor eyesight, liver and stomach ailments, urinary problem, Seeds have insecticidal properties. Oil used in toothache and as a spice.
65.	<i>Valeriana jatamansi</i> Jones (<i>Valerianaceae</i>)	Samoy/ Samau/ Mushkbala	Herb	Roots and fruits	Sep.-Oct.	As stimulant and antiseptic; also used in making incense sticks and scents; for hair oils and perfumes and medicines for hysteria and nervous problems.
66.	<i>Viburnum cotinifolium</i> D. Don (<i>Caprifoliaceae</i>)	Karra/ Ghinwa	Shrub	Bark	Oct.-Nov.	<i>Ayurvedic</i> medicines used as <i>Viburnum</i> bark for menorrhagia and metrorrhagia.
67	<i>Viola odorata</i> L. (<i>Violaceae</i>)	Banfsha/ Vanafsa	Herb	Roots flower and fruit	Mar.-May	Roots antihelmintic, antipyretic, febrifuge. Flowers emollient, demulcent, used in biliousness and lung troubles; flowers used in <i>Ayurvedic</i> and <i>Unani</i> systems for several skin, eye and ear diseases; also used as blood purifier.
68.	<i>Woodfordia fruticosa</i> (L.) Kurz.	Santha / Dawi	Bush	Tuber	Jan.-Mar.	In <i>Ayurvedic</i> and <i>Yunani</i> medicines, solutions / liquids, bark extract is used as a colouring agent and for

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S.No.	Botanical Names (Families)	Local Names	Habits	Parts Used	Season of Collection	Uses
						tanning.
69.	Zanthoxylum armatum DC. (Rutaceae)	Timur / Tejphal/ Darmar	Tree	Stem bark and seeds	Nov.-Jan.	Teeth and gum ailment including pyorrhoea; Treatment of scabies seeds used as a tonic; bark, fruits and seeds are extremely used in medicines as carminative, stomachic and anathematic; essential oil from seeds used for making tooth powders.
70	Tanacetum nubigenum Wall. ex DC. (Asteraceae)	Dhup/ Gugal	Herb	Roots	Sep.-Oct.	In pain and fever, as an insecticide; gum resin is used as incense.

(Source: Field Survey 2003)

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Annex-4.3: Available Seedlings of Medicinal Plants species with Forest Department in Garhwal Manda: (As at end of February 2004)

Circle	Division	Tropical Species									Temperate and Alpine Species									(Fig in Nos.)	
		Harad	Baheda	Amla	Tejpat	Satavara	Timru	Sarpgandha	Stivia	Ashwagandha	Koot	Kootki	Salampanja	Atish	Doulu	Faran	Salamishri	Aatmesh	Jatamasi	Other	Total
Shivalik	Dehradun FD	90	26966	16814	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	28996	72866
	Soil Con. Kalsi FD	0	15226	27214	0	0	0	8361	0	0	0	0	0	0	0	0	0	0	0	0	85381
	Soil Con. Lansdown FD	0	1040	9660	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13345	24045
	Lansdown FD	3639	11370	5250	0	1400	0	0	0	150	0	0	0	0	0	0	0	0	0	44639	66448
	Haridwar FD	12786	10562	17000	0	212	0	316	10000	3010	0	0	0	0	0	0	0	0	0	154060	207946
	Total	16515	65164	75938	0	1612	0	8677	10000	3160	0	0	0	0	0	0	0	0	0	326421	507487
Yamuna	Upper Yamuna Barkot	0	536	6560	0	8	118	0	0	25300	0	0	0	0	0	0	0	0	0	27764	60286
	Chakrata FD	40	8	500	0	123	0	425	0	0	0	0	0	0	0	0	0	0	0	68827	69923
	Tons FD	0	0	0	0	0	0	0	0	0	10000	13500	0	10065	0	0	0	0	0	1000	34565
	Musooriee FD	6	1680	3090	0	20	0	89	0	0	0	0	0	0	0	0	0	0	0	28195	33080
	Total	46	2224	10150	0	151	118	514	0	25300	10000	13500	0	10065	0	0	0	0	0	125786	197854
Bhagirathi	Narendranager FD	3720	20136	39715	300	1051	175	0	0	808	297	6050	0	0	0	0	0	0	5400	173266	250918
	Tehri Dam - I New Tehri	1002	5960	12504	6072	250	758	0	0	1245	0	117532	27	11852	0	0	0	0	5070	72263	234482
	Tehri Dam - II Uttarkashi	2760	6045	27835	0	493	3050	0	0	700	50	40	0	10	0	0	0	0	0	26259	67242
	Soil Con. Uttarkashi	830	7290	13977	1962	2060	1740	0	0	205	0	0	0	0	0	0	0	0	0	36114	64178
	Tehri FD	222	3662	33339	1620	792	50	0	0	1325	3822	26175	1	0	0	0	0	0	55	59221	130284
	Uttarkashi FD	698	0	23340	0	1280	0	0	0	121	0	56935	526	2745	0	0	0	0	2066	134336	222047
	Total	9232	43040	150710	9954	5926	5773	0	0	4404	4169	206732	554	14607	0	0	0	0	12591	501459	969151
Garhwal	Garhwal FD	0	300	2160	1200	500	0	0	0	0	2900	0	0	0	0	0	0	0	58083	65143	
	Civil Soyam Pauri	300	3700	39600	0	70	0	0	0	8290	0	0	0	0	0	0	0	0	21610	73570	
	Badrinath FD	0	0	1530	650	0	550	0	0	0	47855	74000	0	6500	11250	19000	24000	0	30040	25608	240983
	Alaknanda Soil Cons.	600	2255	16200	16665	500	0	0	0	0	3920	2570	0	0	0	0	500	32341	7	19912	95470
	Upri Ganga Karanprayag	350	3430	5105	6600	2030	1000	0	0	0	1060	3040	0	0	0	0	0	0	500	66224	89339
	Total	1250	9685	64595	25115	3100	1550	0	0	0	61125	82510	0	6500	11250	19000	24500	32341	30547	191437	564505
Nanda Devi Bio-sphere Reserve	Kedarnath FD Gopeshwar	0	600	8430	3500	90	80	0	0	1385	24583	109180	3085	0	0	0	0	0	593	110041	262567
	Nanda Devi National Park	0	0	0	0	0	0	0	0	0	1035980	0	600	0	0	0	0	150	38069	174799	
	Total	0	600	8430	3500	90	80	0	0	1385	24583	245160	3085	600	0	0	0	0	1743	NRTP	437366
Total Garhwal Mandal	27043	120713	309823	38569	10879	7521	9191	10000	34249	99877	547902	3439	31772	11250	19000	24500	32341	44881	1293213	2676363	

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Annex 4.4: Available Seedlings Medicinal Plant Species with Forest Department in Kumaon Manda: (As at end of February 2004)

Circle	Division	Tropical Species									Temperate and Alpine Species										(Fig in Nos.)	
		Harad	Baheda	Amla	Tejpat	Satavar	Timru	Sarpgan da	Stivia	Ashw agand ha	Koot	Kootki	Salampanj a	Atish	Doulu	Faran	Salamishri	Aatmesh	Jatamashi	Other		Total
		3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
Western	Haldwani FD	2450	3500	436	-	-	-	9	-	-	-	-	-	-	-	-	-	-	-	7968	14354	
	Tarai Central FD	15500	17107	22213	-	1500	-	6100	-	10000	-	-	-	-	-	-	-	-	-	34905	107325	
	Tarai East FD	-	3000	3000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6900	12900
	Tarai West FD	20	220	800	-	1350	-	4700	-	-	-	-	-	-	-	-	-	-	-	-	32675	39765
	Ramnagar FD	5316	11400	9688	-	-	-	1600	-	4000	-	-	-	-	-	-	-	-	-	-	20337	52341
	Total	23286	35227	36137	-	2850	-	12409	-	14000	-	-	-	-	-	-	-	-	-	-	102785	226685
North	Almora FD	2994	3100	10924	2900	19	-	-	-	1500	-	25	50	-	-	-	-	-	-	54800	76312	
	Civil Soyam Almora	320	2375	98061	10115	75015	160	-	-	200	-	-	-	-	-	-	-	-	-	255765	442011	
	Pithoragarh FD	-	-	5030	9350	3210	-	-	-	-	500	43885	16000	-	3360	-	500	-	100	237690	319625	
	Champawat FD	-	-	1255	802	1130	-	-	-	-	-	-	-	-	-	-	1000	-	-	113798	117985	
	Bageshwar FD	4185	1615	6680	36190	-	-	-	-	495	-	-	-	-	-	-	-	-	-	32866	82031	
	Total	7499	7090	121950	59357	79374	160	-	-	2195	500	43910	16050	-	3360	-	1500	-	100	694919	1037964	
South	Nainital FD	-	-	7440	1860	-	-	-	-	-	-	-	-	-	-	-	-	-	-	37165	46465	
	Soil Cons. Nainital	-	30	11893	5815	-	-	-	-	-	840	-	-	-	-	-	-	-	-	13124	31702	
	Soil Cons. Ranikhet	380	2780	16360	5150	230	-	-	-	2550	-	200	500	-	-	-	-	-	-	44290	72440	
	Add. Soil Cons. Ramnagar	2000	3000	6000	300	2900	-	75	-	900	-	-	-	-	100	-	-	-	-	34045	49320	
	Total	2380	5810	41693	13125	3130	-	75	-	3450	840	200	500	-	100	-	-	-	-	128624	199927	
FTI	Silviculture Haldwani	-	-	-	-	5	-	3300	-	-	-	-	-	-	-	-	-	-	-	16298	19603	
	Silviculture UA	-	25	1222	900	1300	-	1452	-	4865	6949	18312	160	1060	-	-	130	1300	100	91651	129426	
	Total	-	25	1222	900	1305	-	4752	-	4865	6949	18312	160	1060	-	-	130	1300	100	107949	149029	
Total Kumaon Mandal	33165	48152	201002	73382	866591	160	17227	-	24510	8289	62422	16710	1060	3460	-	1630	1300	200	1034277	1613605		

"Pilot Study of the Mechanism for Sustainable Development & Promotion of Herbal & Medicinal Plants" In the State of Uttarakhand



Konch



Agarkara

A view of H & MP Cultivation in farmer's field near Dehradun

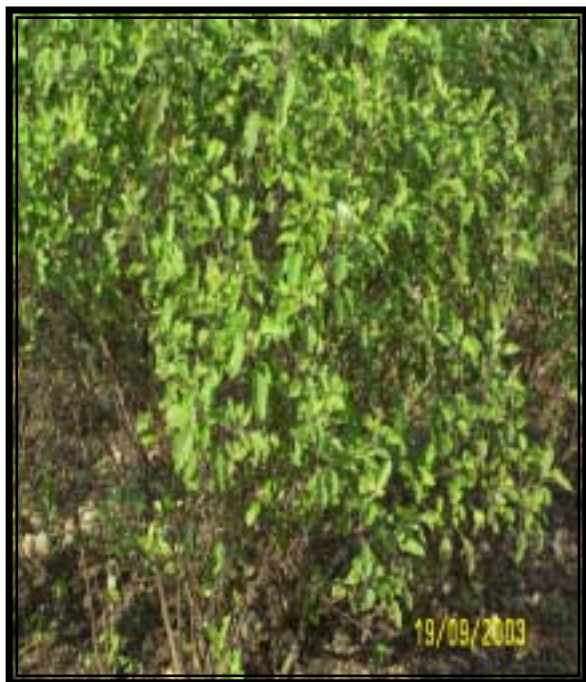


Pipali



Sarpagandha

"Pilot Study of the Mechanism for Sustainable Development & Promotion of Herbal & Medicinal Plants" In the State of Uttarakhand



Chitra



Sarpagandha (with seed)

A view of H & MP Cultivation in farmer's field near Dehradun



Ratanjot



Brahmi

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Rattan Jot



Reetha

A view of H & MP Cultivation in farmer's field near Dehradun



Aloe



Aloe

“Pilot Study of the Mechanism for Sustainable Development & Promotion of Herbal & Medicinal Plants” In the State of Uttarakhand



Annato Dye



Sarina

H & MP species propagated at Demo-Centre



Ashwagandha



Putranjiva

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Ashwagandha



Sarpagandha

H & MP species propagated at Demo-Centre



Tejpata



Guggal

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Jamua



Vaivihang

H & MP species propagated at Demo-Centre



Kalabansa



Vivigunda

CHAPTER-5:

POLICY DIMENSIONS ANALYSIS

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CHAPTER – 5**POLICY DIMENSIONS ANALYSIS****5.7 General**

Traditionally, the forest management in India and the world has been confined to produce and harvest timber. Considering, the environmental overtones e.g. ecology, conservation of natural resources specially relating to water, land and, bio-diversity, increasing biotic pressures, economic value of forest produce and bio-diversity issues called for review of policy aspects initiated some additional policy supports. Gradually globally, the watchword for progress in forestry sector became "sustainable development of forests, forest based industry and the people dependent on forests". The situation invited conflicting components affecting forest management end hence differently modified forest policies came into existence. Medicinal plants and herbs primarily being a non-timber forest produce (NTFP) automatically became part of the policy framework. In India, forestry is put on concurrent list e.g. technically to be governed and advised by the central government but physically to be driven by state governments. Consequently, the sector experienced number of new dimensions in policies and legislations both at central as well as state level. Most of the formulations of policies and legislations have wrapped up NTFP as a whole and only in few cases the word herbs & medicinal plants and found mention. However, the subject has been covered through interpretations of NTFPs and other aspects of forestry. Implications of such policies whether direct or indirect have been critically analyzed in succeeding paragraphs.

5.8 National Level Policies and Legislations**5.8.1 Forest policies and acts:**

In India, there are number of union laws enacted with direct and indirect relevance to the NTFPs including medicinal plants. The first ever forest legislation came into existence in 1865, when the Indian Forest Act was enacted for the first time. A more comprehensive Indian Forest Act later replaced it in 1927. The preamble of the Act indicates that the Act is meant to consolidate the law relating to forest produce, the transit thereof and the duty leviable thereon. The Act has been adopted by most of the States in India. The Indian Forest Act empowers state governments to regulate the extraction and transit of forest produce e.g. via requiring the issue of passes, the payment of fees and the establishment of such depots and check posts which would regulate export of forest products outside the area. The 1952 National Forest Policy brought private forests under the control of government. It clearly states that the owner of private forests should in the first instance be given an opportunity to manage their forests in accordance with an approved working plan. It further says, in case, the owner of private forests are tempted to sacrifice their capital for immediate gain, the management of their forests should be made to rest in government by due

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process of law. Earlier, even forest Act 1927 attempted such provision. The 1952 Forest Policy categorized forests under four heads:

- Protected forests.
- National forests.
- Village forests and
- Private forests and tree lands.

The Forest (Conservation) Act 1980, has the three major objectives:

- Check deforestation.
- Check diversion of forestland for non-forest purposes.
- Afforestation of wasteland.

Both the Indian Forest Act 1927 and the Forest (Conservation) Act, 1980 provide certain amount of legal protection to medicinal plants. These Acts also empower the state governments to take effective measures to conserve various threatened species.

The Wildlife (Protection) Act, 1972, yet another central legislative was a bold step towards further strengthening the conservation of flora and fauna including medicinal plants. The 1991 amendments to the Act included the word 'Plants' alongwith protection of wild 'animals' and 'birds'. Under section-17, the collection, cultivations, dealing etc. of 'specified plants' without license is banned. The Act incorporates a schedule-VI mentioning specified medicinal plants e.g. *Cylas beddomei*, *Vauda coerulea*, *Saussurea costus*, *Paphiopedilum spp.*, *Nepenthes khaziana* and *Renauthera isnscheetiana*.

In the 1988, Forest Policy certain rights have been provided to tribal and local community in the form of servitude. The principal objective of the forest policy 1988 is to ensure environmental stability and maintenance of ecological balance. It emphasizes that the rights and concessions should always remain related to carrying capacity of forests. However, even this policy does not specifically mention medicinal plant. The interpretations of course indicate that the industry based on forests should manage their raw material requirement themselves. In other words, the forests cannot be depended for raw materials in totality and the industry should make own efforts to generate their forest-based raw materials. Reference can also be linked to medicinal plants.

5.8.2 Panchayati Raj Acts:

In 1933 Panchayat Raj Act has recognized as the legal entity and vested rights to the: village committees for management of 29 items and the list includes local resources, NTFP etc. Further in 1996 Panchayat Raj Extended Act has granted greater role and right to the Village Committees of scheduled tribes covered by the

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Vth Schedule of Constitution. Consequent to these, some States such as Chattisgarh, Rajasthan, etc. are taking steps through State Policy Instruments to open up forest resources, enhance greater access and devolve greater role to people's bodies. There are, therefore, new options, which could help the State to take new initiatives in the matter of H & MPs.

5.2.3 Bio-diversity Strategy and Action Plan (BSAP):

The State Forest Department of Uttarakhand is supposed to be involved in the preparation of Action Plan for BSAP, in accordance with the National Bio-diversity Strategy & Action Plan (October 2002). Presumably, it should also be covering an important section on: H & MP, because of declaration of the State as a '*Herbal State*'. This, among other things, should include the initiatives, strategies and, actions related to the following:

- Wild bio-diversity (i.e. natural ecosystems and wild taxa).
- Domesticated bio-diversity (i.e. crops, livestock, and pets).
- Land / waterscape or Eco-regional Approach To Planning and natural resource governance, including the links between wild and domesticated bio-diversity;

The BSAP has to cover eleven sub-sections: viz. 1) Understanding and information; 2) *In-situ* conservation; 3) *Ex-situ* conservation; 4) Sustainable use; 5) Equitable access, Use and sharing of benefits; 6) Capacity of actors in each sector (Education, Awareness, Training); 7) Inter-sectoral co-ordination & Integration; 8) Policy and, legal measures; 9) Financial measures; 10) Technology; 11) International Fora.

5.2.4 The "Eco-system Approach" in the Convention on Biological Diversity:

In accordance with the decision adopted by the Conference Of The Parties (COP) To The Convention On Biological Diversity (CBD) at its Fifth Meeting (UNEP / CBD / COP / 5 / 23, Nairobi, 15-26 May 2000) the following 12 principles have to be complimentary and interlinked by the State Government:

- Principle – 1: The objectives of management of land, water, and living resources are a matter of societal choice.
- Principle – 2: Management should be decentralized to the lowest appropriate level;
- Principle – 3: Ecosystem managers should consider the effects (actual or potential) of their activities on adjacent and other ecosystems.
- Principle – 4: Recognizing potential gains from management, there is usually a need to understand and manage the ecosystem in an economic context. Any such ecosystem-management programme should: (a) Reduce those market distortions that adversely affect biological diversity; (b) Align incentives to promote

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biodiversity conservation and sustainable use; (c) Internalize costs and benefits in the given ecosystem to the extent feasible.

- Principle – 5: Conservation of ecosystem structure and functioning, in order to maintain ecosystem services, should be priority target of the ecosystem approach.
- Principle – 6: Ecosystems must be managed within the limits of their functioning.
- Principle – 7: The ecosystem approach should be undertaken at the appropriate spatial and temporal scales.
- Principle – 8: Recognising the varying temporal scales and lag-effects that characterize ecosystem processes, objectives for ecosystem management should be set for the long term.
- Principle – 9: Management must recognise that change is inevitable.
- Principle–10: The ecosystem approach seek the appropriate balance between and, integration of, conservation and use of biological diversity.
- Principle – 11: The ecosystem approach should consider all forms of relevant information, including scientific and indigenous and local knowledge, innovation and practices.
- Principle – 12: The ecosystem approach should involve all relevant sectors of society and scientific disciplines.

5.2.5 Regional Planning for Conservation and Development:

The State has to undertake:

- Incorporation of ecological concerns in landscape / regional planning by preparing regional land and water use plan, based on a long-term vision by transcending political boundaries and, providing policy and, legal backing to national land / water use plan through: (a) strengthening the positive links / relationships between wild and domesticated biodiversity and, (b) providing incentives to farmers and pastoralists that have pro-wild biodiversity practices; (c) generate awareness amongst different sectors of the actual and potential synergy between wildlife and agriculture.
- Building alliances-mechanisms for inter-agency cooperation, inter-district relations, trans-boundary issues and eco-development.
- The governance structure proposed has to cover the following in nut-shell:
 - **"Village assembly"**, be set-up at village level, *panchayats* they are already mandated by the constitution, as *Gram Sabha*, village tribal council, or other equivalent body that consists of all the adults of the village and, not only a small "representative" decision-making number with inclusion of women and landless. For the purpose of Biological Diversity Bill / Act, the term "local

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body" used therein should refer to village assembly which may form if deserved by a separate body such Bio-diversity Management Committee (MBCs) to take focused initiatives.

- In case of **towns** and **cities** basic decision-making unit as per constitution amendment are called as **urban** ward. But here the ward is represented by an elected representative to Urban Council or municipal committees and, thus differ from the role of village assembly.
- These people's forums or associations be linked to **micro/ meso-landscape level bodies** that contain the relevant government line departments.
- Such village cluster would in turn be amalgamated into larger administrative units, including at **taluka / block** and **district** levels. Thus forming **District Planning Committees (DCP's)**, by including representatives of village clusters and urban committees on rotation basis. At this level, co-ordination between the rural and urban bodies could be responsible for bio-diversity.
- These DPCs, and on a rotational basis representatives of village clusters and urban committees, could be on **State Bio-diversity Board**, which could be mandated under the Biological Diversity Bill / Act. These could include substantial cross-section of people from the grassroots, in particular from those under-privileged sections that are most dependents on biological resources.
- These districts and local bodies should also be represented on the key state level decision-making bodies, including the **Planning Board**, and have a say in the **Committee of Secretaries** and the **Council of Ministries**.

5.9 Critical Analysis of National Forest Policies / Legislations

Most of the policies / legislations enacted by the central government relates to conservation and community rights, again a part of timber oriented management. NTFPs have not been thought of part of mainframe policy / legislation. Even verdicts of Supreme Court have gone against excessive exploitations of forests which if technically defined includes medicinal plants and herbs. Sustainable management of medicinal plants has been confined up to conservation without paying any attention to harvesting and regeneration aspects of it. Whatever may be interpretation of policies and legislations, it is evident that none of the national forest policies favoured harvesting of medicinal plants and herbs in parts as well, from natural forests on grounds of conservation and gene-pool maintenance. Even, the national policies on JFM did not spell out management of medicinal plant by community. Similarly, the Forest Reports are yet to examine and act on the Statutory directives contained in the Panchayati Raj Act and Panchayati Raj Extended Act in respect of local resources and NTFP inclusive of H & MPs. Off late, some thoughts were given to use medicinal plants and herbs for sustainability of JFM, and different state governments for the areas managed by JFM committee have covered up their

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income generation for the long run but again only in the concept as the Status of JFM Committees vis-à-vis Village Sabha and Panchayati Raj Institutions (PRI) is yet to be resolved. International funding agencies always have shown interest in studying feasibility of it, however, the civic society has a mixed reactions whether to go for it or not. The results are clear that without license or permit no one can cultivate, harvest or deal in medicinal plants and herbs.

Despite all the legislations, extraction of medicinal plants and herbs continued and is continuing in forests including reserve forests. As a result, about fifty-two species have been listed to be on verge of extinction and many more declared as endangered species. Since specialized traditional communities make collection, their access to forests for some purpose or other cannot be practically denied. Few of these communities are nomadic shepherds (e.g. *Bhutias*) have very easy access to the forests in the hills. Similarly, *Saharias*, another tribal community in plains also specialize in this profession. These examples have been cited to elaborate that conservation oriented policies and their strict follow-up by state governments have not been able to serve the purpose as the situation is driven by demand supply forces. In process, neither the forests nor these collectors get benefited as the pilferage practice enables middlemen, traders, industry to gain maximum of the accruals.

In lack of proper policy framework and adequate protection measures, destructive harvesting continues to take place, as the planners did not have vision to open up alternative measures to fulfill the market demand. Only recently Government of India realized the need for it and **National Medicinal Plant Board** (NMPB) has been set up under Ministry of Health and Family Welfare to co-ordinate all the matters related to medicinal plants in terms of cultivation, conservation, harvesting, post harvesting, R&D, processing and marketing. The board emphasizes on cultivation of high demand species to reduce biotic pressure on natural resources and sustenance of gene pool. The prime mandate of the board since its inception on November 24, 2000 has been:

- In coverage to associate farmers for cultivation of selected medicinal plants backed by buy-back arrangements.
- Encourage States and UTs to registering raw drug traders and cultivators so that source of supply of medicinal plant is monitored as a measure to promote quality control, safety and efficacy of drugs.
- Facilitate measures, which enhance efficiency, cost effectiveness and upgradation of harvesting, drying, grading, packaging, transportation and storage of medicinal plants.
- The thirty-one (31) species, which are in high demand both in domestic and international markets are to be brought into cultivation status as these constitute a bulk of the ingredients used in the preparation of Indian System of Medicines

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& Health (ISM&H) and herbal products. This list will naturally undergo changes from time to time.

- Undertake general and specialized surveys of the national and international market for medicinal plants and products for identifying niche areas.
- Motivate and encourage States / UTs to set up State Medicinal Plants Board / *Vanaspati Van* Societies who can give a focus and direction to medicinal plants related activities.
- Support manufacturers / NGOs and representative individuals for participation in international fairs, seminars and meetings with a view to create awareness and explore the international market for plant based herbal products.
- Support R&D studies in the areas of post harvest management including increasing shelf-life, introducing better storage techniques and agro-techniques, enhance bio-availability to be taken up through CSIR, NBRI, CIMAP, ICFRE, RRLs, DBT, Horticulture and Forest Departments.
- Launch efforts to create mass awareness about the importance of medicinal plants in all strata of society, rural and urban.
- The Board has initiated some work in desired directions, however, the marketing aspects still need to be strengthened but undoubtedly, this is the first policy at central level enabling sustainable growth of the sector.

On the other hand the **Bio-diversity Act – 2002**, clearly focuses on management with community participation approach and, linking economic benefits from the resources with bottom-up-approach from: Village to Block / *Taluka* / District / State / Nation. These have to be achieved through regional planning for conservation and development. The Act explicitly provides scope for building up alliances / mechanisms for inter-agencies cooperation, inter-district relations, trans-boundary issues and, eco-development under the overall charge and control of State Bio-diversity Board. This could be mandated under the biological diversity Bill / Act.

5.10 Uttarakhand State Policies / Legislations on Medicinal Plants

State of Uttarakhand was carved out as a separate state in November 2000. Before that it had been part of Uttar Pradesh. In view of this, the state inherits many of the policies / legislations enacted by erstwhile U.P. when it was part of it. The U.P. Government has enacted a number of Acts / Regulations to protect and regulate the exploitation of its vast wealth of NTFPs including medicinal plants and herbs. These legal enactments are summarized and discussed in succeeding paragraphs.

5.4.1 The U. P. Private Forest Rules, 1950

This Act, framed under the U.P. Forests Act, 1948, provides that the forest produce in vested forests, shall ordinarily be sold by the DFO by public auction after due publicity under an agreement with the corporates. The DFO may grant a license to

any person who is the inhabitant of a town/village in the neighbourhood of a vested forest to take produce of the said forest for his own use. The collection, manufacture and removal of forest produce from vested forests shall be regulated according to the prescriptions of the approved working plan of the forest. Similar provisions are contained in the rules in respect of a notified forest. Under the rules, 'Passes' or 'Rawannas' must cover all export of forest produce. In the 'Rawannas', the *Rawanna* must cover the description of the forest produce briefly. No export shall take place between 'sunset' and 'sunrise'.

5.4.2 The U. P. Protection of Trees in Rural and Hill Areas Act, 1976

This is an Act for regulation of felling of trees and replanting of trees in rural and hill areas of U.P. various timber and fruit trees are mentioned in the schedule I & II respectively of the Act, which cannot be felled without permission of the competent authority. However, vide notification in 1982 under section-21, sixteen tree species have been exempted from the provisions of this Act.

5.4.3 The U. P. Transit of Timber and Other Forest Produce Rules, 1978

This has been framed within the dimensions of Indian Forest Act 1927. It States:

- ⇒ No forest produce shall be moved into or from or within the State except without a transit pass.
- ⇒ No such pass, however will be required for bonafide consumption by any person in exercise of a privilege granted by the government.
- ⇒ The Conservator of Forests may establish depots to which forest produce shall be taken for checking or for determining the amount of money payable to the state governments.
- ⇒ All forest produce imported into the State will have to follow the rules made by the union government under section 40-A of Indian Forest Act 1927, in addition to these rules and shall be covered by a foreign pass.
- ⇒ The penalties provided for under the rules are imprisonment up to one year or fine up to Rs.1000/- or both.

5.4.4 The U. P. Forest Corporation Act, 1974

This is an Act to provide for the establishment of a Corporation for better preservation, supervision and development of forests and better exploitation of forest produce within the State. By section 14 and 15 of the Act, the FC is empowered as the authority for removal and disposal of forest resources, which includes NTFP and setting up of workshop/factories for processing of the same. According to the list of products issued by the government the FC markets the products, which includes about 65 species (then 30) of medicinal plants in U.P. (At present). For hills (now

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Uttarakhand), the *Bhesaj Sahakari Sangh* was given monopoly for collection and purchase of medicinal plants in Kumaon and Garhwal regions. However, in 1986, the *Kumaon Mandal Vikas Nigam* (KMVN) was also given right of purchase of medicinal plants in Kumaon regions. The FD only issue periodically the list of medicinal plants not to be harvested and the royalty and purchase price are fixed jointly by the CF, Divisional Commissioner, Director and Chief Pharmaceutical Expert, Ranikhet. The harvested material is inspected by the cooperative and counter inspected and certified by the FD. The chief executives of two organizations issue export permit countersigned by DFO. For all these activities the *Sangh* charges 5 percent as commission on the approved rates from the Conservator.

5.4.5 The U. P. Panchayati Forest Rules, 1976

This provides for the management of village forests via the formation of forest panchayat. The forest *panchayat* shall have the status of a forest office with power relating to the sale and exploitation of forest produce including medicinal plant. The exploitation of medicinal plants for commercial purposes shall be done strictly according to the prescriptions of the working plan / project if any. The forest produce so harvested shall be sold by public auction.

5.4.6 Order Authorizing *Bhesaj Sangh* & KMVN for Collection of Medicinal Plants in Uttarakhand (formerly hill region of U. P.)

Bhesaj Sangh comprising of village level cooperative societies in Uttarakhand is responsible for regulation of collection and sale of medicinal plants in Uttarakhand. Middlemen and traders basically created the *Sangh* to save the collectors from the exploitation. Since 1986, the formerly U.P. government also authorized KMVN, Nainital for collection and sale of medicinal plants. The notification number 541/28-1.86 (6) / 83 dated 17.3.1986 brought an end to the monopoly of *Bhesaj Sangh* in the Kumaon region.

The policy decision regarding area of operation and of species to be collected, by then, is taken at the government level. The FD, from time to time, issue list of medicinal plant species banned for collection. The CF decides the royalty rate payable to the forest department as well as the price for various species of medicinal plants & herbs jointly with Divisional Commissioner, Director of KMVN and the Chief Pharmaceutical expert located at Ranikhet. FD prepares list of medicinal plants for collection and intimates the same to the *Bhesaj Sangh* / KMVN.

5.4.7 Uttarakhand Forest Policy:

After formation of State, the Uttarakhand government announced its first ever forest policy in 2001. The major provisions relating to medicinal plant sector are:

- The forest policy of the State will be in accordance and with the provision of 1988 National Forest Policy.

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- The main objective is to ascertain bio-diversity, stability and ecological balance of the State. Economic gains from the forests will be a secondary issue.
 - Holistic and sustainable management of vegetation including their conservation and protection through rational and scientific method.
 - Create employment through scientific management of NTFPs including medicinal plant.
 - Identification of endangered species and their conservation through proper management and protection.
 - Periodical survey of endangered species and form strategy to conserve them through regeneration.
 - Encourage cultivation of medicinal plants on non-forest lands and establish micro-enterprises for value addition.

Further to the above policy framework, the government has declared Uttarakhand as "Herbal State". This is in the line of the State's philosophy of going organic. Several steps have been taken by the state government to develop this sector. Few of the major steps taken are:

- Under conservation scheme, three herbal gardens have been established at (i) Mandal (ii) Selakui and (iii) Muni Ki Reti (Rishikesh).
- 150 farmers have been trained for cultivation of medicinal plants.
- Beginning of cultivation has been made in 130 ha. spread throughout the State.
- Announcement for establishment of "Uttarakhand Medicinal Plant Export Zone" which could be monitored by a committee and explored for international markets.
- Preparation of Global Environmental Facility Project.
- Development of websites & portals for information dissemination;

The most recent development on policy matter has been to handover the marketing of medicinal plant to Forest Corporation from *Bhesaj Sangh* and the KMVN.

5.11 Critical Analysis of Uttarakhand State Policies / Legislations

The impact of these Acts and Rules on the sustainable development of medicinal plants & herbs are analyzed in succeeding paragraphs.

5.5.1 The 1950 U. P. Private Forest Rules

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This rule framed in 1950 had excellent relevance at that time to prevent large-scale destruction of forests. However, in the new approach adopted under MoEF's JFM guidelines of 1990 & 2000 all NTFPs growing in government forests, which are, and managed under JFM micro plan have been allowed free to the villagers. Moreover, under the 73rd Constitution amendment of the ownership in notified areas has been granted to the local tribal village and the people living in the village, foresters at best work as co-managers. However, the authority for sustainable environmental management, in order to safe guard long term interests, under Forest Conservation Act, 1980 continues to rest with the Dept. of Forests. The privileges and rights bestowed under these two statutory Acts are, therefore, not without liabilities and obligations, which must be fulfilled.

The villagers during interactive sessions (PRA) have explicitly revealed that procurement of such transit pass (*Rawannas*) from the DFO office is a herculean task. Sometimes it takes weeks and by the time the '*Rawanna*' is obtained, most of the produce would perish and rot. The expenses incurred in commuting between villages and the DFO office sometimes exceeds the sale value of NTFPs. This aspect should be critically considered and the regulations at least applied to the cultivators which otherwise damage the government efforts for expanding cultivation base or at least be simplified and relaxed. An alternative could be that the transit passes should be issued at village level by the village level institutions e.g. JFM committee after a joint inspection by forester or the Range Officer along with Village Pradhan. The time limits for transportation should also be lifted as it does not serve any purpose rather it hurts the system as the villages are in remote areas and sometimes reaching to the nearest market may take over twelve hours and hence the transportation even between sunset and sunrise should be allowed. One the other hand Village Committee, whether tribal or otherwise, should realize forests including NTFPs. Are inter generational as well as inter-regional or even national resource. The committee has right to manage and use produce, keeping the resource intact as provided by the technically competent authorities. NGOs championing the cause of Committees under PRA or PREA, should not overlook this responsibility.

5.5.2 Protection of Trees in Rural and Hill Areas Act 1976

It is very favourable to sustainable development and management of NTFPs as the list of trees in schedule 1 and 2, which are restricted for felling are producing large quantity both of food and products of medicinal value and thereby deserve protection. Moreover notification of Jan. 1982 (schedule – III) provides for species which can be felled in the private land, which are commonly found grown in the fields and do not have much NTFP value.

The beneficial implication of this Act is not very well known to the villagers. However, when implications of the provisions were explained to them during PRA they supported the Act. The forest officials are also in favour of this Act, since it covers

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NTFPs including medicinal plants and supports sustainable development of NTFPs. Moreover, it allow villagers to harvest without restrictions the trees grown under social and farm forestry programmes. However, here too the authority to sanction tree cutting with replanting should vest jointly or Village hood and Range Officer.

5.5.3 The U. P. Transit of Timber and Other Forest Produce Rules 1978

Now that the 100% NTFP ownership in JFM areas has been granted to the local community & harvesting is to be done as per micro plans approved by the DFO, there is need for decentralization of powers as well as gradual empowerment of the village level institutions.

In view of the JFM rules authorizing 100% revenue for most of the NTFP going to the VFC, it is suggested that amendment may be made to authorize the Chairman of the VFC or jointly by VFC Chairman and local Range Officer to issue export permits for sale of NTFP and small timber within the limits of the forest Division to the purchases depot or factories or buyers, after verification by local Deputy Ranger.

Transit pass for transit from JFM areas and outside the Division may be issued by DFO on the recommendation of the JFM committee after meeting their local needs.

The individual principle of shared concern / shared governance should be with a transparent partnership mode and not by dictorial mode. The DFO level officers should move and visit the micro-site and help build up confidence in the changed pattern and should not continue to expect representatives of Village Committee to visit DFO's office and waste their time and other resources.

5.5.4 Under the U. P. Forest Corporation Act 1974

Ownership of NTFP (given under JFM order) provides right for stakeholders to first use for subsistence of all members in the community and then sale of surplus. A growing body of evidence in various States in India, which have adopted JFM as a new policy in early 1990s, show that where stakeholder has right to harvest, consume and, sell NTFPs the sustainable productions have increased, while production and conservation of the production base have become easier and a way of living, as the farmers tend to protect forests and harvest less than when they were not involved in JFM mode of management.

The multiple ownership of Medicinal Plants by the Forest Corporation (owner) *Bhesaj Sangh* & KMVM (monopoly buyer) as well as the stakeholder in JFM area only encourages the local villagers to individually undertake unsustainable harvesting for getting maximum products as price received by them is much lower than the market price. As such it is suggested that in light of joint forest management objectives there should be enhancement of the powers of stakeholders in deciding the manner of

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disposal of surplus and selection of the buyer of forest products as well as for its transit within the forest Division.

Based on discussion with villagers during PRA, it is suggested that instead of monopoly purchase by the FD and designated other organizations like KMVN and Bhesaj Sangh the FD should only declare a base price for purchase. The collector should be free to sell it, to anyone paying the best price.

It may be further mentioned that under the constitutional amendment of 1966, the community resources including ownership of minor forest produce have been endowed to *panchayat* in the scheduled areas. As such the present Act comes in direct conflict with the constitutional amendment and needs revision wherein the FD / FC can only serve as a partner and not the owner of NTFP in the scheduled areas. Similar, procedure should also be adopted in the non-schedule areas in the State to ensure equal opportunities for economic development through sustainable management and harvesting of medicinal plants and herbs. However, PRA & PREA too need specific clarification stipulating the liabilities of the Village Committee as explained in paragraph 5.5.1.

Moreover, the bulk users like Dabur India Ltd., Himalayan Drug Co., other Ayurved firms and R & D organizations should be encouraged to have direct purchase contracts with various JFM organizations. They will in their own interest provide know-how for sustainable collection, storages, packaging, local processing etc. This will ensure better price realization and prevent loss of material in village level due to unscientific storage & transport.

Handing over the business to Forest Corporation is also socially not acceptable in Uttarakhand. The villagers and the NGOs have mostly opined against it. In their view, the Corporation has experienced only in timber trading and their personnel are not trained in medicinal plants and herbs. In final analysis, notwithstanding ecological stipulations, forest dept. and forest officers continue to be tree centric and not of comprehensive eco-attribute of a forest. Besides, in recent decades the working has been becoming more of administrative management than Scientific and professional. Even KMVN in similar efforts lost a huge amount in the past and in lack of marketing a good amount of materials perished in their godown.

The *Bhesaj Sangh* concept could be a good social decision but it certainly has not been able to serve the purpose as it was meant for the *Sangh* appointed agents in different areas. These agents were supposed to be the people equipped with license or permit for harvesting. However, practically all these agents became the contractors and employed Nepalese / *Bhutia* labourers who are not trained in identification or harvesting techniques etc. Resultantly, on name of these so-called agents, destructive harvesting continues in bulk and the basic purpose of conservation and gene pool maintenance is defeated.

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All the policies / legislations made whether at central or the state level have orientation to conservation, propagation, cultivation and institutionalization etc. Not a single policy discusses about post harvesting, logistics, infrastructure and marketing aspects. To some extent Uttarakhand government on its own has addressed these issues but the results are yet to be realized. All the marketing efforts made in the past have not been able to yield any result. The recently constituted National Medicinal Board and its state counterparts is indeed a good step to channelise the trade. Uttarakhand government has also constituted a body namely Infrastructure Development Finance Company Ltd. to promote cultivation and processing of medicinal plant by extending liberal financing to the interested farmers and processors.

The field investigations and literature reviews have indicated that more than two dozen of organizations / institutions are involved to handle different aspects of medicinal plants but none of these organizations have shown any concrete results. Till date full proof seeds, saplings and nursery technologies have not been developed, yield pattern not known and quality certification measures are still missing.

It is advisable that the State should empower one organization to tackle the situation, as none of the stakeholders know about each other's activities. The policies required be re-addressing and making these as practical as possible.

5.12 The New Approach Of Participatory Management or Joint Forest Management – Policy Evolution

5.61. Evolution in policy instruments

Till mid 1970s foresters had followed the traditional system of management with little interaction with local people, (except meeting their recorded rights and involvement in the fire fighting) and urban opinion makers. However, due to rapid rise in human and livestock population the demand for forest produce increased dramatically specially for fuel, fodder, non-wood forest products etc. which were not part of the old timber oriented management practice. This led to excessive harvesting of fuel and fodder as well as damage through grazing and fire, as people had to meet their sustenance needs. This created conflict between people and the foresters following the old custodial approach for management. As such attempts were made in U.P. (Van Panchayats Rules 1976), West Bengal (Arabari), Himachal Pradesh (Dhauladhar), Orissa and few other States in 1970s to involve people in forest protection and management as well as in sharing of forest produce.

The first policy level decision was taken in the resolution passed in the meeting of the XXII Central Board of Forestry (CBF) held in December 1987. The Prime Minister in his Chairman's address stressed the need for effective people's

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participation in forest protection and management. This was also reflected in the Resolution No. 25, which reads as under:

"This meeting resolves that by 31.3.90 every village will have a plan for regeneration of forests and the restoration of ecological balance. This plan will be drawn up and implemented with full participation of village *Panchayats* or other such bodies".

This also got incorporated in the basic objectives of the National Forest Policy of 1988, which emphasized the creation of a massive people's movement, with involvement of women for achieving the policy goals. Moreover, the order of 1.6.1990 issued by the Ministry of Environment and Forests, Government of India clearly laid down the procedure for peoples involvement in forest conservation and management through appropriate village level organization under a proper scheme. It also laid emphasis on the procedure for sharing of and usufructs and a share of the net sale proceeds of timber on the lines of West Bengal. The gap seems to persist in not removing the word 'involvement' by 'partnership' and management by participatory mode must clearly state the rights with liabilities for both communities and forest officers as well in respect of these intergenerational and inter regional natural resources.

<p>"The National forest Policy 1988 envisages people's involvement in the development and protection of forests. The requirement of fuel wood, fodder and small timber such as house building material, if the tribal people and other villagers living in and near the forests are to be treated as first charge on forest produce. The forest communities should be motivated to identify themselves with the development and protection of forests from which they derive benefit".</p>

5.6.2 Legal & Social Issues

The constitution was amended through 73rd amendment in 1993 and the *Panchayats* became part of IX schedule to ensure economic development and social justice in respect of 29 subjects listed in the eleventh schedule of the constitution in which item 6 & 7 cover the social forestry / farm forestry and minor forest produce (NTFP) respectively. This provides for endowing *Panchayats* at the appropriate level, with the ownership of NTFPs. The Act however has not defined the term NTFP and the issue is under consideration of the MoEF.

This legal issue needs examination for state level application in notified *panchayats* with tribal population. The procedure developed and followed in Madhya Pradesh may be adopted i.e. NTFP ownership of people and joint management with FD.

Moreover, vide its circular No. 22 - 8 / 2000 -JFM (FPD) dated 21st February 2000; Govt. of India, MoEF issued guidelines for strengthening of JFM programme. The main issues addressed are summarized as under:

A. Legal Back Up To The JFM Committees

- (i) It is necessary that all the state government register the JFM or village committees under the Societies Registration Act, 1860 to provide them with legal back up. This may be completed by 31st March 2002.
- (ii) There are different nomenclatures for the JFM committees in different States. It would be better if these committees are known uniformly as JFM committees (JFMC) in all the States.
- (iii) Memorandum of understanding, with clearly defined roles and responsibilities for different work or areas should be separately assigned and signed between the state governments and the committees.

B. Participation of Women In The JFM Programme

- (i) For the general body meeting, the presence of at least 50% women members should be a prerequisite for holding the general body meeting.
- (ii) At least 33% of the membership in the JFM Executive Committee / Management Committee should be filled from amongst the women members. One of the posts of office bearer i.e. President / Vice President / Secretary should be filled by a women member of the committee.

C. Extension of JFM In Good Forest Areas

For better resource planning and collective management, distance from the village and dependency on forests should be the main criteria for allowing JFM programme to operate. Therefore, JFM programme should cover both the degraded as well as good forests (except in the protected area network) within 5 kms. of a village. The micro-plan or treatment plan and memorandum of understanding should be different for degraded forests and good forests (crown density above 40%). In good forest areas, the JFM activities would concentrate on NTFP management and no alteration should be permitted in the basic silvicultural prescription prescribed in the working plan but to promote regeneration, development and sustainable harvesting of NTFPs.

D. Preparation of Micro-plan In JFM Areas

- (i) In case of new working plans a JFM overlapping working circle should be provided to incorporate broad provisions for micro plans. To achieve this, flexible guidelines should be evolved for preparation of local needs based micro plans.
- (ii) The micro plan should aim at ensuring a multi product and more NTFP oriented approach. Without changing the basic principles of silviculture, deviations may be approved in the existing working plans if necessary. It should incorporate locally available knowledge as well as aim to strengthen local institutions and ensure marketing linkages for better return from NTFPs.

E. Conflict Resolution

In order to resolve conflicts in the functioning of JFM committees and to maintain harmony among different group participating in the JFM, State Governments may constitute divisional and state level representative forums or working groups.

F. Contribution for Regeneration of Resource

For long-term sustainability of resources, it is essential that a mechanism is created for ploughing back a certain percentage of the revenue earned from final harvest. For this purpose, the forest department may make not less than 25% of the share of village community and a matching contribution from its share of such sales.

G. Monitoring and Evaluation

Evaluation of the programme should be planned at an interval of 3 years and 5 years at Division and State level respectively.

H. Identification of draft 'Criteria' and 'Indicators' (C & I)

The concern of sustainable management of herbs & medicinal plants can broadly be addressed by using 'criteria' and, indicators' approach for ensuring sustained supply of forest goods and services. This refers to a set of eight criteria and 43 indicators that had been developed for sustainable forest management in India, through a process known as the 'Bhopal-India process'. The Task Force report on this subject has already been submitted to the Government of India, which has now initiated action to apply them to different forest types of India. The bulk of the supply of medicinal plants comes from forest areas and it is largely in the forest areas that the plants are threatened due to unscientific, sustainable extraction and use practices. Draft C & I has been provided for the use of FD which are given in *Annex 5.1*

With the help of C & I, the status of medicinal plants in relation to their contribution and, well-being of humans and ecosystems can be measured in sample areas, trial sites or - best of all - forests subject to certification, where their status can be correlated with production figures. With baseline data, subsequent measurements will indicate the direction of change leading to well being (or not) of humans and ecosystems.

Potential regarding Applicability of C & I

Measurement of all indicators may have some limitations, as all of them cannot be measured in one go. Therefore, measurability can be grouped into three categories (i) the ones measured that can be measured from the existing secondary sources of

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information; (ii) the ones for which information can be gathered from the field with little effort; and, (iii) for the ones which require long-term research. As resources develop and the potential of medicinal plants grows, the third category of indicators can also be measured through investment in research and development.

5.13 JFM Policies in U. P and Now (Uttarakhand)

In the light of above policy guidelines of MoEF an assessment of the steps taken by the States of U.P. & Uttarakhand in implementing the same is summarized as under:

Uttar Pradesh has been a late starter of Joint Forest Management Programme. Concept of JFM, however, was included to some extent in the U.P. Panchayati Forest Rules 1976 to cover Districts of: Nainital, Almora, Pithoragarh, Pauri Garhwal, Chamoli, Uttarkashi and Tehri and Chakarata Tehsil of Dehradun District. However, a fresh direction was issued through Uttar Pradesh village Forest Joint Management Rules, 1997. The rules framed under section 28 and 76 of the Indian Forest Act, 1927; apply to such village forests in U.P., which are not governed by the U.P. *Panchayat* Forest Rules 1976. Subject to the supervision, direction control and concurrence of the D.F.O. a village forest is to be managed jointly by the Village Forest Committee (VFC) and nominated officers of the forest department.

The JFM formation in U.P. and Uttarakhand is still in initial stage. The orders for adoption of JFM approach was issued in 1997 vide rules made under section 76 of the Indian Forest Act of 1927. The committees have been named as "Village Forest Committee (VFC), which normally comprises of one member of each family as its member. The executive committee constitutes of seven members, which also has the forest guard as member secretary. Though the selection of committee chairman and members selection are to be made through election procedure but it has been found that almost in all the cases the chairman of the committee are the village *Pradhans* who are already part of the political system.

The duties of the VFC are:

- i) To prepare a five year micro plan and annual implementation plan for the village forest and place the same before the village community for its approval to prevent destruction of trees, to utilize forest produce to the advantage of the village community, to protect the village forest and plantations from illicit felling, lopping, grazing etc.
- ii) A village forest committee is deemed to be a forest officer for the purposes of these rules. Thus the committee is to make local sale of forest produce including NTFPs without detriment to the village forests, provided it has the prior approval of the D.F.O. and is for bonafide domestic use of right holders.

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- iii) The funds for Joint Forest Management are released directly to and utilized by village forest committee. The forest department and the NGOs have the role of a facilitator.

In both the States, the activities designed for JFM are:

- Training and capacity building
- Planning
- Micro plan implementation
- Monitoring & evaluation

The State of Uttarakhand after its formation in November 2000 made improvements in "The Uttarakhand Forests *Panchayat* Rules of 1997. The main element of the new rules in Uttarakhand is decentralization of powers to the communities with the objective of the improvement in the condition of the forests and the poor rural populace.

- The jointly managed forest areas will have the status of village forest referred to in the section – 28 of the Indian Forest Act.
- Concept of forest user groups has been adopted.
- The representation of the women members has been increased.
- The VFC have been given power to recommend compounding of forest offences.
- Sharing mechanism in Uttarakhand has been changed in favour of VFC and now the share of VFC will be as follows:

⇒ In case of timber 50% of the net income up to the limit of Rs. 5 lakhs.

⇒ In case of Sal seeds, Cane and Bamboo 50% of the total royalty.

⇒ In case of resin total income after deducting the department expenditure.

⇒ 100% share in all other cases, which are not covered among items mentioned above.

5.8 Critical Analysis of Policy Guidelines of U. P and Uttarakhand

The policy and the formation of JFMCs in both the States have had a positive impact on sustainable management of NTFP. However, following issues need to be addressed to bring the state guidelines in consonance with the MoEF guidelines of Feb. 2002.

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- (i) JFM areas are functioning as independent unit, but as yet no order have been issued for their registration under Societies Registration Act of 1860, as desired by MoEF (Feb. 2000).
 - (ii) Similarly the women's participation has not yet been brought to the desired level of 50% nor have women been appointed to one of the three top offices in the executive committee.
 - (iii) As a matter of practice at present, good forests are deprived of JFM interventions. The good forests are rich with NTFPs from tree, herbs and shrubs. Community involvement could augment productivity if these areas are brought under JFM as per new directives of MoEF.
 - (iv) The working plans do not yet have a JFM overlapping working circle. As a result, the micro plans being prepared totally depend on local transect walk and the PRA exercise, normally being, conducted by untrained NGO representatives and FD staffs. The stake holder's involvement in micro planning is still only at a rudimentary stage. Economic motivations without extension support are not enough to attract them for serious involvement in the planning activities. Resultantly, these micro plans lack a proper visualization of local subsistence and economic needs as well as application of a multi product silvicultural practice for sustainable harvesting under an MoU.
 - (v) JFM hitherto has been limited to only plantation and some regeneration activities on degraded or barren forest / communities land. Entry point activities have not been given due importance. The plantation activities have funds for limited period and are activity based. This doesn't provide continuous income to the people in and around the area and hence their interest remains limited till the time they get some employment opportunity from the activities. No extension or conflict resolution mechanism has yet been set up at forest Division level.
 - (vi) There is hardly any input either as substantial guidelines or inspection & scrutiny, to preparation of micro-plan from levels of DFO and above while there are many aspects of holistic and integrating planning with inter-sectoral and long-term implications, which call for such higher-level inputs. Perhaps the micro plans are finally approved by DFO but with hardly any security. There is no system of documenting micro plans at DFO level even in abstract form, which could be retrieved and perused. In short micro plans in reality meets more of in difference lip services at higher levels. is w t
 - (vii) None of the policy guidelines directly brings NTFPs management under JFM. Resultantly, NTFP collection is not made in organized way under sustainable management under an MoU. Lots of destructive harvesting by individual

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collectors was observed during PRA by the consultants. Collection of grasses, particularly from Civil and Soyam forests of hill areas are also more or less systematic (through *batwara* system). However even these areas require JFM intervention for sustainable development and equitable distribution of the benefits from these resources. More than 70% of the villagers interacted under PRA have shown tremendous interest for bringing H & MP under JFM for stakeholder oriented management will not only provide a regular income source to the stakeholders but also result in sustainable development of H&MP through scientific harvesting and value addition ingredients. It would then encourage the entire community to protect the forests from destructive harvesting and other damages.

- (viii) The local sale of H & MP under present situation doesn't have protective and enabling provisions to counter the market forces. No market mechanism exists to guarantee fair and poor price of the produce to the collectors.

Bhesaj Sangh and 'KMVN' are dealing in the H & MP in Uttarakhand. These organizations have appointed agents to facilitate collection of medicinal plants on locally guided prices, which is hardly about 50% of the prices (PRA) on which it is procured in the open market. Empowerment of JFM committees for self-marketing and issuing of export permit within the forest Division limits, will certainly change the scenario and its linkage with the direct consumers will bring in post harvesting technology and better price for local stakeholders.

- (ix) The mechanism for equitable sharing of benefits of H & MP is not yet defined in both the States excepting in case of grasses (*batwara* by local community) in Civil and Soyam forests and in case of deficit they purchase the grasses from other villager who have surplus. In case of H & MP, due to lack of JFM interventions, no such mechanism of equitable sharing exists. Any one in the village can extract any quantity of H & MP for self-consumption and sale to the government and private agencies. This aspect needs immediate remedy through issue of guideline by the F.D.
- (x) Institutional support to JFM for conflict resolution, monitoring etc. is an area, which require considerable attention of F.D. JFMCs will not be successful unless supported by District / State level institutions in form of a **Federation of JFM's**, to provide through an extension approach harvesting, post harvesting and grading knowledge to local stakeholders and, establishment of marketing linkages with bulk buyers and consumer industries. These must be brought as policy goals, through an appropriation order. The newly formed Forest Development Agencies (FDA) under directive of MoEF in 2001 may be used as focal points for negotiations for pricing interaction with consumers / dealers and dispute resolutions.

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- (xi) However, it was observed that U.P. and Uttarakhand have given more powers to VFCs than in many States like:
- i) Granting powers of forest officers to VFCs for recommending compounding of cases.
 - ii) High share of net value in sale of major items like resin (100%), Sal seeds (50%).
- (xii) But during PRA it was observed that in none of the 10 villages in Uttarakhand the VFCs were effective and the powers of forest officers in recommending compounding of cases was not being utilized.

Similarly, excepting in 5 villages of Pithoragarh Division, the effective participation of women in JFM activities especially in preparation of micro plans, usufruct distribution was not being implemented in practice in Chamoli Division (5 villages) of Uttarakhand.

Again, consultations with local NGOs in the field have revealed that the presence of women in GBM and executive committee meeting is nominal and their voice is not given due weightage.

While, the PRA feedbacks have revealed that the micro plans are normally prepared by the forest field staffs without much discussion of the local issues involved with the villagers. However, the VFCs approval is obtained in due course before start of the activities under the micro plan.

5.10 H & MP Propagation and Linkage with JFM

The Flow Chart of JFM as perceived in general is shown in Fig 5.1 and, the one existing vis-à-vis NTFP is given in Fig 5.2. The examination of this vis-à-vis the issues discussed in preceding paragraphs opine to following: -

- i) Sustainable stakeholder oriented management of H & MP could work as a vehicle to boost rural economy of villages situated near forest areas. But then sustainability to this end needs to be defined in terms of specific criteria in the light of definitions of FAO, or others in India. This is essentially as sustainability perceived by various stakeholders differing or in other words it is target group as well as target area variant. It is also time variant due changes in socio-economic scenario over time.
- ii) The present system of uncontrolled harvesting, lack of post harvesting treatment and community based marketing are the main constraints in its sustainable development and regular income generation. JFM could certainly be the right tool to improve the situation. It will not only check the destructive harvesting due to close monitoring and support of the local community through the JFM Committees, but also help in sustainable development through protection, regeneration and propagation. JFM with its legal back up

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- and institutional supports will be in a better position for bargaining to create a favourable price mechanism, ensure better post harvest treatment and value additions. In fact the JFMC's, which presently do not have a good financial base, will also be getting financial support through savings from the H & MP sales and allocations under the FDA programme of MoEF under the Xth Five Year Plan.
- iii) H& MP sales could work as a source of regular income throughout the year as different species have different harvesting seasons and some species or other will be harvested and marketed periodically during the year. The system of individual harvesting and marketing is resulting in irresponsible extraction of H & MP both in terms of damage to the forests and haphazard marketing. Once the management is brought under JFM, the local's love and knowledge for this perennial resource will increase and protection and maintenance of forests will become normal process for the community.
- iv) About 95% of the villagers and 70% of the senior forest officials interviewed have opined in favour of stakeholder oriented JFM management of H & MP. However, the field officials who are still directed by the traditional ways lack enough drive and, are against the JFM approach. The commitment is lacking at all levels and perhaps at higher levels even though they are more vocal in supporting the JFM concept.
- v) The prime reasons for linking H & MP and JFM as viewed by the stakeholders are summarized as under:
- It will minimize destructive harvesting due to close monitoring by JFM Committee and its members.
 - Species wise extraction level will be defined on availability basis as they have fair idea of the resource availability and regeneration potential.
 - Accelerate propagation level even on private lands as the JFM could take care of value addition and marketing aspects.
 - Depleting and endangered species could be saved through protection and restrained harvesting level.
 - Sharing mechanism will be well defined as it will become a community resource and stake level of every family and member will be fixed. It will ensure equitable distribution of products and income.
 - JFM as an institution will have a better strength to receive institutional support and interact with the FDs for technical and financial assistance.
 - It will help to reduce unemployment in the area and stop destruction to forests through uncontrolled head loading of fuel wood.
 - JFM Committee will be strengthened financially to take up in addition to forest development some community developmental activities also.

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- JFM Committee will have better bargaining strength to fetch better prices for H & MP based on market intelligence system and institutional support of FDA and NGOs.
 - It will free the villagers from exploiting grip of traders, middlemen and industries.
 - JFM will be able to get more institutional support and avail of governments development initiatives in the area.

All the above factors reveal a encouraging picture. However, the efforts required are multi-dimensional and rigorous. The enthusiasm shown by the villagers leads to a conclusion that management of H & MP must be brought under JFM but the Village Committee must be at the Centre and not FD while there has to be with interactive support of FD. JFM committees should be given all the rights of sustainable propagation, harvesting and marketing as per F.D. guidelines from time to time. Regular and frequent inspection and on site monitoring from higher level such as DFO is needed. Considerable research support on multi product silviculture, harvesting and post harvesting technology, grading etc. along with institutional development and market research will be needed to improve the JFM Committees capabilities for the sustainable development and management of H & MP under this new approach of management. As PRIs have stronger statutory backing of the Constitution and, JFM has to appropriately harmonized with PRA and, PREA.

5.11 The Way Ahead – Operational Issues

For proper implementation of MoEF and state policy guidelines following operational issue need immediate attention of F.D.

- (i) The participatory management or JFM approach elevates the local people from the receivers of some benefits from forest area to the level of co-managers along with the forestry personnel's of a designated area of forest. It ensures equitable benefit sharing of the usufruct as well as the financial returns from timber harvest. Many of the traditional percepts of communities are well in conformity with ecological principles and these are not true center but oriented to multiplied or multi-canopy forests. These have brought to focus the need for development of modified silvicultural systems, flexible management and, multi-criteria based assessment approach for ensuring local need based and sustainable multi product output from the previously degraded forest area and better yield from good forest areas.
- (ii) There is an urgent need for propagating this new major policy shift from the contemporary timber oriented and custodial forestry practices to a more socially and environmentally as well as local people friendly approach of micro planning and management. It also calls for a holistic trade off between ecological and economic benefits from forests. This will perhaps be more environmental friendly as well.

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- (iii) This requires a rapid attitudinal change on part of both forest officers, field level personnel and local villagers for giving up the feeling of antagonism. They must work as members of a team and as partners with the common goal of conserving and enhancing the forest resources for its sustainable use by the society in general and local people in particular. The guiding principle should be shared concern and, shared governance. The focal issues deserving immediate attention are as under:
- (i) Development of proper guidelines for a PRA approach for resource and need assessment will go a long way in preparation of need based technically sound micro plans by using GIS based large scale maps along with implementation schedule, possible silvicultural options for multi product management. The cross-sectoral linkage will be essential with other developmental activities like agriculture, animal husbandry, rural development etc.
 - (ii) Large scale grassroots' level training has to be organized for field level forest staff, local village leaders and NGOs about capacity building and it can be done in institutes like FRI, IIFM Bhopal for assuming the added responsibility in adoption of participatory approach. There is need to develop the basic skills of silviculture, technical details of raising of nursery with certified seed or genetically superior seedlings, cultural operation which favour non wood forest product growth, non-destructive harvesting technology for H & MP, soil and water conservation etc. It will require research support and assimilation of the local knowledge in close collaboration with the people.
 - (iii) The maintenance of records of technical operation, yield of H & MP, fuel wood, grass, leaf fodder and timber etc. and its distribution should become an essential part of JFM committee activities.
 - (iv) It would be necessary to develop skills of local leaders and staff through training and extension to ensure equity in distribution of benefits amongst local people, for community development works, conflict resolution as well as maintenance of proper accounts of receipt and expenditure both of government funds and locally raised resources and share of sale proceeds from the harvesting of the JFM managed forest area.
 - (v) Once the training and human resource development process has been completed, adequate administrative and financial powers along with necessary funds should be given to the village level committees for ensuring smooth working of JFM. This will ensure a level playing field for all stakeholders and the F.D.

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- (vi) Joint Forest Management is a process aimed at regenerating and reviving the degraded and semi degraded forests with the help of the community. Naturally, the JFM overlapping working Circle in future working plans may prescribe development of a forest system, which will be as close as possible to natural forests suited to local ecosystem. In this effort, JFM will help not only in the production of fodder, H & MP and fuel wood but also possibly timber required for construction and other forest based industries. As such if promoted on correct lines this could form a viable option for meeting the national requirements of timber and at the same time to ensure economic return for the local community.
 - (vii) In due course, JFM approach may also cover large areas of good forest where people have rights like in tribal areas and the forests are situated within 5 km. of walking distance from the village concerned. However, in such areas micro plan though favouring better production of H & MP should not aim at changing the silvicultural rotation of the main tree species for quick financial gains.
 - (viii) Proper institutional set up and standards will have to be developed for monitoring and evaluation of JFM units, for ensuring effective functioning.
 - (ix) There is need to develop special approach for joint management of National Parks and Sanctuaries where usufruct sharing may not be possible but benefits from eco-tourism sustainable in improved availability of water in areas of immediate neighborhood can be shared. This should be the top agenda of the Uttarakhand Government.
 - (x) The policies and laws covering forests and specially regarding harvesting, trade and export of H & MP will have to be reviewed to support the goals of the new approach indicated in GoI guidelines of 01 / 06 / 1990, 21/ 02 / 2000 and 24/12/2002.

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Annex 5.1: Criteria & Indicators for Sustainable Management and Supply of MPs

Criteria	Indicators
1. Increase in the extent of associated forest and tree cover	1.1 Area of dense and open forest 1.2 Area under JFM (including H & MP)
2. Maintenance, conservation and enhancement of biodiversity	2.1 Area of protected ecosystems 2.2 Area of fragmented ecosystems 2.3 Number of rare, endangered, threatened and endemic species 2.4 Level of species richness and diversity in selected areas 2.5 Availability of medicinal and aromatic plants in various forest types 2.6 Status of non-destructive harvesting 2.7 Number of keystone and flagship species in various forest types 2.8 Certification norms 2.9 Gene-pool maintenance
3. Maintenance and enhancement of ecosystem function and vitality	3.1 Status of natural regeneration 3.2 Extent of secondary forests with medicinal plants 3.3 Incidence of pests and diseases, weed infestation, grazing and fire
4. Conservation and maintenance of soil and water resources	4.1 Extent of ground cover 4.2 Area under watershed treatment 4.3 Soil erosion status 4.4 Level of scientific harvesting
5. Maintenance and enhancement of forest resource productivity	5.1 Growing stock of keystone and flagship species 5.2 Volume of production of identified/ important medicinal plants 5.3 Propagation in non-forest areas
6. Optimization of forest resources utilization	6.1 Aggregate and per capita consumption of medicinal plants 6.2 Import and export 6.3 Recorded removals 6.4 Direct employment in conservation, development and extraction 6.5 Direct employment in <i>ayurvedic</i> industries 6.6 Level of processing and value addition 6.7 Auditing and price acceptance by Industry
7. Maintenance and enhancement of social, cultural and spiritual benefits	7.1 Degree of people's participation: number of committees and area protected by them 7.2 Use of indigenous knowledge 7.3 Human development index 7.4 Extent of cultural / sacred protected landscapes: forests, trees ponds, streams, etc.
8. Adequacy of policy, legal and institutional framework	8.1 Existing policy and legal framework for conservation, extraction and utilization of medicinal plants 8.2 Enabling conditions like JFM resolution, transit rules etc., for participation of communities, NGOs, civil societies 8.3 Level of investment and priority for research and development of medicinal plants 8.4 Human resource capacity building 8.5 Status of information dissemination and utilization

CHAPTER – 6:

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CHAPTER – 6

MARKET SCENARIO

6.1 General

Academically, marketing is the process of planning and executing the conception, pricing, promotion and distribution of ideas, goods and services to exchanges that satisfy individuals and organizational objectives. The definition just does not fit in case of marketing of herbs and medicinal plants (H & MP). Several organization and institutions have made multiple efforts, which unfortunately went into seminar proceedings, research papers and workshops conclusions. It is indeed a paradox that the raw material (H & MP) market continues to be in shape of un-organized sector on the contrary the processed products out of it are enjoying a perfect corporate patronage i.e. marketing in organized ways wrapping up all the four Ps i.e. Product, Placement, Price and promotion. Consequently, it is interesting to note that raw materials cost constitutes to less than 12% of product cost in *Ayurveda* Drug Industry. This does not compare suitably with any industry as the average raw material cost comes to the tune of 25-30% of cost of production in most of the industries. The scenario draws a conclusion that the trade is dominated and controlled by the industry and H & M suppliers are forced to remain in un-organized sector.

Marketing of any product starts with the variable 'ownership'. If a person, a group, an institution or the government owns a product, the ways and means of marketing are somehow located. The H & M in Uttarakhand is mostly found in forests, owned and regulated by the government. However, the ownership exists only in legal term as far as H & MP are concerned. The operation part rests with the collectors-both legal as well as illegal. As a result, bulk of the marketing is done in clandestine way i.e. pilferage and smuggling. The scenario does not answer the following basic questions:

- Who collects the H & M?
- Who sells?
- At what price?
- Who are the buyers?
- Where are the destinations?
- Which products are coming from wild and cultivated sources?

During the PRA conducted in 5 different altitudinal zones of Kumaon and Garhwal each, hardly 0.25% of the villagers have admitted to be involved in collection of medicinal plants. Incidentally, none of the villagers have been found to be cultivating H & M. On the contrary, interviews with trade and industry segments reveal that substantial quantity of H & MP collection from these villages or the clusters. In other words, H & MP are being collected by local residents, sold to someone and supplied somewhere but no one admits to be involved in the

operation. The supplies from the cultivation sources do not exceed 5 to 7 % of the total volume traded. It can hence be safely concluded that about 95% of the supplies are sourced from wild sites.

In view of the above complex situation, it is indeed a difficult task to trace out marketing variables and resultantly; the consultants had to make efforts to investigative and reach a reliable conclusion. The process of marketing starts with product, hence it becomes imperative to discuss the different part or from H & MP available by their source of origin as discussed in succeeding paragraphs.

6.2 The H& MP available in Uttaranchal:

6.2.1 Basis for assessment:

In terms of world health organization (WHO) "a medicinal plant is any plant which in one or more of its organs, contains substances that can be used for therapeutic purpose, or which are precursors for chemo-pharmaceutical semi-synthesis." If this definition is to be believed, more than 7500 species of plants are estimated to be used by over 4600 ethnic communities for human and veterinary health care across the diversified eco-systems of India. The scientific communities say that around 1700 species of plants are fully documented in terms of their biological properties and actions. In Uttaranchal about 320¹ species have been found to be commercially available. In small or big quantities those are being collected from the wild or cultivated lands and traded throughout the country. The altitudinal variations do emerge in terms of species but there are also overlapping for species in different phyto-climatic zones. Thus this study divided Uttaranchal in five different altitudinal zones. These are

- Up to 900 m above the msl;
- 900 to 1200 m above the msl;
- 1200 to 1500 m above the msl;
- 1500 to 2500 m above the msl;
- More than 2500 m and above the msl.

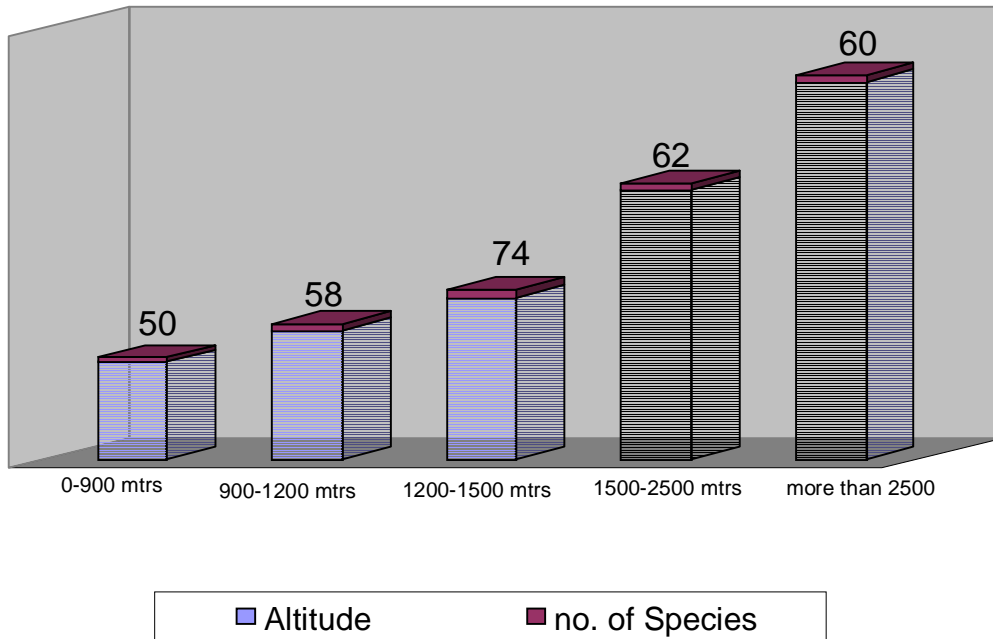
Geographically, the state again, has two different zones, (a) Kumaon and (b) Garhwal. One village each under each zone and each altitudinal zone have been investigated through extensive PRA techniques. The resulting number of species emerging in each zone and altitude are depicted below:

6.2.2 Availability in two regions:

The number of species reported for Kumaon is 304 while 288 is reported for Garhwal region as illustrated in Fig 6.1. Largest number (143) of H & MP species is in altitudes between 1200 and 1500m, followed by altitudes between 1500 and 2500m.

¹ Claimed by Indian Institute of Ayurveda for Drug Research Tarikhet, Ranikhet

a) Kumaon Region



b) Garhwal Region

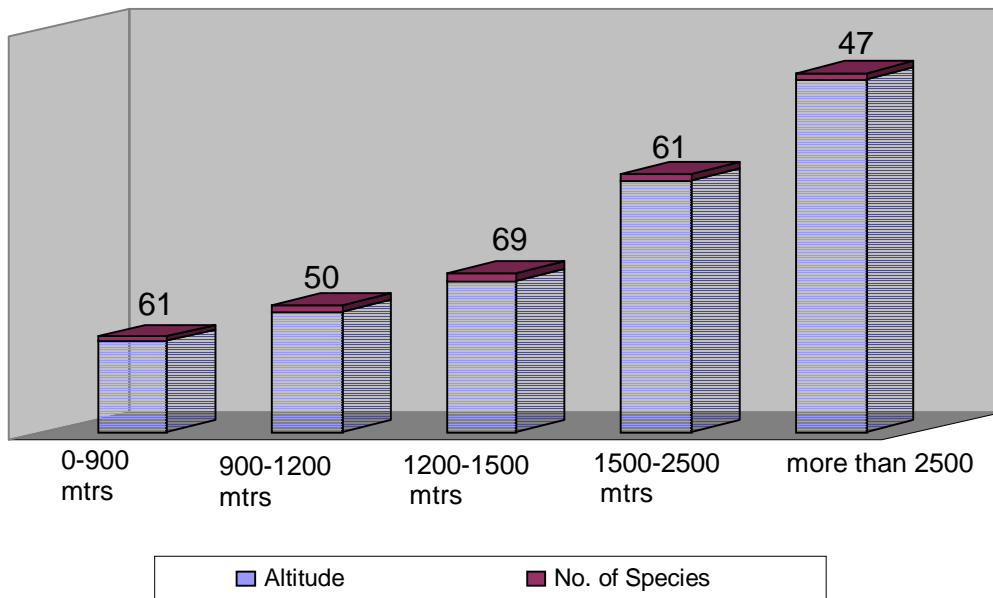


Fig 6.1: Altitude-wise H & MP species available in Kumaon and Garhwal regions of Uttarakhand

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The species have been placed in two groups of quantities availability such as those offer 9 qtls. and those between 5 & 9 qtls. per year have been listed in Annex's- 6.1 to 6.5. Many species, which have availability per village per year in some kgs., are not viable for commercial extraction and, therefore, have not been shown in these Annex's.

A summary of number of species with quantities availability of species above 5 quintals within a village / year in five different altitudes are given in Table 6.1.

Table 6.1: No. of species with quantity available over 5 Qtls. per village / year in 5 altitude class

No. of Species			
Altitudinal range	Kumaon	Garhwal	Total
Upto 900 m.	20	13	33
900 – 1200 m.	13	25	38
1200 – 1500 m.	22	10	32
1200 – 2500 m.	21	18	39
2500 m. & above	19	11	30
Total	95	77	172

A number of identified H & MP species (10) occur in more than one altitude zones as given here under:

The species overlapping between the altitudes are:

1. *Sanan* - 900,1200 and 1500 m
2. *Maduva* - 900 & 1200 m
3. ***Dadim*** - **900, 1200, 1500 & 2500 m**
4. *Harer* - 900, 1200 & 1500 m
5. *Chura* - 900, 1200 & 1500 m
6. *Bel Patri* - 900 & 1200 m
7. *Aonla* - 900, 1200 & 1500 m
8. *Daiya* - 900, 1200 & 1500 m
9. *Malu* - 900 and 1200 m
10. *Ritha* - 900, 1200 & 1500 m
11. *Rueen* - 900 and 1200 m

Dadium: occurs in four out of five altitude zones. *Sanan*, *Harer*, *Chura*, *Aonla*, *Daiya*, *Ritha*, are found in three altitude zones, while, *Maduva*, *Bel Patri*, *Malu*, and *Rueen* are present in altitude zones.

As intervention of H & MP has recently been initiated in the state, this study has endeavored to make an inventory of such species and their commercial value through extensive PRA conducted as well as with the feedback obtained from trading circle. Availability of H & MP in each village investigated has been used to extrapolate the availability for the whole state and valued in terms of the prevalent market prices. The values so worked out for only 45 species reveal a total potential of about Rs. 424 crores per year which if added to the value for other

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127 species available in the state (out of total 172) hence could easily reach to the figure of Rs. 1000 crores approximately. The method followed for this estimation has been illustrated for 57 species in *Annex – 6.6*.

In addition to the above, there are other 25-30 species found commonly in different altitudes of Garhwal region, about 50-60 species found commonly in Kumaon region.

6.3 Species under Cultivation

Conservationists have been pleading for cultivation of H & MP as an alternative source of supply to enforce and strengthen conservation measures. The field investigations have revealed that commercial cultivation is still in infancy and only about 300 ha. have been brought under cultivation under different schemes throughout the state. However, these interventions cannot be said to be commercial as these are mostly in the form of herbarium, demo centres or nurseries. Only a few species have started to be commercially cultivated. For example at village Ghissa near Joshimath nearly 20 farmers have started cultivating kutki. Near Nainital, Jiranium is another product being cultivated. There are few more examples of cultivations of about 30 – 35 species on higher altitudes near Milam glacier by one of the leading cultivators Mr. Durga Singh Martolia and few others. However, still the cultivated H & MP do not exceed 5 % of the total quantities being traded. It is a fact that the collections from wild sources are also being sold as cultivated one since the cultivators enjoy license for cultivation and trading of H & MP – a practice further damaging spirit of conservation. The National Medicinal Plant Board has identified about 32 species for cultivation out of which Government of Uttarakhand has laid emphasis on about 10 have been chosen for cultivation in Uttarakhand as given. (Paragraph 1.1).

Even this extent of cultivation of H & MP is not finding much of fortune due to several reasons. Few of the prime reasons behind reluctance for cultivation are:

- Undefined market channels with uncertainty
- Need for registration and licenses for cultivation
- Harassments in obtaining permits and in transit of materials
- End-users' denial for acceptance of commodities on ground of poor Phyto-chemical composition in terms of medicinal value.
- Lower price realization again on ground of phyto-chemical compositions
- Lack of certification on quality
- Non-availability of certified seeds and planting materials
- Instant comparison of cultivated H & MP with wild species grown under natural conditions

As a result, few of top cultivators e.g. Durga Singh Martolia and Amir chand Sayana (from Munsiyari in Pithoragarh district) have confined themselves to produce H & MP species of higher altitude and enjoy a self made premium market. Mr. Durga Singh's operations has been summarized in Table 6.3.

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Table 6.2: H & MP cultivated and traded by Mr. Durga Singh Martolia (Munsiyari, Pithogarah)

Type / Altitude	<2500 m	2500-9000 m	9000 m & above
Medicinal Plants	<i>Pipli; Bach; Ashvagandha; Chitrak; Satawar; Kalihari; Malkangi; Mushkdhan & Others</i>	<i>Samaeva; Moti vach- (Satova); Medha-Maha Meda; Paitheram; Kaiser & Others</i>	<i>Kutki; Podofilam; Kuth; Aatish; Jatamasi; Chiraita; Som; & Others</i>
Spices	<i>Illachi; Maitha; Chandersur; Tejpat; & others</i>	<i>Aik Putima Lahsan; Mirch; Adrak; Van pyaz; & Others</i>	<i>Jambhu; Gandrain; Thoa; & Others</i>
Herbs	<i>Lemon grass; Citronalia; Pamaroza; & others</i>	<i>Kapur kachri; Ziraniyam; Gi;ab & others</i>	<i>Lavander; Kalairisez; Dhup lakad; & others,</i>

The Prices / rates for which the products are being sold to the customers as reported by Mr. Martolia are given in Table 6.3.

Table 6.3: Sale prices of different products (rates per kg.) of Mr. Martolia

Item	Rs. Per kg	Period of cultivation
Jambhu	200/-	Every year; 3 months
Salem Panja	1000/-	Every 3-4 years
Kala zira (Tohia)	300/-	Every year; 2-3 months
Chairata	2000/-	Every year; 3-4 months
Rattan jyoti	100/-	Once in 2-3 years
Gandarayan	200/-	2 years crop
Jata Masi	150/-	Every year
Dolu	100/-	2-3 years
Timur Beej	100/-	Every 3 years
Sarsoon	300/-.	
Phafar (flour)	80-90/.	

Cumulatively, the total turnover of all the cultivators (on record is about Rs. 70-80 lakhs. If it is further added to turnover of the Bhesaj Sangh Cooperatives (18 nos.) to the tune of Rs. 3.25 crores, the total H & M worth Rs. 4.05 crores are reported

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to be sold every year from Uttarakhand which is nearly half of the two trade centres turnover i.e. Haridwar and Dehradun alone. Estimates put the figure to the level of more than Rs. 100 crores in present context. This is an alarming indicator both from conservation as well as marketing point of view. Thus becomes imperative to examine the role and opinion of each major stakeholder to define the scenario and attempt is provided in Table 6.4.

Table-6.4: Role-played by the Different Stakeholders in H & MP trading sector

Stakeholders	Conservation/Protection	Marketing	Institutionalisation	Propagation & Cultivation	Certification	Value Addition	Policy/mgt.
Forest Deptt./ FDC	Moderate	Very poor	Not concerned	Encouraging	No effort	No interest	Only conservation orient
Collectors	Very poor	Very poor	Does not like	Not concerned	Not aware	Not aware	Not aware
Bhesaj Sangh	Poor	Poor	Against it	Encouraging	No effort	Interested but clueless	Against present policy
Cultivators	Very poor	Good	Prefers	Restricted interest	Directionless	Interested but no awareness	Not happy with
JFM	Moderate	Poor	Low awareness quotient	Not yet started	Not aware	clueless	Not happy with
Institutions	Not concerned	Very poor	Directionless	Only academic	Not yet successful	efforts made	Not interested
NGOs	Only advocacy	Not concerned	Indifferent	Drive just initiated through SMPB	Not interested	None	Only criticises
Industry	Very poor	Excellent	Own system of procurement	Good efforts	Discourages	Excellent	Indifferent

6.4 Existing Harvesting, Post Harvesting Marketing Practices

Some of the species being traded on record from Kumaon and Garhwal regions are:

Kumaon Region

Jula
Tejpat
Jambhu
Ritha
Satwar
Lavender
Moss grass
Majishtha

Garhwal Region

Amla
Mahuva (Fruit/seed)
Bel (Fruit/leave)
Semar (Root/fruit)
Baheda
Jamun
Jungli Pyaj (Tumber)
Peddeve (fruit)

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<i>Atish</i>	<i>Kachur (Tumber)</i>
<i>Lasonia</i>	<i>Ritha</i>
<i>Kapur kachri</i>	<i>Vand Haldi</i>
<i>Khas</i>	<i>Elephant Grass</i>
<i>Kuth</i>	<i>Bessin grass</i>
<i>Pashan Bhed</i>	<i>Juhi (leaf)</i>
<i>Chitrak</i>	<i>Sehtool</i>
<i>Pundwath</i>	<i>Achari (fruit)</i>
<i>Ashwagandha</i>	<i>Burans</i>
<i>Indrayani</i>	<i>Satawar</i>
<i>Van Haldi</i>	<i>Chindala</i>
<i>Muskdana</i>	<i>Van</i>
<i>Timur seed</i>	<i>Kutki</i>
<i>Maitha</i>	<i>Kuth</i>
<i>Kahiyas</i>	<i>Arkana</i>
<i>Pangan</i>	
<i>Kala Jeera</i>	
<i>Pati</i>	
<i>Burans</i>	
<i>Guiya Bank</i>	
<i>Salam Panja</i>	
<i>Salam Misrhi</i>	
<i>Doscoria</i>	
<i>Kismode</i>	

In addition to this, there are hundreds of other varieties being traded but are off the records. In Uttaranchal, the zonal distribution of medicinal plants and herbs are as follows:

Zone	No. of Species
Alpine	60
Temperate Zone	40
Tropical Zone	75
Total	175

Source: Forest Department, Govt. of Uttaranchal.

Presently, there are only two organizations authorized by Government to handle harvesting and marketing of h&mp. These are:

1. *Bhesaj Sangh Cooperative*
2. *Kumaon Mandal Vikas Nigam*

In between, Garhwal Vikas Mandal Nigam was also given the right but nothing concrete could come on implementation front. However, the year 2003 has experienced a decisive policy i.e. to transfer the harvesting and marketing rights to the Forest Corporation. Now the FC is in process of initiating their operation.

Bhesaj Sangh has been more popular than their counterpart i.e. KMVN and GVMN and focused their attention only to H & MP. *Bhesaj Sangh* with their 18 district level cooperatives have appointed area wise agents who facilitate collection of H & MP. These agents are given permit/license for harvesting. Legally, these agents are trained in to H & MP harvesting methods and its identification. These agents collect the H & MP and deliver them to the godowns of *Bhesaj Sangh*. They are paid as per prices fixed by *Bhesaj Sangh* along with other Govt. authorities. The **typical collection and disposal chain followed for H & MP in the state is illustrated in Fig 6.2.**

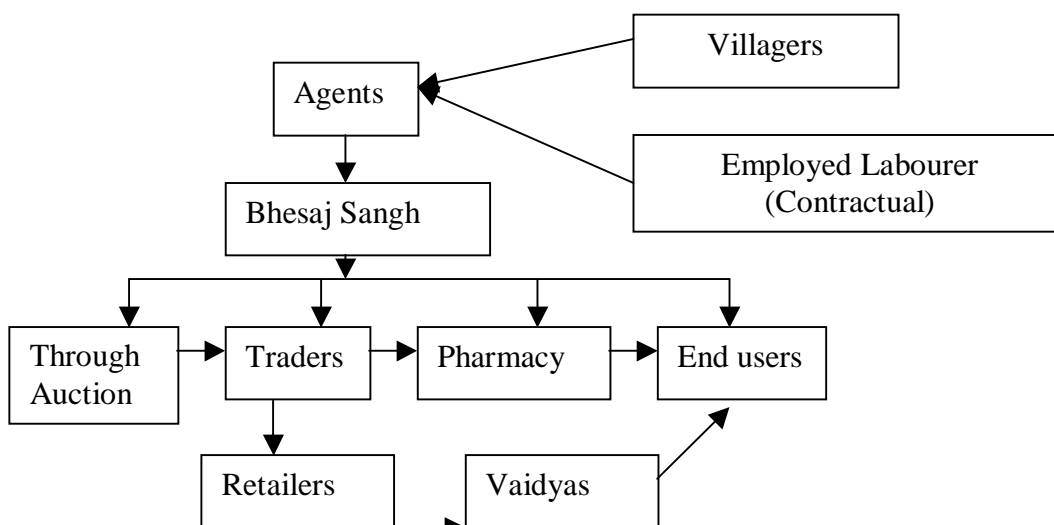


Fig 6.2: Chain followed by *Bhesaj Sangh* in collection and disposal of H&MP

The employed agents are hardly involved in collection as in reality-untrained villagers and laborers (Nepalees / Bhutias) are employed to harvest. Resultantly, tremendous destructive harvesting and loss of price on quality ground are taking place. The typical pattern is shown in Table-6.5. The avoidable distribution during harvest and loss in price are the highest for altitude zone below 900m and the altitudes greater than 2000m.

Table – 6.5: Status of destructive harvesting and price loss for H & MP in Uttaranchal:

Type	900-2000 m			Less than 900 m			2000 m & above		
	Systematic Harvesting	Immature Harvesting	Extent of Price loss	Systematic Harvesting	Immature Harvesting	Extent of Price loss	Systematic Harvesting	Immature Harvesting	Extent of Price loss
Roots	48	52	44	26	68	49	37	63	45
Stems	56	44	38	40	60	48	48	52	53
Bark	55	45	56	25	75	48	40	60	46
Whole Plant	30	70	60	12	88	75	21	79	65
Flower	62	38	26	35	65	46	49	51	36
Leaves	72	28	52	33	67	68	53	47	60
Wood	42	58	56	22	78	60	32	68	58
Rhizome	35	65	50	18	82	64	27	73	57
Seeds	45	55	30	40	60	40	43	57	35
Fruits	35	65	38	45	55	25	40	60	32
Overall	46	54	40	28	72	48	42	58	42

Source: PRA and Field Investigation

The destructive harvesting is taking place due to extraction by untrained hands e.g. where roots are to be collected, the whole plant is uprooted and nothing is left for re-generation. Similarly, in order to collect more and more to enhance income, H & MP are over harvested.

In the process, quality standards are totally ignored resulting in exploitation by collection agents and also the traders in terms of offering lower prices. The prices are always much below the wage rate prevailing in the open market. The trend is resulting in diminishing interest of the knowledgeable villagers for collection of H & MP and as a result hardly about 20% of commercially viable H & MP are properly collected and marketed in the state.

6.5 Post Harvest activities for H & MP:

Post harvesting also has a direct linkage with marketing. It normally includes either direct local consumption of the collected product or meant for marketing. **The minimum post harvest steps required are shown in Fig 6.3.**

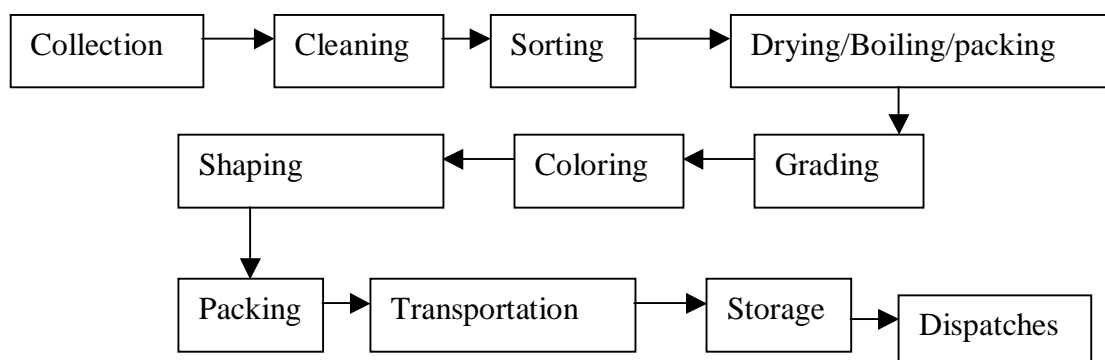


Fig 6.3: Minimum 10 steps for Post harvest are required between collection and dispatch of H & MP

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The post harvesting process can be separating shells, bark, seeds, shredding, pulping, powder making activities in which physical shape is changed but original characteristics are not changed. Some H & MP are boiled and beaten to separate fibres, or to take out extracts as per market demand. This can change consistency and color. At the end of packing exercise, it is marked indicating the identity of collector, quantity and place and time of collection. It is then handed over either for local storage or transportation to end users for further processing.

Raw H & MP is normally bulky. Many products like green leaves, fruit etc. loose weight after drying. Proper post harvesting techniques whether traditional or scientific if applied normally reduce these problems and result in multi-stage value addition and create market goodwill.

Apart from value addition through other different methods, storage is very important stage in trade. One needs to tide over bad times, depressed markets and wait for proper time like a festival after some months for getting a better price. Medicinal plants plucked at high altitudes in Himalayas mostly by the grazers who migrate up and come down, during winter are just packed and carried to market. At times whole plant is uprooted and then needed produce is taken out at leisure. By the time these collectors return back their homes down in plains, many of the "*Jadi Buties*" are affected by fungus, some get rotten and spoiled or over dried in smokes and sun. Such materials loose their value as some intrinsic alkaloids are lost or destroyed.

Taking a desired product, at a place of demand, at a proper time, in a proper shape and size, taste and appearance, for marketing is essential. In such case, the price paid by the final consumer is many times more than the price paid to the collector who had gathered the raw materials from the forests. The middlemen do charge their commission but at every stage they facilitate the movement of the produce to desired destinations most efficiently.

In Uttarakhand, the harvesting techniques used are primitive. The PRA conducted has revealed that the post harvest techniques applied are limited to few species and that too mostly for self-consumption.

Amla is mostly boiled for taking the pulp out. Separation of seed is another post harvest treatment applied to *Amla*. Similarly, *Mahua* flowers and seeds are treated locally for making indigenous liquor for self-consumption. The maximum extent of post harvest treatment in H & MP is limited to the extent of drying, sorting and grading if recommended by the purchaser. Storage, packaging and certification are the areas completely missing in the state. Selected pictures taken during PRA also reflect the species are dried with primitive method and, packed in plastic bags and marketed.

Post harvest treatments applied to certain selected H & MP are enlisted in Table-6.6.

Table – 6.6: Post harvest treatments applied to selected H & MP in Uttarakhand

H&MP	Post harvest treatment	% of produce treated	Extent of value addition (%)
<i>Mahua flower</i>	Fermentation through local technique for making wine	30	120
<i>Mahua fruits</i>	Drying	40	50
<i>Gully</i>	Oil extraction	30	110
<i>Amla</i>	Pulping, seed extraction and drying	20	40-90
<i>Tejpatta</i>	Sorting and drying	40	25-30
<i>Ritha</i>	Drying	70	15-20
<i>Hurre/Bahera</i>	Drying	30	10-15
<i>Safed Musali</i>	Drying/peeling	60	30-40
<i>Satawar</i>	Drying	50	30-35
<i>Vetivar</i>	Drying	40	25-30
<i>Amaltas</i>	Pulp extraction	20	60-70
<i>Vanhaldi</i>	Cleaning, drying	70	40-45

Source: PRA conducted.

For 12 species the value addition gained through appropriate PH techniques range from 120 percent for Mahua fruits to 10-15 percent for *Hurre / Bahera*. It is thus observed that value additions through application of proper post harvest techniques if adopted the losses can be reduced to a great extent. The perishable produce, due to lack of proper cold storage, goes waste after sometime and hence do not fetch a good price. In view of this, development of scientific post harvest management system is of utmost importance in the state.

Existing Processing Practices

The field investigations have revealed that at village level hardly any processing takes place for H & MP. The processing of H & MPs is limited to household level for self-consumption. However, some incidences of semi-processing have been noticed in case of *Amla*, *Hurre / Bahera*, *Ritha* etc. which are converted into semi-processed form acceptable to end-use industries. No efforts have been made to mechanize these sectors and organize them in shape of micro-enterprise having processing facilities. Resultantly, about 80% of the collected produce are dispatched in raw form to the processing sector i.e. the end use industries². The *Bhesaj Sangh* though has been able to establish processing units of medicinal plant at Ranikhet namely Cooperative Drugs Factory. This unit is manufacturing about 150 formulations utilizing about 75 local H & MP. At local level, the

² The buyers also desire to procure the materials in raw form for easy identifications

processing is confined up to boiling, peeling, de-seeding etc. The final processing however is done at industries located throughout the country.

6.6 H & MP Users in India

The H & M are also used by *Vaidyas* for making medicines for local uses. This processing for local consumption are hardly about 5% of the total collection. In organized sector, the processing is done by three schools of medicines namely, *Ayurved*, *Unani* and *Siddha*. The number of these mills licensed in India, state wise, is shown in Table-6.7.

Table 6.7: State wise number of licensed pharmacies in ISM (As on 01-04-1999)

State/UT	number of licensed practioners				Number of licensed pharmacies holding licenses			
	<i>Ayurved</i>	<i>Unani</i>	<i>Siddha</i>	<i>Total</i>	<i>Ayurved</i>	<i>Unani</i>	<i>Siddha</i>	<i>Total</i>
Andhra Pradesh	4	556	222	-	778	4	-	-
Assam	39	-	-	39	-	-	-	-
Bihar	228	21	-	249	-	-	-	-
Delhi	78	24	-	102	1	-	-	-
Goa	5	-	-	5	1	-	-	1
Gujrat	892	-	-	892	125	-	-	125
Haryana	210	3	-	213	-	-	-	-
Himachal Pradesh	225	12	-	237	11	-	-	11
Maharashtra	757	-	-	757	243	-	-	243
Orissa	160	-	-	160	-	-	-	-
Punjab	149	-	-	149	2	-	-	2
Rajasthan	388	4	-	392	-	-	-	-
Tamilnadu	218	8	323	549	17	3	6	26
Tripura	1	-	-	4	-	-	-	-
Uttar Pradesh	2575	217	-	2792	2	-	-	2
West Bengal	620	22	-	642	21	-	-	21
Chandigarh	2	-	-	2	-	-	-	-
D&N haveli	10	-	-	10	-	-	-	-
Daman & Diu	1	-	-	1	1	-	-	1
Pondicherry	24	-	94	118	1	-	-	1
Total	7138	533	417	8088	429	3	6	438

Source: Ministry of Health, 2000

There are 8088 licensed practioners of three systems where *Ayurvedic Vedic* systems contribute over 88 percent, while the rest is *Unanai* and *Siddha*. Out of 438 licensed pharmacies or mills 429 are for *Ayurveda* only. Maharashtra (243) tops the list followed by Gujrat (125). The other facilities existing where these medicines are listed in Table-6.8.

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Table – 6.8: Indian traditional system of medicine: infrastructure

Facilities	Ayurved	Unani	Siddha	Total
Hospitals	2068	177	115	2360
Bed	241308	2990	1241	245539
Dispensaries	13325	954	311	14581
Colleges	109	26	2	137
Seats	4316	845	150	5311
P.G. institutes	25	2	1	28

Source: Ministry of Health, Govt. of India

Ayurvedic System has the lion's share i.e. 88 percent hospitals, 91 percent dispensaries, 80 percent colleges and 89 percent postgraduate institutes. But number of beds is only 2.46 lakhs and undergraduate seats are only 5311. Even then these could be organized into network and sensitized and involved in the overall scheme of developing H & MP trading.

6.7 Dominant Market Players in H & MP sector:

Few large market players dominant the Ayurvedic industry in India, major being:

- Dabur India Ltd.
- Himalayan Drug Co.
- Baidyanath Ayurved
- Zandu Pharmaceuticals
- Charak Pharma
- Maharshi Sevashram
- Gurukul Kangri
- Cooperative Drug Factory, Ranikhet

All these units both in organized as well as unorganized sector procure these raw materials from open market sources. Price and quality are the main criterion. They get these raw materials procured in four ways:

- Through auctions;
- Through agents appointed region wise;
- Self-cultivation;
- Imports.

These organizations have state of the art technology for processing including R&D facilities. However, the units in cottage and unorganized sector still depend on local know how for processing. Despite the facilities existing at end-users point, majority of produce are not collected as these units decline to buy products or offer lower price in guise of inferior quality, lack of medicinal value in the produce and correlate them with market forces. In view of this it emerges that

NATURE OF AYURVEDIC INDUSTRY

- Mostly family owned businesses;
- Origin can be traced back to a *vaidya*;
- Presently run by third generation owner managers;
- Ownership pattern helped in transfer of knowledge but also brought in secretive attitude affecting the amalgamation with general stream of development.

development of micro-enterprises with JFM back up and mechanisms like Amul Cooperatives and subsidiaries like mother Dairy etc. could make a tremendous difference.

6.8 MARKETING PRACTICES

There are three types of marketing practices in Uttarakhand. The first one is marketing systems of H & MP in Uttarakhand, which are an admixture of multiple practices. Officially, the marketing is executed as per schematic diagram are shown in Fig 4.2.

This officially accepted and recorded practice, however, accounts for hardly 5 % of the total trade. In practice, bulk of the produce is marketed as through a non-official chain as has been shown in Fig 4.3.

The sales of H & MP are mostly local, which the third marketing system. In case of legalized procurement (official system) the collectors (agents) deliver them to the collection centres (Godown) of *Bhesaj Sangh* or KMVN. In case of open sales (Non-official) the deliveries are made to the local grocer's shops or the traders at the terminal markets. In parallel trade practice (Local sales), a typical collector takes his produce to the nearby markets where the traders purchase them. These traders in turn sale them to the processing factories or the individual buyers. The practice collectively is known as parallel trading dominating the scenario. Parallel trading is taking place due to several reasons. On a graded scale the reasons for parallel trading in view of the stakeholders are as below:

	% of Stakeholders
• On Spot cash payment by private traders	90
• Purchase of limited species by Govt.-agencies	75
• Advance payment receipts from the traders	75
• Procedural hassles in selling to Govt.-agencies	95
• Payment problems by Govt.-agencies	70

The parallel trading practice however has some limitations as well. The major limitations of parallel trade are:

- Considering that the collected produce is illegally procured, the traders pay a meager amount to the collectors-sometimes as low as 20% of the actual price. The collectors are hence badly exploited.
- The traders sometimes welcome immature produce or even substandard products since his profit margins are up to 100% and hence he does not mind in accepting substandard products. This not only motivates the collectors to harvest more quantity in order to maximize his earning but also results in destructive harvesting. A typical compassion of this effect is made below:

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Comparison Variable	Sales to Govt. agencies	Sales to private traders
Sales point Distance	Upto 5 kms	Upto 50 kms
Legal hassles	Too much	None but exploited on name of legal implications
Hypothetical price received (Rs./Kg)	100	40
Quantity to be collected to Earn Rs. 100/-	1 kg.	2.5 kgs.

Source: PRA

The comparison made above reflects the level of exploitation of the collectors as well as damage to the forests as in order to collect 2.5 times more, the collectors do not hesitate in adopting destructive harvesting practices such as uprooting, lopping, harvesting of immature produce and so on. The villagers appear to be fully aware of the scenario and hence are demanding for an open system of marketing where they will not have any restriction on sales of H & M. Nearly 95% of the villagers during interactive sessions have opined that restrictive marketing are the reasons for pilferage and excessive harvesting of H & M. In their view and short comings stated above, an open system is less time intensive, will motivate them to protect the forest and facilitate regeneration for the next season. With limited harvesting they will be in position to earn better income. However, the argument is debatable from conservation point of view and requires a critical assessment. Practice of direct sales to the consuming industries has not been noticed except from a couple of cultivators in Uttarakhand's Upper Himalaya for some specific species. The reasons quoted by the industries are:

- Too much control by the government on product's movement;
- Expensive procurement on account of infrastructure creations, skilled manpower deployment, logistics and overheads;
- Quality standards are not guaranteed, as a quick in-situ quality inspection is not possible;
- Procurement through middlemen, traders and government auctions are much cheaper and less time consuming.

6.9 Institutional support and Market Intelligence

The institutional support for marketing is totally missing. Even the government organizations are not equipped with any market intelligence system and sell the products by auction where minimum price is fixed on the basis of last 3 years average prices. In open market the deviation may be even more than 200%. The government prices are mostly pre-fixed and lack any market orientation. Even a periodic market survey is not conducted to facilitate strategic decisions for price fixations etc. For a typical collector, market is either the agent collecting from him or the collection centres nearby or the nearest terminal markets/district markets.

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The existing system does not support a sustainable management of H & MP in the state.

It has been confirmed by the villagers that main reason for non-development of H & MP are the lack of marketing avenues and intelligence on market changes. About 96% of the collectors/villagers do not know the exact final destination of their products. The only awareness quotient about market centres has been about the terminal markets like Kathgodam, Kotdwara, Haldwani, Rishikesh, Hardwar, Dehradun, Varanasi, Tanakpur etc. Similarly, the awareness quotient about prices is totally missing. The multi-dimensional shortfalls in marketing of H & MP are summarized below:

- Legislation not allowing free trade resulting in pilferage, promotes bribery and lower price realization;
- Un-defined markets-even *Bhesaj Sangh* and KMVN do not know where the products will find its last destination and at what price and thus deny opportunities to collectors / cultivators to formulate strategy;
- Agent system resulting in substantial amount of revenue loss in between PRA reveals that the agents pocket up to 50% of the price of the products;
- Totally missing market intelligence system is the most critical shortcoming. None of the stakeholders excepting traders, and the industry are aware of ongoing price and expected trend in major domestic as well as international markets. As a result, the price realization at the source of origin remains substantially low. In a state like Uttarakhand total tradable availability of medicinal plants and herbs is valued at Rs. 1000 crore per annum but the recorded turnover of *Bhesaj Sangh* is hardly Rs. 3.50 crores;
- Un-identified market opportunities in lack of market need assessment;
- Market competitions are not analyzed;
- Proper marketing starts with linking the resource and product development to market preferences. In sustainable forestry the role of marketing to create effective linkage between resource managers, processors and the end users is vital. No initiatives have been made in this direction;
- Poorly designed price mechanism, based on previous years sales price resulting in least remuneration to the people in collection and cultivation of H & MP;
- Un-organized market channels leading to monopoly of few individuals and industries controlling and dictating the market;
- Absence of certification of products or prescribed standards to guide the quality and price linkages';
- Institutional efforts confined up to cultivation and propagation and a total indifference towards marketing.

6.10 International Marketing Scenario

6.10.1 World Market and Indian Share:

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In terms of WHO, over 80% of the world population relies on traditional medicine, largely plant based for their primary healthcare needs? The EXIM Bank of India, in its report (1997) has reported the value of medicinal plants related trade in India to the tune of USD 5.5 billion and is growing rapidly. According to WHO, the international markets of herbal products is estimated to the order of USD 70 billion, which is likely to grow to USD 5 trillion by the year 2050. India's share in the global market of medicinal plants related trade is hardly about 0.5% (Source CMPB).

The global market for herbal medicines is estimated to be growing at the rate of 7% per annum. China emerges to be the largest exporter with an export of about 5 billion USD per annum. A comparative statement of the export i.e. India Vs other major exporters are given below:

Export Value:

China	-	Rs. 22,000 Crores
Thailand	-	Rs. 10,000 Crores
India	-	Rs. 446 Crores

(Source: Planning Commission, Govt. of India)

For a country with one of the largest bio-diversity of H & MPs and rich traditions of a proven system, the situation is simply not acceptable as it is simply a bolt on glorious past.

In view of the above, the task force of Planning Commission has planned to achieve the following export targets:

Year	Value of exports (Rs. Crore)
2005	3,000
2010	10,000

The targets though look to be very optimistic but are of course achievable if the operational variables are optimized. However, India, despite having tremendous potential, has been importing substantial quantity of H & MP particularly herbs, spices, medicinal plants and aromatic plants. The quantities imported along with their values are depicted in Table – 6.9, and export from India over last 5 years are given in Table 6.10

Table – 6.9: Imports of Medicinal Plants & Herbs in India

Year	Quantity (tones)	Value (Rs. Million)
1998-99	6194.325	187.407
1999-2000	6347.677	231.716
2000-2001	8627.186	334.95
2001-2002	7273.614	333.57
2002-2003	8407.444	477.30

Source: Monthly Statistics of Foreign Trade, CSO Ministry of Commerce, Govt. of India

Similarly, the Indian Exports of H & MP are summarized in Table – 6.10

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Table – 6.10: India's export of Medicinal Plants & Herbs

Year	Quantity (tones)	Value (Rs. Million)
1998-99	37564.368	1789.158
1999-2000	38,825.696	1914.808
2000-2001	42,785.394	2486.72
2001-2002	49,144.302	3709.50
2002-2003	45,786.371	3341.68

Source: Monthly Statistics of Foreign Trade, CSO Ministry of Commerce, Govt. of India

The imports have shown a festive growth of 6.5% per annum with maximum quantity being of *Jeshtimadhu (Glycyrrhiza glabra)*. The major sources of imports are Pakistan, Iran, Afghanistan, China, Indonesia, Nepal, Myanmar and many other countries. While exports in volume, value and has not grown with the same pace.

6.10.2 Consumption Vs Imports

There are about 10 major H & MP being imported in the country to a great extent. The estimated consumption and their import levels are depicted in table 6.11.

Table – 6.11: Major plants used by Indian Pharmaceutical Industries and their extent of Imports.

Ingredient	Source of supply (August 1999 for updating)			Consumption (tonnes)
	Cultivation	Wild	Imported	
Ajwain (<i>Carum copticum</i>)	100%			200
Akkalkadha (<i>Anacyclus pyrethrum</i>)			100%	50
Cardamomum green (<i>Elettaria cardamomum</i>)	66%		33%	60
Cardamomum big (<i>Amomum subulatum</i>)		Assam		NA
Aloes (<i>Aloe vera</i>)		Maharashtra, Tamil Nadu		200
Amala green (<i>Emblica officinalis</i>)	50% South	50% MP/ UP Maharashtra		10,000
Anantmool (<i>Hemidesmus indicus</i>)		TN, AP		200
Baheda (<i>Terminalia belerica</i>)		Maharashtra, MP		500
Bhringraj (<i>Eclipta alba</i>)		MP, UP, TN, Maharashtra, W Bengal		500
Brahmi (<i>Bacopa monnieri</i>)		Tamil Nadu, W Bengal		700
Kankol (<i>Piper cubeba</i>)			150 tonnes	NA
Chitrak (<i>Plumbago zeylanica</i>)		Maharashtra, TN		500
Dalchini (<i>Cinnamomum zeylanicum</i>)			100%	250
Daruhaldi (<i>Berberis aristata</i>)		Nainital, Kulu		500
Deodar (<i>Cedrus deodara</i>)		Nainital, Kulu		200
Gajpippali (<i>Scindapsus officiale</i>)			100%	400
Guggul (<i>Commiphora wightii</i>)		10%	90%	500

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		Gujarat, Rajasthan		
Harda (<i>Terminalia chebula</i>)		Maharashtra, MP		500
Nutmen/ mace (<i>Myristica fragrans</i>)	20% Kerala		80%	500
Jambul beej (<i>Eugenia jambolana</i>)		Maharashtra, Gujarat, UP, MP, TN		300
Jatamansi (<i>Nardostachys grandiflora</i>)		Nepal, Assam, Kulu		200
Jeshthimadh (<i>Glycyrrhiza glabra</i>)			100%	5000
Kadu Kutuki (<i>Picrorrhiza kurroa</i>)		Kulu (HP), Nepal, Assam		200
Kesar (<i>Crocus sativa</i>)		Jammu and Kashmir		5
Clove (<i>Syzygium aromaticum</i>)	Kerala 13%		87%	150
Black Pepper (<i>Piper nigrum</i>)	Kerala			150
Ginger (<i>Zingiber officinale</i>)	50% Assam, Kerala		50%	500
Ashwagandha (<i>Withania somnifera</i>)	50% MP	50% MP		500
Nagkesar (<i>Mesua ferrea</i>)				200
Pipramool (<i>Piper longum</i>)	AP, Maharashtra			200
Safed Musli (<i>Chlorophytum arundinaceum</i>)	40% MP, Maharashtra	40% MP, Maharashtra	20%	25
Shatavari (<i>Asparagus racemosus</i>)	50% MP, UP	50%, MP, UP		500
Vayvidang (<i>Embelia ribes</i>)		Maharashtra, MP		200
Kuchla (<i>Strychnos Nux vomica</i>)		Assam, AP, Bihar		1000
Kalmegh (<i>Andrographis paniculata</i>)		MP, UP, Bihar		250
Senna	60% TN 20% Gujarat			1000

Source: Mr. Anand Puranik, Chemexcil, Mumbai,

It is apparent from the above statistics that in at least 4 to 5 cases India has to depend entirely on imports. On the contrary only in one case i.e. Ajwain, the total procurement is made from cultivated sources. Wild sources still remain to be the major source of procurement.

6.10.3 Species-wise Indian Exports

Hundreds of species in some form or other are being exported from India. However, traditionally the major species being exported from India are listed in Table 6.12.

Table 6.12: Major Medicinal Plant species exported from India.

Plant name	Plant part exported
<i>Plantago ovata</i>	Seed and husk
<i>Cassia angustifolia</i>	Leaf and pod
<i>Rheum australe</i>	Rhizome
<i>Inula racemosa</i>	Rhizome
<i>Rauwolfia serpentina</i>	Roots
<i>Hedychium spicatum</i>	Rhizome
<i>Zingiber officinale</i>	Rhizome
<i>Colchicum luteum</i>	Rhizome and seed
<i>Acorus calamus</i>	Rhizome
<i>Adhatoda vasica</i>	Whole plant
<i>Juglans regia</i>	Bark
<i>Punica granatum</i>	Flower, root, bark
<i>Barbris aristata</i>	Root
<i>Juniperus communis</i>	Fruit
<i>J. macropoda</i>	Fruit
<i>Heracleum candicans</i>	Rhizome
<i>Picrorrhiza kurroa</i>	Root
<i>Aconitum species</i>	Root
<i>Saussurea lappa</i>	Rhizome
<i>Swertia chirata</i>	Whole plant
<i>Podophyllum emodi</i>	Rhizome
<i>Valerina wallichii</i>	Rhizome

Source: Handa 1992

6.10.4 Conservation Vs Industries:

On consideration of conservation, few of the species have been banned for exports by Ministry of Commerce vide their notification number 2 (RE 098)/1997-2002 dated 13th April 1998. The **species banned for exports** are:

- *Cycas beddomei* (Beddomes cycad)
- *Vanda coerulea* (Blue Vanda)
- *Saussurea costus*
- *Paphiopedilium species* (Ladies slipper orchids)
- *Nepenthes khasiana* (Pitcher plant)
- *Renanthera imschootiana* (Red Vanda)
- *Rauwolfia serpentina* (Sarpagandha)
- *Ceropegia species*
- *Frerea indica* (Shindal Mankundi)
- *Podophyllum hexandrum* (emodi) (Indian Podophyllum)
- *Cyatheaceae species* (Tree Ferns)
- *Cycadaceae species*
- *Dioscorea deltoidea* (Elephant's foot)

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- *Euphorbia species* (Euphorbias)
- *Orchidaceae species* (Orchids)
- *Pterocarpus santalinus* (Red Sanders)
- *Taxus wallichiana* (Common Yew or Birmi leaves)
- *Aquilaria malaccensis* (Agarwood)
- *Acibitum species*
- *Coptis teeta*
- *Coscinium Fenestratum* (Calumba wood)
- *Dactylorhiza hatagirea*
- *Gentiana kurroo* (Kuru, Kutki)
- *Gnetum species*
- *Kah&mpergia galanga*
- *Nardostachys grandiflora*
- *Panax pseudoginseng*
- *Picrorrhiza kurroa*
- *Swertia chirata* (Charayatah)

However, the formulations with these species as ingredients are kept open for exports. In other words, the species whether rare or on verge of extinction can be extracted for domestic use but are banned from exports from conservation point of view the situation is contradictory and is affecting marketing of these species. In addition to it, the industry feels that there are several species with short supply, and these have been reported to Planning Commission as given in Table 6.13

Table 6.13: The species in Short Supply as reported to Planning Commission.

Botanical Name	Common name
-	Ashtvarga
<i>Acacia catechu</i>	Khair chhal
<i>Aconitum heterophyllum</i>	Ativisha
<i>Alpinia galanga</i>	Kosthakulinjan
<i>Aquilaria agallocha</i>	Krishnageru
<i>Artemisia maritima</i>	Kirmani ova
<i>Artocarpus heterophyllus</i>	Phanas ambe
<i>Baliospermum montanum</i>	Dantimool
<i>Berberis aristata</i>	Daruhaldi
<i>Cedrus deodara</i>	Devdar
<i>Commiphora wightii</i>	Guggul
<i>Convolvulus arvensis</i>	Harenvel
<i>Curculigo orchioides</i>	Kalimusli
<i>Curcuma zedoaria</i>	Kapurkachri
<i>Dioscorea bulbifera</i>	Dukkarkand
<i>Embelia ribes</i>	Vaividang
<i>Gentiana Kurroo</i>	Triman
<i>Hemidesmus indicus</i>	Chavak
<i>Inula racemosa</i>	Pokharmool

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<i>Mallotus philippiensis</i>	Kapila
<i>Mesua ferrea</i>	Nagkesar kala
<i>Myrica esculenta</i>	Kaiphal
<i>Myristica fragrans</i>	Jaiphal
<i>Nardostachys grandiflora</i>	Jatamansi
<i>Nelumbo nucifera</i>	Kamalphool
<i>Picrorrhiza kurroa</i>	Kutaki
<i>Piper cubeba</i>	Kankol
<i>Piper longum</i>	Pippali
<i>Piper longum</i>	Pippalmool
<i>Piper nigrum</i>	Shvet miri
<i>Pistacia chinensis</i>	Kakdashingi
<i>Plumbago zeylanica</i>	Chitrak lal
<i>Pterocarpus santalinum</i>	Raktchandani
<i>Rubia cordifolia</i>	Manjishtha
<i>Saraca indica</i>	Ashok Chhal
<i>Saussurea lappa</i>	Koshtha
<i>Smilax china</i>	Chopchini
<i>Solanum indicum</i>	Motiringani
<i>Swertia chirata</i>	Kirata
<i>Tecoma undulata</i>	Raktroda
<i>Valeriana wallichii</i>	Tagar
<i>Vetiveria zizanioides</i>	Vala
<i>Wagatia spicata</i>	Vakeri bhate
<i>Wrightia tinctoria</i>	Andrajava

Source: Planning Commission 2000

Despite the claim for short supply, the industries are able to procure these H & MP for production of their formulations. The situation is critical as the strong lobby of industries and the traders are able to procure the desired quantity both for processing as well as exports but hue and cry for non-availability is always made to protect the illegal trading and procurement at the lowest price.

6.11 Pricing

Pricing of H & MP has been a closely guarded secret at least at the source of origin. There has been a wide gap between the prices paid to the collectors and the prices paid by the industry. The differences have been noticed up to the extent of 600% in some cases. In their article, "Trade in medicinal plants in Kerala-Issues, Problems and Prospects", M. S. Suneetha and M.G. Chandrakanth have tried to compile the trade margins and price spread and these are given in Table 6.14.

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Table 6.14: Price structure and Price spread showing the differences between what Industries
pays what gatherers get.

Crop	Part harvested	PP of trader	TC Gatherer	NM Gatherer	SC Trader	FC Trader	SP Trader	MM Trader	Price Spread
		1	2	(1-2)	3	4	5	5-(1+3+4)	5-1
Sida (dry)	Roots	1200	100.	1100	8	0	1800	592	600
Tinospora (fresh)	Stems and leaves	400	100.	300	8	0	600	192	200
Asparagus (fresh)	Rhizomes	5000	100.	4900	8	0	5500	492	500
P. emblica (fresh)	Fruits	2000	100.	1900	8	0	2400	392	400
Aegle (dry)	Roots	600	100.	500	8	0	1000	392	400
T. Chebula (dry)	Fruits	600	0.	600	8	300	1000	92	400
Withania (dry)	Roots	5200	0.	5200	8	300	6000	492	800
Strobilanthus (dry)	Roots	400	100.	300	8	0	800	392	400
Adhatoda (dry)	Leaves and roots	800	100.	700	8	0	1200	392	400
Cuminum (dry)	Seeds	5900	0.00	5900	8	300	6750	540	850

Note: **PP** – Purchasing price of trader from gatherer, cultivator and traders.

TC – Transport cost of gatherer. **NM** – Net margin of gatherer. **SC** – Storage cost of trader.

FC – Freight charges. **SP** – Selling price of trader. **MM** – Marketing margin of trader.

The situation is even worse in Uttaranchal. The price spread widens as per involvement of channels. **A typical trade margin and price relationship** is depicted below in Fig 6.4.

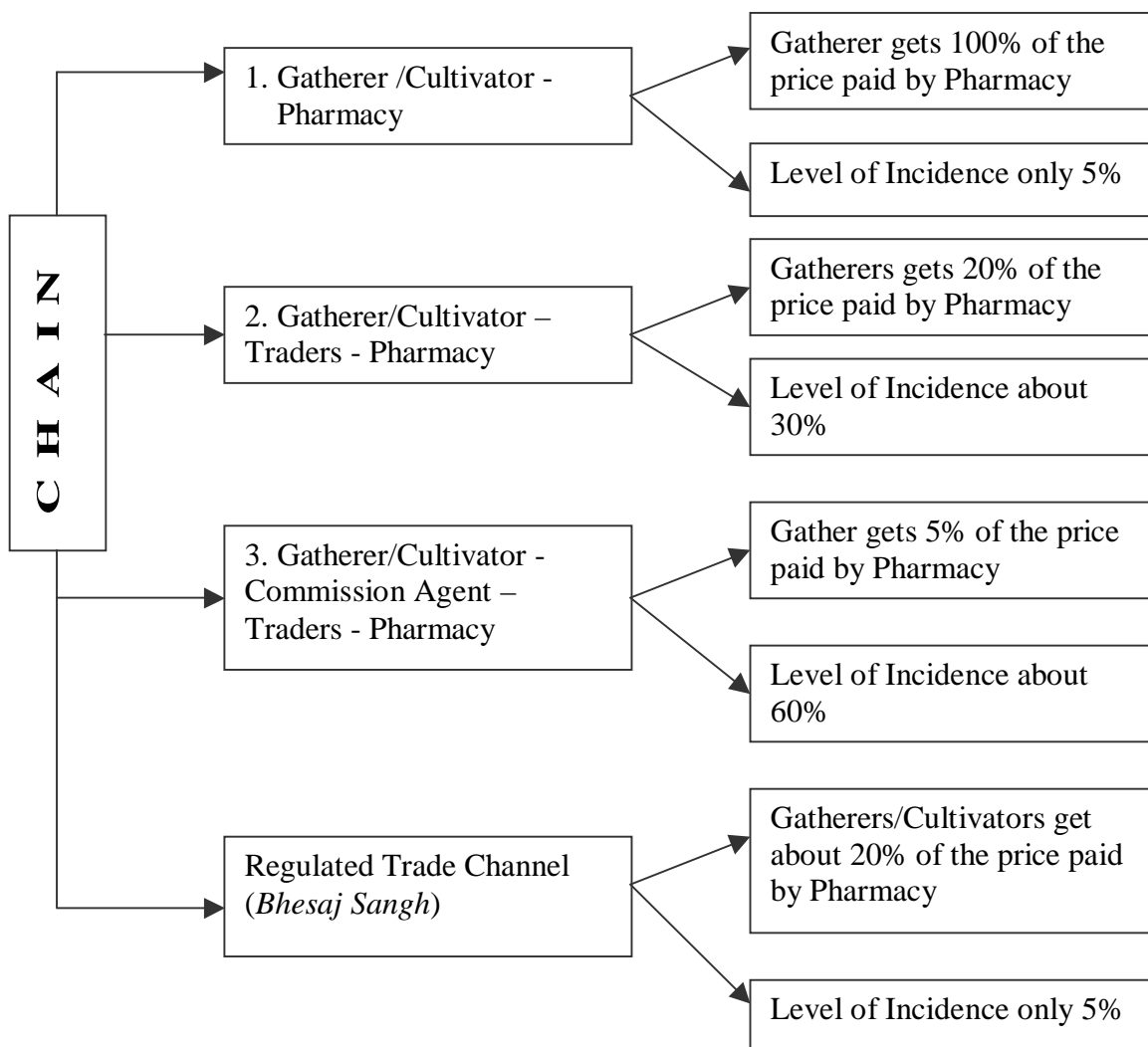


Fig 6.4: Typical relationship between trade margin and price

The gatherer's price has been constant for last 5 years. In other words not a single percent of price hike is passed on to the gatherers. Even in regulated trade channel, the gatherers do not get their share at current price level since the *Bhesaj Sangh* procures through agents and the agents pocket most of the prices.

The details of price at which the pharmacies are purchasing these products are enlisted in *Annex 6.7*. However, for ready comparison, prices of few species are given in *Table 6.15*.

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Table 6.15: Prices paid by Pharmacies and paid to gatherers in Uttarakhand.

Species	Prices paid to gatherer (Rs./Kg)	Prices paid by Pharmacy (Rs./Kg.)	Differential (%)
<i>Akarkara</i>	75.00	540.00	620
<i>Atish Mitha</i>	65.00	395.00	507
<i>Ashwagandha</i>	18.00	82.00	355
<i>Kutki</i>	40.00	235.00	487
<i>Dalchini</i>	15.00	63.00	320
<i>Vaividang</i>	12.00	67.00	458
<i>Belgiri</i>	2.00	11.00	450
<i>Jatamasi</i>	20.00	110.00	450
<i>Tejpatta</i>	5.00	22.00	340
<i>Chiraita</i>	30.00	178.00	493
<i>Shilajeet</i>	120.00	490.00	308
<i>Giloye</i>	3.00	13.00	333
<i>Indrayan Bij</i>	30.00	135.00	350
<i>Kuth Jar</i>	22.00	120.00	445
<i>Kuth Bij</i>	300.00	1200.00	300
<i>Ritha</i>	8.00	60.00	650

Source: PRA and Price List of Pharmacies

The trade channels e.g. the middlemen, wholesaler and even the grocers define the price margin on ground of semi-processing, weight loss (30-60% moisture), storage and marketing expenses. Assuming that all the above indeed contribute to final selling cost. The typical relationship that emerged from the study is given in equation emerges 6.1.

$$FP = \square PP.1 + WL 0.5 + TC 0.05 + SC 0.05 + MC 0.2 + PM 0.2 \dots \dots \dots 6.1$$

Or $FP = 2TC$

- Where
- FP = Final Price Paid by Pharmacy
 - PP = Price Paid to Gatherer
 - WL = Cost of Semi-processing (Drying and weight loss)
 - TC = Transportation Cost
 - SC = Storage Cost
 - MC = Marketing Cost
 - PM = Profit Margin

If the claims of traders and middlemen are taken as genuine, the difference between gatherer's price and the final price should not be more than 100%. Or FP should not be twice the price paid to gatherers i.e. $FP=2 PP \dots \dots \dots 6.2$ But the differences given in Table 6.15 and the emerging equation themselves. This reflects the level of exploitations of gatherers and cultivators on price ground.

It will also be interesting to compare procurement prices fixed by the government and the prices paid by the pharmacies as shown in table 6.16

Table 6.16: Government fixed prices vs prices paid by pharmacies (Selected Species)

Species	Fixed Purchase Price by State Government (Rs./Kg.)	Prices Paid by Pharmacies (Rs./Kg)	Differentials (%)
<i>Indrayan Bij</i>	89.60	135.00	51
<i>Ashwagandha</i>	25.30	82.00	224
<i>Indrajow</i>	3.80	28.00	637
<i>Amla Dry</i>	8.30	36.00	334
<i>Chitrak Mool</i>	16.50	28.00	70
<i>Brahmi</i>	12.70	35.00	176
<i>Dhatwa</i>	3.80	45.00	1084
<i>Sarpgandha</i>	113.90	136.00	19
<i>Bhringraj</i>	8.90	12.00	35
<i>Brahmi Amla</i>	3.80	14.50	282

Source: Pharmacy Price List and Working Plan of different division

Note: Price fixed by the District's Cost Committee

It is evident from the above that the price fixation or so called the purchase prices by the government agencies have no rationale and it helps the middlemen / trading segment in multiplying their profits manifold. The prices are fixed by an unit cost committee at forest circle level constituting Commissioner of the Circle, Conservator, DFO and member from *Bhesaj Sangh*. The prices fixed are normally based on average of past 3 years auction prices with some provision for inflationary trends. The system and prices fixed result in discouraging the cultivators / gatherers to get involved in the business as mostly the accruals are not even equal to the normal wage rate prevailing in the market where they should have been in picture to provide transparency. The scenario also looks for a strong market intelligence system to monitor the demand, prices and market forces. If this particular aspect is not properly addressed, the distress selling process will continue and people with knowledge of H & MP and their harvesting times and techniques will keep on declining.

6.12 Delivery Schedule

Delivery schedule is totally an organized affair from trader to the pharmacy points. The traders in Khari Baoli (Delhi), Haridwar, Dehradun and other places procure the products from different sources and deliver them to the pharmacies as and when required. Few of the pharmacies procure the H & MP through traders. In all the cases a delivery schedule of 15 to 30 days are strictly maintained. However, in case of direct procurement from the gatherers/cultivators, delivery schedule prescribed are not maintained. The gatherers alone cannot procure the desired quantity and depends on other gatherers for bulk procurement and in turn they are not able to deliver the goods in time. Therefore, the pharmacies prefer

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procurements through traders/middlemen/agents. Only about 5 % of procurements are made from *Bhesaj Sangh* through auctions.

6.13 Products Destination in India:

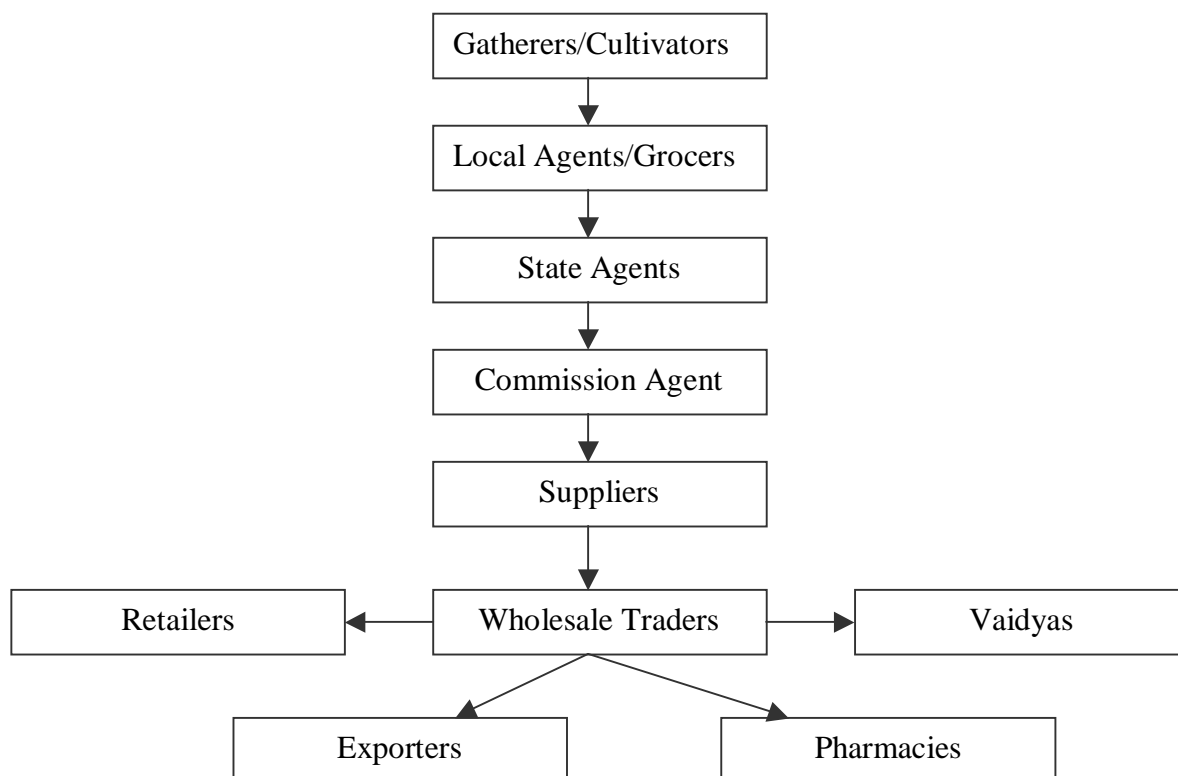
In terms of marketing, the cross tradings are quite noticeable, both within the country as well as in international market ally. In India, a pharmacy located in UP are also sourcing H & MP from Tamil Nadu, Kerala, other places and vice versa. It means that market forces are functional in this field. However, no effort has been made to understand these market forces and act accordingly. Similarly middlemen facilitating the supply dominate the channels and pocket major share of trade value. Few of the operational markets duly categorized within the country are given in Table 6.17. There are in all 6 major markets, 21 medium and, 35 minor markets in the country. Though the markets are in reasonable strength the gatherers & cultivators have hardly any direct access. Their goods follow a long-

Table 6.17: Distribution of Trade and markets of different states across India

Zone	States/Region	Major mkt.	Medium mkt.	Minor mkt.
Northern	Jammu & Kashmir	Patna		Ranchi, Ambala
	Himachal Pradesh, Amritsar	Raxaul		Bilaspur, Jammu
Eastern	Uttar Pradesh,		D'dun	Baramulla
	Bihar,		Lucknow	Hoshiarpur
	Delhi		Kanpur	Chandigarh
			Tanakpur	Haridwar
				Varanasi
Eastern	Assam, North eastern states	Calcutta	Siliguri	Serampur,
				Bhubaneswar,
Western	Gujarat, Maharashtra	Mumbai	Nagpur,	Shillong,
			Sidhpur,	Kokrajhar, Barpeta
Southern	Kerala, Karnataka, Chennai	Thrissur		Road, Dibrugarh,
	TN, AP			Guwahati
				Ratnagiri
				Vashi
				Pune
Central	Madhya Pradesh,			
	Rajasthan	Raipur		
Total		6	21	35

chain before these reach destination where from these are either exported or supplied to pharmacies (Fig 6.4).

Fig 6.5: The typical trade chain formation that denies cultivators and gatherers direct access to destination market.



Even if trade mark up of about 10% at each level is charged, about 70% of the final prices are consumed in between which otherwise could have gone to gatherer/Cultivator. The major markets in the country are not dominated by Uttaranchal but states e.g. M. P., Chattisgarh, Kerala, Tamil Nadu etc. About 12 species being traded in four major markets in the country reveals that there are species, which are being traded, in high volumes i.e. up to 1000 tpa. (Table 6.18) But share of products from Uttaranchal in these markets are not even 10%. In view of the tremendous potential, there is a need to optimize the constraints to enable the sector to develop and provide income to the targeted groups.

6.14 Marketing in other states

In the newly established state of **Chhatisgarh**, the H & MP is dealt through model popularity known as "Van Dhan" (Wealth of Forests)

The people for whom Van Dhan is launched belong to the primary

Table 6.18: Estimated volumes (in tons) of selected medicinal plants traded across four markets in April, 2000

Botanical name	Delhi	Mumbai	Bangalore	Shivpuri
Aloe vera	No sale	No info.	B	-
Chlorophytum borivillianum	E	No info.	No info.	C
Commiphora mukul	G	C	B	C
Embelia ribes	G	H	G	D
Emblca officinalis	I	I	G	J
Nardostachys grandiflora	G	G	C	C
Picorhiza kurrooa	H	G	C	C
Rawoulfia serpentina	E	F	F	C
Saraca asoca	H	G	G	-
Swertia chirayata	G	H	C	A
Terminalia chebula	H	I	G	I
Withania somnifera	H	I	G	G

Index: Range showing volume traded tpa- tones pe annum
 A – below 1 ton
 B – between 1 & 2 tons
 C – between 2 & 5 tons
 D – between 5 & 10 tons
 E – between 10 & 25 tons
 F – between 25 & 50 tons
 G – between 50 & 100 tons
 H – between 100 & 500 tons
 I – between 500 & 1000 tons
 J – up to 1000 tons

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strata of society where compartments of the government are not recognized: where a holistic approach is indispensable for a development program to this end and market truly effective. This calls for a abandon the artificial, self-defeating compartmental based functioning different / various Government departments and forging of a new multi-departmental corporate forum. In the Bastar Model, such a forum is called the Apex Committee. District Collector is the Chairman of this Committee. It includes the Additional Collector, DFOs in the District, The Cooperative Department, TRIFED, and Mandi, apart from 14 tribal community representatives. It meets every Saturday at a fixed time and place. This forum has itself grown into an NGO of sorts. Under the accepted policy of decentralization, the Chairman of the Apex committee should be the Chairman of the Zilla Panchayat and the CEO of ZP the member secretary.

The reason for this approach as opposed to the individual approach is that H & MP being a community resource of the Gram Sabha (GS)³ the task be entrusted to a social group (*the bodies that try to regulate these forces*) rather than an individual. Secondly, strong market forces exist in the trade of H & MP feel threatened if any local initiative is allowed to prosper and grow. The individual, who is entrusted with task is, therefore, both lured and won over or if weak s/he will simply be sidelined and even smothered by the 'mafia forces of the market. GS will be better placed to take on these forces through collective strength and, with a degree of transparency. Thirdly, GS as a Group ensures wider spread of gains and for its traditional as well as new empowerment can motivate the gatherers and cultivators to adopt better methods and means. It can also induce and help SHGs to become more effective. . Van Dhan, does not intend to impose the duty of forest protection on the villagers; it seeks to inspire this duty in them. If the gains accrue to a larger number of tribal, the army of forest protectors will be correspondingly larger. The GS-SGH structure facilitates this.

These SHGs are promoted by the Panchayats. The Gram Sabha in Scheduled Areas has been vested now with the power to organize market in its area. And it has been granted ownership rights over H & MP in its area. Based on these it resolves that the job of procuring H & MP will be done by a SHG consisting of its own members. It further names about 8-10 of its members to do this job. These people constitute the SHG. They are registered with the "Focal Agent" DFOs of concerned forests and the CEO, Zila Panchayat are such Focal Agents. It will be better if at Block-level these are registered with Block CEO besides with The SHG receives money in advance from Trifed to procure the produces. The villagers bring their collections from the forests to the SHG, which procures these at rates fixed by the Apex Committee. At the end of the day the SHG packs the produces in gunny bags and delivers them to TRIFED's nominated godown / cold storage. TRIFED pays service-commission to the SHG. This commission is the income and earning of the SHG and thus gives some economic compensation. The gain to the villager's lies in the fair and transparent trade terms they receive at the hands of

³ Gram Sabha (GS) is the legal entity as per the PR Act.

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the SHG (i.e. their own people) as opposed to the wily, middlemen (the koochiya). Fair trade terms (right weight, right rate and right arithmetic) have helped double the income of the villagers from H & MP.

Focal Agents (FAs) are links between TRIFED and the SHGs. DFOs in the district and CEO Zila Panchayat are the FAs. TRIFED could not have dealt directly with nearly 1000 SHGs. Hence the concept of FA was evolved. FAs are directly in contact with the SHG members. Their involvement as FA therefore helps. FAs also serve to raise the SHGs' grievances/problems, if any, at the weekly Apex Committee meeting. They also serve to transmit information relating to price-revisions to the SHDs affiliated to them. The FAs receive no commission. What they do is a part of their duty.

Too often noble schemes have failed because marketing was taken for granted. Even where it is done so as a very civil function: demand and supply shaking hands on a gentlemen's land. On the field, however, one finds anything but civility. On the field, there are forces, which are wily, vicious, and ever seeking to upset any initiative towards tribal/rural upliftment. 'Market forces' is a euphemism; the right term would be 'mafia forces'. These forces are sometimes visible but often hidden; sometimes direct, but often they act through agencies – including government officials. They sabotage any such initiative, silently, surreptitiously. Marketing has to be planned bearing in mind these forces and their strength. The support of a tribal-friendly state-sponsored organization like TRIFED is very essential. Van Dhan's strong point lies in having understood the importance of marketing right from the start and in tying this up well. TRIFED has been bound to function in Bastar through a MoU it has signed. The local OIC of Trifed, a GM, is a member of the Apex Committee. He is a party to all decisions taken at the Apex Committee meetings, including fixation of procurement prices for MFP and commission to the SHGs. His presence at the meeting helps sort out the small, nameless, endless field-problems that crop up afresh week after week. These are indicators of the fact that something is indeed happening on the field. They are therefore discussed at the meeting in such a spirit. Most common among these problems relate to supply of gunny bags, release of money etc.

Van Dhan has been emphasizing value-addition. It is shocking to report that in Bastar less than 2% of the produces was processed within the district; 98% left the district in its native form. Of the goods that were so traded, only around 30% were actually traded within the district, the bulk 70% involved a job done on commission basis-aadat business, as it is known. The merchants were elsewhere and the local trader was only a commission agent for the principal. It indicates the hush-hush, shady character of business based on the principle of the quick buck. It indicates that commission agency was by itself so fulfilling for the traders that they never bothered about value-addition. The victim is this game was the forest-gatherer and the forests.

Value addition is by nature adding value; making little resource yield more. It is economic good-sense. In the present context, it can be stated that value-addition activities, the forest-dwellers will depend on the forest and draw from it to so much more extent. For value-addition, Van Dhan proposes to set up a network of rural, primary processing centers to be called Van Dhan Gramodhyog Kendras. Each such Kendra will be services by about 8-10 collection SHGs who will be the feeders to the Kendra. It will thus be a satellite arrangement with the Kendra in the centre and the SHGs around it.

Kerala is probably the most organized state in terms of marketing of H & MP. The state has adopted h&mp in their image and tourism promotional campaign. Marketing is mostly done through service centres and well-organized markets. This is probably the only state in India where gatherers and cultivators in some cases receive upto 40% of the final price. Value additions are done mostly through micro-enterprises run by the gatherers. Instant markets have been created through massage parlors, vaidyas and pharmacy with a well-defined purchase back ups. Export and supplies to pharmacies in other states are also being made. The state normally does not allow trade channel to dominate the scenario despite routing their products through trade channel located throughout the country.

Uttarakhand, unfortunately has not developed either a strategy or an image for its medicinal wealth. May be due to different demographic profile procurements and marketing are the problems but certainly an optimization strategy could solve the problems to a great extent.

6.15 Marketing Models: (Short term & Long Term)

There could be two alternative models to optimize and to smooth the marketing systems in Uttarakhand. These alternative models are discussed in succeeding paragraphs and based on clustering variables e.g. conservation, cultivation, value addition and marketing the most suitable strategy has been recommended in chapter 8 of this report.

Alternative – I: PHARMACY-GATHERERS / CULTIVATORS MODEL (SHORT TERM MODEL)

In this model, optimization strategy should start from bringing improvement in harvesting methods. The open system of harvesting appears to be good from humanity point of view but is not able to serve its objective. Hence, optimized system should follow the steps as given in Fig 6.6. This can also be termed as NTFP-JFM Model :

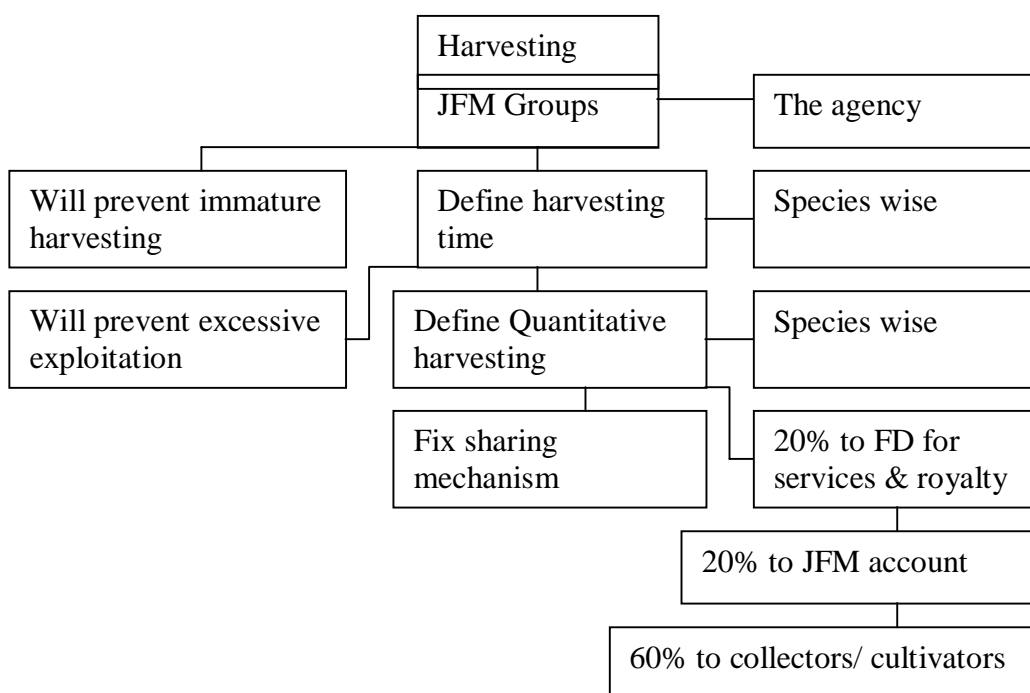


Fig 6.6: PHARMACY-GATHERERS / CULTIVATORS MODEL FOR NTFP

Post harvest treatment is the most important factor to be optimized AS It will not only provide value addition to products but also increase income of the stakeholders and create better demand base and ease for marketing. The optimization strategy should follow the following steps OUTLINED IN Fig 6.7. The model deals each species separately so far establishing norms of key steps.

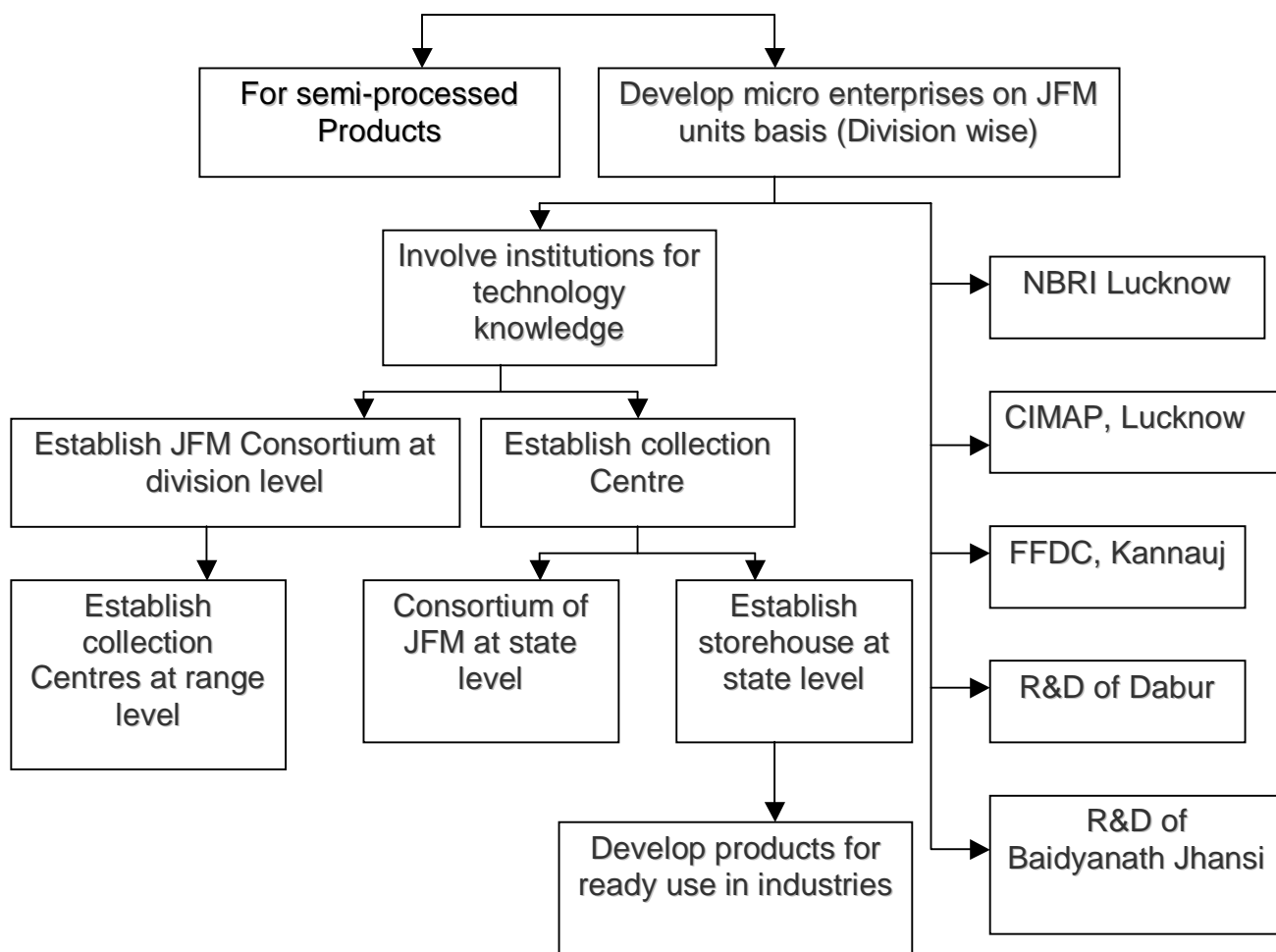


Fig 6.7: STEPS FOR POST HARVEST TREATMENT OF H&MP UNDER MODEL-II

In this role of forest department becomes very crucial. The field surveys clearly indicate failure of the existing marketing and development systems. The findings suggest that all the H & MP should be brought under the control of forest department, which in turn should link it with JFM. The agencies such as FC, Bhesaj Sangh and KVMN should be removed from the scene as their role in maintenance; conservation and bio-diversity enhancement has not been appreciable. The strategy in marketing optimization could follow the steps outlined in Fig 6.8.

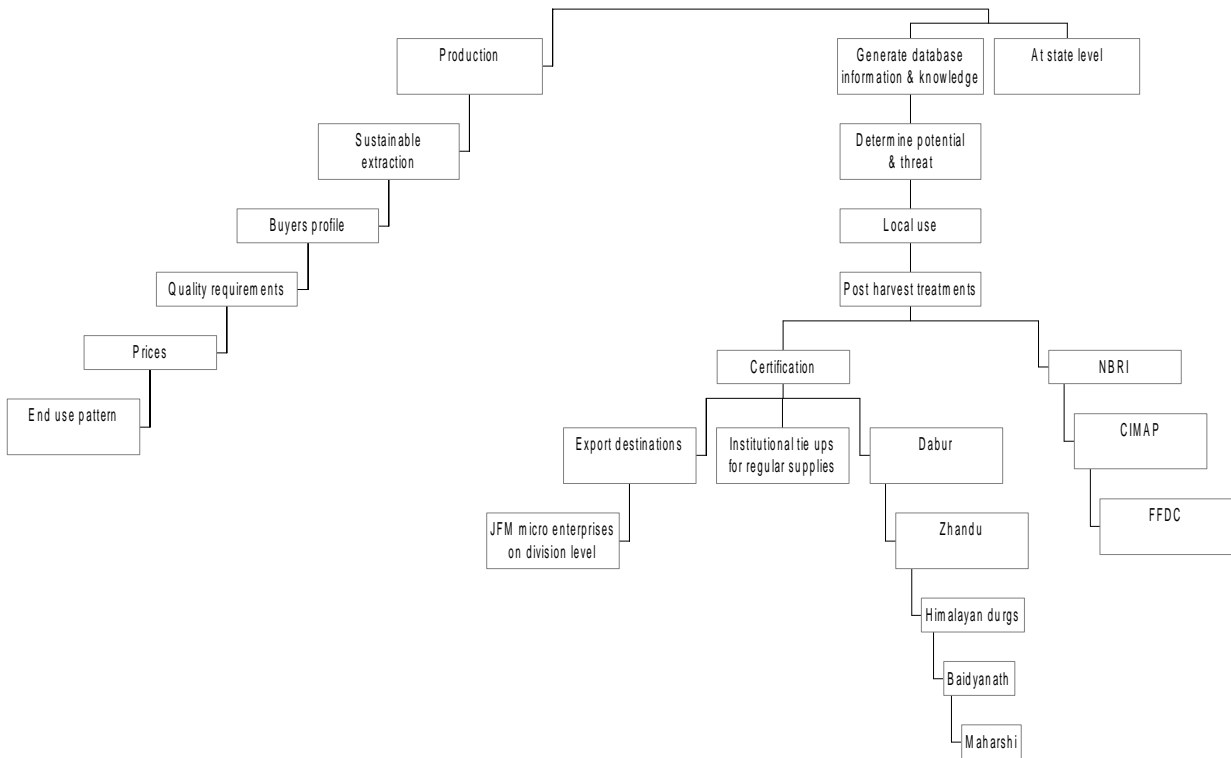


Fig 6.8: Steps in marketing optimization strategy under Model-II.

The above exercise should be handled under the charge of Conservator (utility) at state level. The market intelligence system should be supported by modern IT systems.

Sustainable development of H & MP is of course the root of the above criterion considered for optimization. This variable requires a continuous maintenance, conservation and enhancement of bio-diversity as per steps outlined in Fig 6.9.

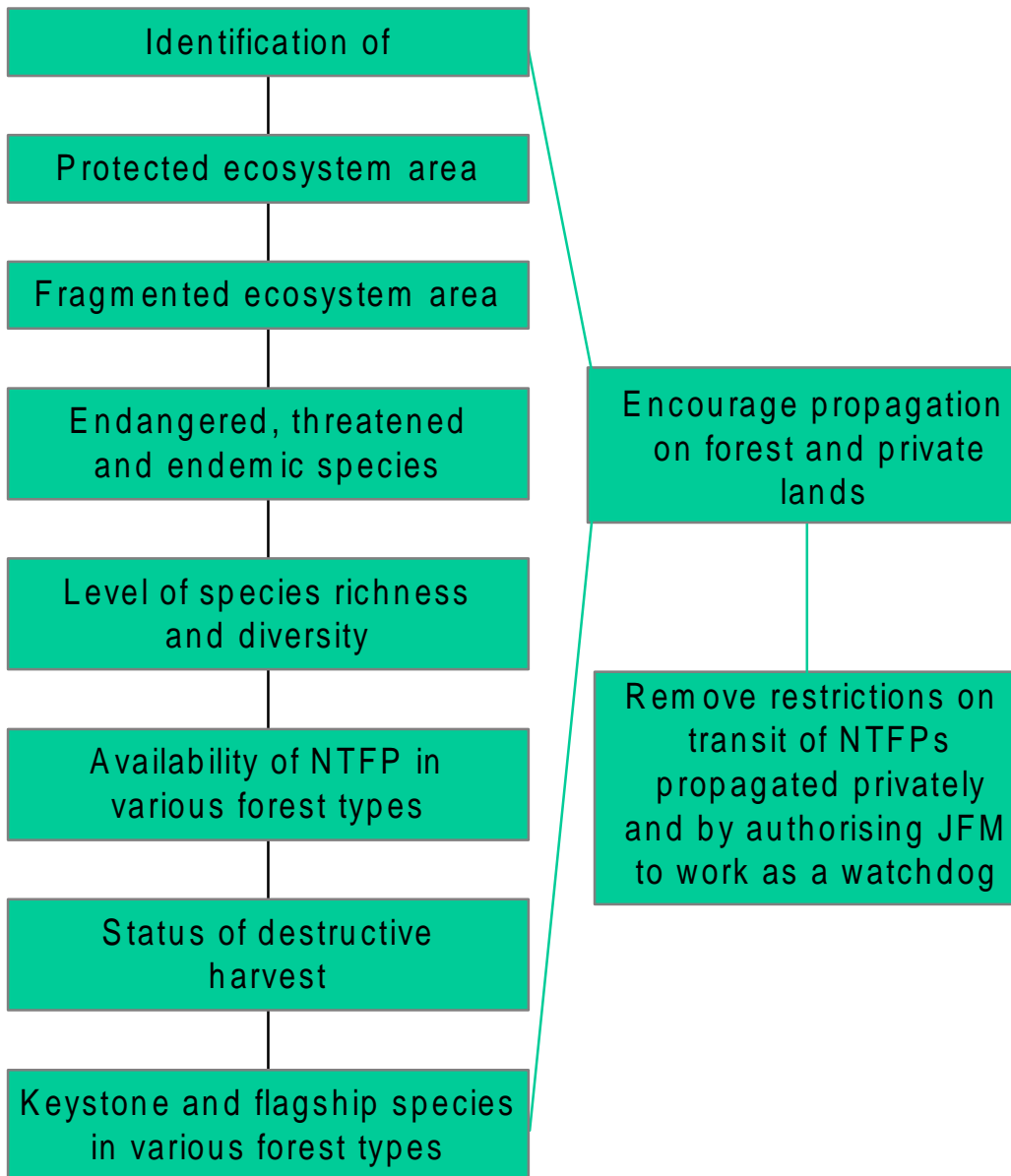
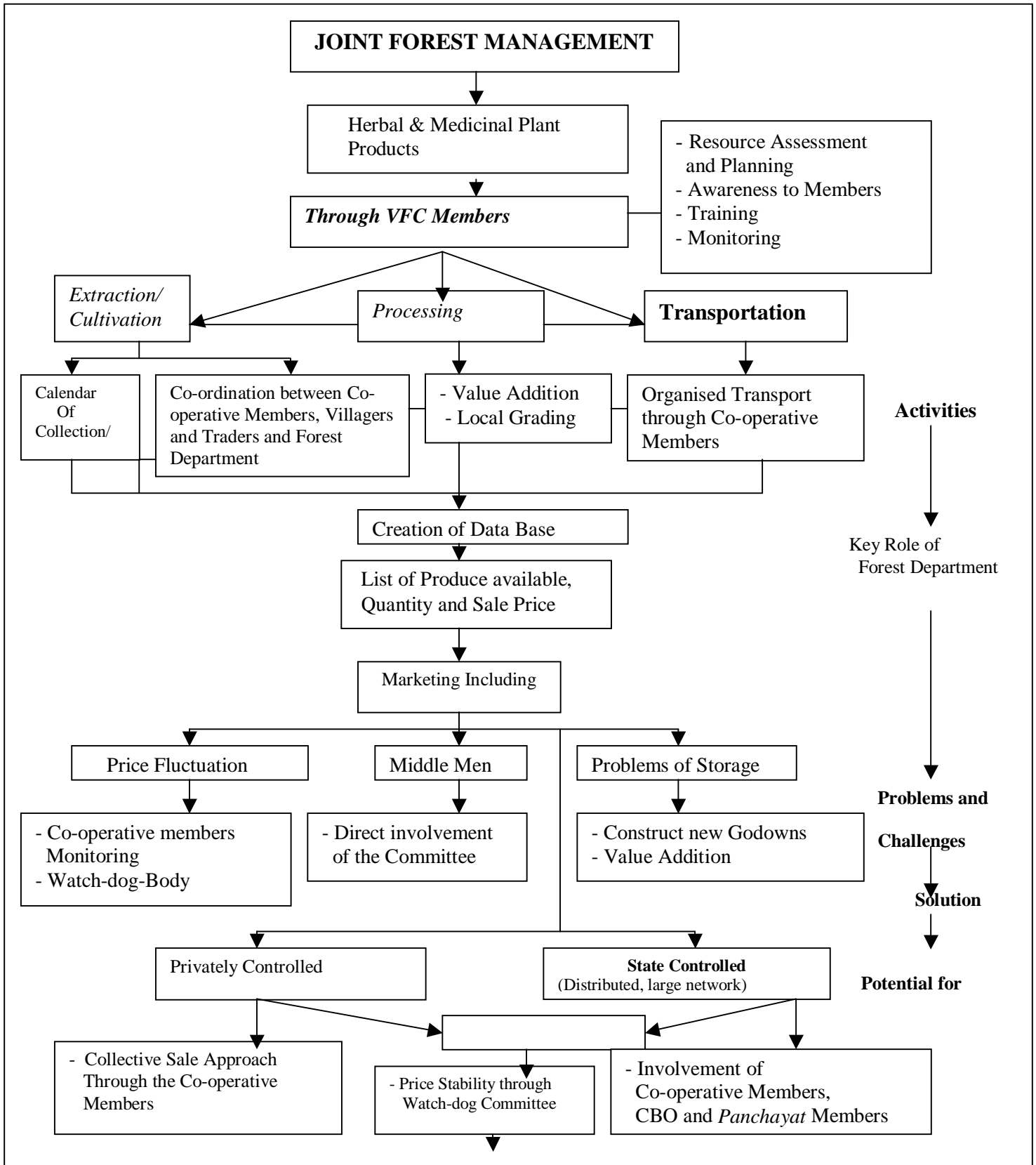


Fig 6.9: Steps for Conservation and enhancement of bio-diversity in the Model-II.

Alternative – II: NTFP Model: HERBAL & MEDICINAL PLANTS MODEL FOR SUSTAINABLE MANAGEMENT -LONG-TERM MODEL

This model considers Silviculture, ethnicity, socio-economic management through a complementation strategy and illustration in Fig 6.10. It safeguards interests of primary producers and collectors and sustainability of source areas. The model gives Complete Implementation Strategy)

Fig 6.10: HERBAL & MEDICINAL PLANTS MODEL FOR SUSTAINABLE MANAGEMENT (Long Term Model)



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In this case too the three stages sequential pathways depicted for Short-term immediate action i.e. Fig 6.6 to 6.8 would be there but perhaps after these are especially modified.

ANALYSIS:

To achieve this the Long Term Conceptual Model for Comprehensive action plan that could be ushered through a considered study by the Standing Advisory Committee (SAC) of the Apex Body –Uttarakhand State Medicinal Plant Board. It could also make provisions for :

- a) Collective sale approach; b) Watchdog Committee and, C) Involvement of Cooperatives, CBOs and, Panchayat could take care of.

While, the Model-I in first appearance gives impression that Community is at the Centre stage. In subsequent details it is designed to increase bureaucratic control and less of decentralization and partnership in various links of the chain concerns of H & MP.

Therefore, both the models will need improvement and it may be easier and appropriate to do so in case of Alternative-II, where all basics are provided in line with new developments in the area of policy, institutions, technology and marketing after the leap taken towards globalization.

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Annex 6.1: The Most Emerging Species (Below 900 m & above msl.) with quantitative availability per village)

S.No	Species (9 Qtl & Above)				Species (Between 5 - 9 Qtl)			
	Kumaon		Garhwal		Kumaon		Garhwal	
	Species	Availability	Species	Availability	Species	Availability	Species	Availability
Upto 900m								
1	<i>Kaun</i>	10 Qtl	-	-	<i>Rambas</i>	6 Qtl	<i>Kirmora</i>	5 Qtl
2	<i>Daiya</i>	10 Qtl	<i>Daiya</i>	9 Qtl	<i>Jyotila</i>	7 Qtl	-	-
3	<i>Kairva</i>	12 Qtl	<i>Karoja</i>	10 Qtl	<i>Musi Bel</i>	7 Qtl	-	-
4	<i>Githi</i>	12 Qtl	<i>Tej Bal</i>	12 Qtl	<i>Udal</i>	7 Qtl	-	-
5	<i>Sanan</i>	12 Qtl	<i>Kanthkari</i>	15 Qtl	<i>Malu</i>	8 Qtl	-	-
6	<i>Khair</i>	15 Qtl	<i>Aruda</i>	15 Qtl	<i>Sahjan</i>	8 Qtl	-	-
7	<i>Maduva</i>	15 Qtl	<i>Bhimal</i>	20 Qtl	-	-	-	-
8	<i>Nagfani</i>	20 Qtl	<i>Bel</i>	20 Qtl	-	-	-	-
9	<i>Khutadia Patta</i>	30 Qtl	<i>Haldi</i>	30 Qtl	-	-	-	-
10	<i>Dadim</i>	35 Qtl	<i>Dadim</i>	48 Qtl	-	-	-	-
11	<i>Harer</i>	68 Qtl	<i>Harer</i>	68 Qtl	-	-	-	-
12	<i>Chura</i>	100 Qtl	<i>Adarak</i>	75 Qtl	-	-	-	-
13	<i>Bel Patri</i>	120 Qtl	-	-	-	-	-	-
14	<i>Aonla</i>	200 Qtl	<i>Aonla</i>	200 Qtl	-	-	-	-

Annex 6.2: The Most Emerging Species (900-1200 mtrs. Above msl.) With quantitative availability per village)

S.No	Species (9 Qtl & Above)				Species (Between 5 - 9 Qtl)			
	Kumaon		Garhwal		Kumaon		Garhwal	
	Species	Availability	Species	Availability	Species	Availability	Species	Availability
Upto 1200m								
1	<i>Koiral</i>	15 Qtl	<i>Makkhi</i>	9 Qtl	<i>Kirmora</i>	6 Qtl	<i>Safed Indraiyan</i>	7 Qtl
2	<i>Malu</i>	15 Qtl	<i>Harjodan</i>	9 Qtl	<i>Maduva</i>	8 Qtl	<i>Kali Indraiyan</i>	7.5 Qtl
3	<i>Dhuiya</i>	20 Qtl	<i>Dhatura</i>	10 Qtl	-	-	<i>Kanthkari</i>	8 Qtl
4	<i>Kitola</i>	20 Qtl	<i>Vajradanti</i>	12 Qtl	-	-	<i>Phular Kali</i>	8 Qtl
5	-	-	<i>Kafal</i>	12 Qtl	-	-	-	-
6	-	-	<i>Dal Chini</i>	14 Qtl	-	-	-	-
7	-	-	<i>Chirata</i>	15 Qtl	-	-	-	-
8	-	-	<i>Gilae</i>	15 Qtl	-	-	-	-
9	-	-	<i>Neel Kanthi</i>	17 Qtl	-	-	-	-
10	<i>Ritha</i>	25 Qtl	<i>Ritha</i>	18 Qtl	-	-	-	-
11	<i>Rueen</i>	25 Qtl	<i>Van Haldi</i>	20 Qtl	-	-	-	-
12	<i>Bel Patti</i>	45 Qtl	<i>Bauja</i>	20 Qtl	-	-	-	-
13	<i>Dadim</i>	50 Qtl	<i>Paiya</i>	25 Qtl	-	-	-	-
14	<i>Harer</i>	85 Qtl	<i>Harer</i>	25 Qtl	-	-	-	-
15	-	-	<i>Pashan Bhed</i>	30 Qtl	-	-	-	-
16	-	-	<i>Timur</i>	35 Qtl	-	-	-	-
17	-	-	<i>Baheda</i>	100 Qtl	-	-	-	-
18	-	-	<i>Daiya</i>	110 Qtl	-	-	-	-
19	-	-	<i>Safed Musli</i>	200 Qtl	-	-	-	-
20	<i>Aonla</i>	100 Qtl	<i>Aonla</i>	220 Qtl	-	-	-	-
21	<i>Chura</i>	1500 Qtl	<i>Kilmora</i>	250 Qtl	-	-	-	-

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Annex- 63: The Most Emerging Species (1200-1500 mtrs. Above msl.) With quantitative availability per village)

S.No	Species (9 Qtl & Above)				Species (Between 5 - 9 Qtl)			
	Kumaon				Garhwal			
	Species	Availability	Species	Availability	Species	Availability	Species	Availability
Upto 1500m								
1	Khuri	9 Qtl	Giloe	10 Qtl	Khiduva	6 Qtl	Katuki	5 Qtl
2	Guiya	10 Qtl	-	-	Eand	6 Qtl	Sanan	5 Qtl
3	Bana	10 Qtl	-	-	Kapsu	6.5 Qtl	Kirmora	6 Qtl
4	Gurj	12 Qtl	-	-	Dhuiya	7 Qtl	Akhrot	6 Qtl
5	Bichchhu-Grass	20 Qtl	-	-	-	-	Dalchini	8 Qtl
6	Titpati	25 Qtl	-	-	-	-	Jhula	8 Qtl
7	Timul	70 Qtl	-	-	-	-	-	-
8	Timura	70 Qtl	-	-	-	-	Timura	5 Qtl
9	Dadim	100 Qtl	-	-	-	-	-	-
10	Rueen	100 Qtl	-	-	-	-	-	-
11	Hisalu	160 Qtl	-	-	-	-	-	-
12	Harer	200 Qtl	-	-	-	-	-	-
13	Ritha	240 Qtl	Ritha	17 Qtl	-	-	-	-
14	Chura	400 Qtl	-	-	-	-	-	-
15	Malu	500 Qtl	-	-	-	-	-	-
16	Bedu	750 Qtl	-	-	-	-	-	-
17	Khina	750 Qtl	-	-	-	-	-	-
18	Aonla	1200 Qtl	Aonla	15 Qtl	-	-	-	-

Annex – 6.4: The Most Emerging Species (1500 – 2500 mtrs. Above msl.) With quantitative availability per village

S.No	Species (9 Qtl & Above)				Species (Between 5 - 9 Qtl)			
	Kumaon				Garhwal			
	Species	Availability	Species	Availability	Species	Availability	Species	Availability
Upto 2000m								
1	Timura	9 Qtl	Timura	10 Qtl	Gurj	5 Qtl	Thuner	6 Qtl
2	Jamir	10 Qtl	Ghigharu	12 Qtl	Titpati	5 Qtl	-	-
3	Aonla	13 Qtl	Kutki	25 Qtl	Bari Elaichi	6 Qtl	-	-
4	Ritha	15 Qtl	Hisalu	25 Qtl	Hisalu	5 Qtl	-	-
5	Kirmora	20 Qtl	Kirmora	10 Qtl	Kandkari	6 Qtl	-	-
6	Chalmora	20 Qtl	Malu	25 Qtl	Githi	6 Qtl	-	-
7	Chamarmer	20 Qtl	Tejpat	50 Qtl	-	-	-	-
8	Jhijraine	30 Qtl	Nairpati	50 Qtl	-	-	-	-
9	Araiya	30 Qtl	Bhang	50 Qtl	-	-	-	-
10	Uttis	50 Qtl	Vach	65 Qtl	-	-	-	-
11	Buful	70 Qtl	Dandasa	120 Qtl	-	-	-	-
12	Vasila	100 Qtl	Vedu	120 Qtl	-	-	-	-
13	Dadim	100 Qtl	Rambas	140 Qtl	-	-	-	-
14	Bedu	100 Qtl	Pashanbhed	150 Qtl	-	-	-	-
15	Kafal	150 Qtl	Bahera	150 Qtl	-	-	-	-
16	-	-	Aswagandha	160 Qtl	-	-	-	-
17	-	-	Bichchhu Grass	200 Qtl	Bichchhu Grass	6 Qtl	-	-

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Annex- 6.5 The Most Emerging Species (More than 2500 mtrs. Above msl.) With quantitative availability per village

S.No	Species (9 Qtl & Above)				Species (Between 5 - 9 Qtl)			
	Kumaon				Garhwal			
	Species	Availability	Species	Availability	Species	Availability	Species	Availability
Upto 2500m								
1	Van Lahsun	14 Qtl	Lebchi	10 Qtl	Ghai	6 Qtl	-	-
2	Chamarmar	15 Qtl	Kailanva	10 Qtl	-	-	-	-
3	Van Haldi Sikha	15 Qtl	Kafar	25 Qtl	-	-	-	-
4	Bais	24 Qtl	Dawana	25 Qtl	-	-	-	-
5	Thuner	30 Qtl	Marcha Phool	50 Qtl	-	-	-	-
6	Hisalu	30 Qtl	Tulsi	50 Qtl	-	-	-	-
7	Kirmora	30 Qtl	Khulana	50 Qtl	-	-	-	-
8	Bichchhu Grass	30 Qtl	Kanjla	50 Qtl	-	-	-	-
9	Van Tulsi	30 Qtl	Katuki	1 Ton	-	-	-	-
10	Chatera	36 Qtl	Pipi	1 Ton	-	-	-	-
11	Pashan Bhed	50 Qtl	-	-	-	-	-	-
12	Pangar	120 Qtl	-	-	-	-	-	-
13	Harjodan	160 Qtl	-	-	-	-	-	-
14	Faran	200 Qtl	-	-	-	-	-	-
15	Moss Grass	250 Qtl	-	-	-	-	-	-
16	Brunish	375 Qtl	-	-	-	-	-	-
17	Akhrot	200 Ton	-	-	-	-	Akhrot	5 Qtl
18	Baaj (Jhula)	350 Ton	-	-	-	-	-	-

Annex – 6.5: The Most Emerging Species (more than 2500m & above msl.)
(With quantitative availability per village)

S.No	Species (9 Qtl & Above)				Species (Between 5 - 9 Qtl)			
	Kumaon				Garhwal			
	Species	Availability	Species	Availability	Species	Availability	Species	Availability
Upto 2500m								
1	Van Lahsun	14 Qtl	Lebchi	10 Qtl	Ghai	6 Qtl	-	-
2	Chamarmar	15 Qtl	Kailanva	10 Qtl	-	-	-	-
3	Van Haldi Sikha	15 Qtl	Kafar	25 Qtl	-	-	-	-
4	Bais	24 Qtl	Dawana	25 Qtl	-	-	-	-
5	Thuner	30 Qtl	Marcha Phool	50 Qtl	-	-	-	-

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6	<i>Hisalu</i>	30 Qtl	<i>Tulsi</i>	50 Qtl	-	-	-	-
7	<i>Kirmora</i>	30 Qtl	<i>Khulana</i>	50 Qtl	-	-	-	-
8	<i>Bichchhu Grass</i>	30 Qtl	<i>Kanjla</i>	50 Qtl	-	-	-	-
9	<i>Van Tulsi</i>	30 Qtl	<i>Katuki</i>	1 Ton	-	-	-	-
10	<i>Chatera</i>	36 Qtl	<i>Pipi</i>	1 Ton	-	-	-	-
11	<i>Pashan Bhed</i>	50 Qtl	-	-	-	-	-	-
12	<i>Pangar</i>	120 Qtl	-	-	-	-	-	-
13	<i>Harjodan</i>	160 Qtl	-	-	-	-	-	-
14	<i>Faran</i>	200 Qtl	-	-	-	-	-	-
15	<i>Moss Grass</i>	250 Qtl	-	-	-	-	-	-
16	<i>Brunish</i>	375 Qtl	-	-	-	-	-	-
17	<i>Akhrot</i>	200 Ton	-	-	-	-	Akhrot	5 Qtl
18	<i>Baaj (Jhula)</i>	350 Ton	-	-	-	-	-	-

Annex – 6.6 : Estimate of total available quantity and total estimated values for 5711 & 117 MP species of UA				
Species	Availability in one village (qtl)	Estimated Available Quantity Uttaranchal (tons)	On going Market Price (Rs./ton)	Total Estimated Value (Rs. Million)
Akhrot	575	6,095	50,000	305
Aonla	225	2,385	12,000	29
Apraiya	165	1,749	24,000	42
Aswagandha	(Jungli) 160	1,696	82,000	139
Baheda	125	1,325	50,000	66
Bais	24	254	18,000	5
Bauja	20	212	40,000	8
Bel	20	212	8,000	5
Bel Patri	110	1,166	22,000	82
Bhang	50	530	70,000	37
Bicchu-grass	70	742	17,000	13
Bufaul	70	742	18,000	13
Chalmora	20	212	26,000	6
Chamar Khadik	20	212	26,000	6
Chamarmar	15	159	5,000	1
Chatera	36	382	178,000	68
Chura	425	4,505	27,000	122
Dadim	60	636	18,000	11
Daiya	75	795	220,000	175
Dal Chini	14	148	150,000	22
Dandasa	120	1,272	28,000	36
Dawana	25	265	15,000	4
Ghingaru	100	1,060	4,000	4
Gilae	15	159	30,000	5
Githi	42	445	30,000	13
Guiya	10	106	15,000	2
Gurj	12	127	50,000	6
Haldi	30	318	40,000	13
Harer	75	795	70,000	56
Harjodan	160	1,696	32,000	54
Hisalu	160	1,696	10,000	17
Jamir	50	530	10,000	5
Jhjraine	30	318	16,000	5
Jhula	150	1,590	12,000	19
Jkaun	10	106	22,000	2
Jungli Tulsi	30	318	16,000	5
Jyotila	17.5	186	40,000	7
Kafal	150	1,590	22,000	35
Kakri	100	1,060	30,000	32
Kari Patta (Guyya)	60	636	12,000	8
Karoja	10	106	16,000	2
Katuki	10	106	200,000	21
kaun	10	106	8,000	1
Khair	15	159	14,000	2
Khutadiya Patta	30	318	20,000	6
Kilmora	55	583	25,000	15
Kitula	20	212	30,000	6
Marcha Phool	50	530	60,000	32
Moss Grass	250	2,650	8,000	21
Mushroom	60	636	1,200,000	763
Nagfani	20	212	8,000	2
Neel Kanthi	17	180	8,000	1
Pashan Bhed	75	795	20,000	16
Pudina	10	106	30,000	3
Ritha	65	689	11,000	8
Safed Musli	200	2,120	800,000	1,696

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Annex – 6.7: EX-FACROTY PRICES OF SELECTED H&MP

Name of Medicinal Plants	Rates/Kg
Abhrak Leaves	14.00
Ashok Chhal	15.00
Keshar Mograb	26980.00
Keshan Irani	21980.00
Jatamasi	110.00
Jeera (kala)	148.00
Tej patta	22.00
Nagar Mautha	12.00
Patol Patra	18.00
Prishnparthi	12.00
Bala	8.80
Rumimastaki	2900.00
Pashal Parthi	120.00
Saunth	58.00
Samudra Phen	36.00
Suhaga	43.00
Samudra Phal	250.00
Heeng Hara	1100.00
Rasanjan	95.00
Turpin Oil	48.00
Banslochan	30.00
Amaltas	15.00
Kaunch seed	19.00
Kasish hara	12.00
Kharpar	32.00
Chiraita	178.00
Jeera (white)	105.00
Trayman	320.00
Darit Seed	60.00
Najkesar	156.00
Nag Asudh	78.00
Pit Papra	23.00
Bung	390.00
Molsirichal	19.00
Maju phal	65.00
Ral	42.00
Shenoy	34.00
Shilajeet (Pure)	490.00
Hansraj	32.00
Citric Acid	76.00
Peepala Mul	38.00
Manjeeth	48.00
Atish karwa	990.00
Annat mul	9.40
Apamarg	7.90
Ambabel	109.00
Arkamul	12.00
Aamki Chhal	7.90
Arjun Chhal	8.40
Utangan Seed	169.00
Unnav	96.30
Name of Medicinal Plants	Rates/Kg
Arandmul	8.00
Kateli Chhoti	14.40
Kaner Mul	12.90
Kanchnar chhal	13.90
Khair Chal	37.00
Khas	9.40
Tulsi patra	14.70
Dhatur Seed	8.30
Nalika	23.30
Neem chhal	7.90
Netra Bala	14.70
Fitkiri	7.40

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Bakuchi Seeds	9.40
Babul chhal	9.00
Macoy	48.00
Yasad	120.00
Somlata	34.00
Swarn Masik	19.00
Sapt Parn chhal	17.00
Gulhar Chhal	14.30
Namak Kala	6.90
Basa	6.00
Aajwayan	40.00
Alak laghu	600.00
Alak Brihat	192.00
Kali Mirch	107.00
Kattha Biskuti	190.00
Gambhari	14.00
Talis Phal	29.50
Draksha lal	150.00
Peepal Chhoti	105.00
Pasanbhed	20.00
Supari	65.00
Para	13000.00
Haldi	39.00

Chapter-7:

SOCIO-ECONOMIC LINKAGES

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Chapter-7

SOCIO-ECONOMIC LINKAGES

7.1 General

The collection and sale of H & MP has been a subsidiary occupation of the people living in and around the forests from the pre-British period. As they got pushed into a monetized economy, their dependence on H & MP for income increased, even as their access to forests declined. Rapid deforestation aggravated the situation further. Declining availability of H&MP and lack of alternative employment, have triggered off large-scale male migration, both seasonal and long term, from such areas.

Irrespective of socio-economic status of the families living in and around the forests, every family is enjoying benefits of H & MP in some way or other. The families with some other source of income may not be drawing monetary income from H&MP but are certainly consuming fruits, herbs and shrubs, grasses and fuel wood for self-consumption. In other words, H&MP are inter-linked with rural economy of the forest area.

7.2 Role of H & MP in Employment Generation

H&MP in Uttranchal are broadly generating two types of employment (a) Direct and (b) Indirect. Direct employment could be linked with the amount of money a person or a family earns out of its involvement in NTFP related activities. The indirect employment is the activities related with H&MP from which benefits are being derived but not monetized. For example, collection and consumption of fuel wood, consumption of fruit species, medicinal plants and grasses for cattle's/thatching etc. are such activities yet to be monetized. The indirect employment in indirect forms is enjoyed by almost every family living in and around the forest irrespective of cast, creed, economic status or occupation. However, the direct employment is limited to certain strata of society. These aspects have been endeavored to be quantified through field interactions (PRA).

Percentage of families enjoying direct and indirect employment zone-wise is depicted in Table-7.1.

Table – 7.1: Forest dependent families enjoying employment from H & MP % of families

Region	Direct employment	Indirect employment
Garhwal	22	66
Kumaon	65	100

Source: PRA

Note: Inferences drawn on the basis of PRA in five villages under each region and interviews of other stakeholders i.e. FD field officials, NGOs etc.

In Uttaranchal, the employment generation through H&MP could have been more had the resources been better managed and policies supportive and practical. The indirect employment opportunities are enjoyed by practically most of the family members particularly women and children. However, mostly male members who know the business in terms of species identification, market venues and bit of end use enjoy the direct employment. Number of members per family engaged in H&MP related activities are shown in Table-7.2.

Table – 7.2: No. of member engaged in H&MP related activities from each family
% of families

Direct employment (No. of members)	Kumaon	Garhwal	Average income (Rs.per family per Annum
Indirect employment women/children			
1 One member	56	6	1,000
2 Two members	24	29	1,700
3 Three members	6	40	1,900
4 Four members	10	15	2,200
Entire family	4	10	2,500

Source: PRA and field interviews.

7.3 Extent of Income Generation by H &MP

In case of medicinal plants, herbs and shrubs and other H&MP the earning per family has been comparatively lower. The average earning per family from H&MP has emerged as given on table-7.03.

Table – 7.3: Average earning per family from H&MP per annum

Rs./annum

Region	Maximum from H&MP	From Total
Garhwal	2400	5,400
Kumaon	2500	4,700

Source: PRA.

Basis – families identified in table-7.01.

It is noticeable that the above incomes are from direct benefit derived on part time working basis. On an average the paid mandays created by H&MP per family per annum are:

Garhwal	-	40
Kumaon	-	78

In a village having about 100 families, man days to the extent of about 2000 a year is generated (assuming that only 30% of the families are enjoying this benefit). The indirect employment generated has been quantified to the extent

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of 50,000 man days a year in a 100 family village in collection of fuel wood, grasses and other H&MP for self-consumption.

The villagers have themselves revealed that if policy constraints regarding monopoly in purchase of NTFP by FC and other organizations are removed and technical, infrastructural and marketing supports are extended, the economic return for them can be multiplied by 4 to 5 times as lot of resources go waste in the forests. Due to policy constraints, trading being difficult, the villagers do not take interest.

The stakeholders e.g. the local people, forest officials, NGOs and even the traders have opined that if harvesting constraints are removed, trade barriers are opened the employment generation can be ten times more compared to today's scenario. However, the same segment also opine that opening up of harvesting and trading barriers, may result in over exploitation of forests but it can be controlled by assigning the management and protection responsibility to the JFM and CBOs. It will of benefit to create a stake of community in maintenance, protection and sharing mechanism.

7.4 Role of H & MP in Social Structure

H&MP and demography of the area are inter-woven. H&MP have some role or other to play in day-to-day life of the people living in and around the forests. The people's relations start with H&MP for food, fiber, medicine and commercial uses. Use of H&MP is for self-consumption and commercial gains are affecting livelihood of the people dependent on forest.

7.5 Sharing Mechanisms

H & MP sharing mechanism is not yet defined excepting in case of grasses in civil and *Soyam* forests for other NTFP's. Grasses in the hills of Uttranchal are shared through traditional system of "*Batwara*" in which a piece of pasture/forest land is allotted to a family by the village *panchayat*. The family has to live with that much of grasses and in case of deficit they purchase the grasses from other villager who has a surplus of it. In case of H&MP, due to absence of JFM interventions, no such mechanism exists. Any body in the village can extract any quantity of H & MP for self-consumption and sale to the government agencies. Once linked with JFM the sharing of benefits will be regularized and it will enhance income of the people dependent on it.

7.6 H & MP Linkage with JFM

Undoubtedly, H&MP could work as miracle to boost economy of the forest areas if properly managed. The present system of harvesting, posts harvesting treatment and marketing are the constraints causing hindrance in its

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sustainable development and income generation. JFM could certainly be a right tool to improve the situation. It will not only check the destructive harvesting due to close monitoring of JFM committees but also help in sustainable development through regeneration and propagation. JFM with its legal back up and institutional supports will be in a better position to create a price mechanism, post harvest treatment and value additions. In fact the JFM who presently do not have a continuous financial base will also be getting tremendous financial support through H&MP if brought under its control.

H&MP could work as a source of income throughout the year. Different species have different harvesting seasons and if added together there will be some species or other being harvested and marketed every month of the year. The right to individual harvesting and marketing is resulting in irresponsible treatment to the H&MP both in terms of damage to the forests and haphazard marketing. Once brought under JFM, the local's love for this resource will ensure protection and maintenance.

About 95% of the villagers and 70% of the senior forest officials interviewed have opined in favour of management of NTFP and, therefore, of H & MP, through JFM intervention. Negative feedback has mainly emerged from few field officials who still believe in administering the forests in traditional ways and is against JFM.

But inertial persists at all levels and perhaps greater motivation vis-à-vis direct involvement of DFOs in participatory than directive ones or at equal level may change the situation coupled with sensitization of field level functionaries.

For H & MP, unlike fodder & fuel wood, many linkages are needed laterally and vertically. At every step stakeholders must be given a key role in decision-making. Consequently, the concurrent capacity building and updating awareness through R & D on technology and through market intelligence on profitable mid-course correction.

In short JFM as practiced so far has to evolve dimensionally, in depth and spread, if it can be useful for significant-stepping up H & MP trade.

Chapter-8:

SUGGESTIONS AND RECOMMENDATIONS

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H & M P in the State with Multiple Stakeholders

Observation: The destiny of H & MP appears to be in the hands of different Govt. Organizations / Bodies / Institutions at the State as well as Central level. The study reveals a paradoxical situation that organizations have not been able to develop / create an appropriate mechanism for inter & intra co-ordination among themselves. There lacks a synergy of internal & external monitoring information system for the State as a whole.

For Example:

- National Medicinal Plant Board (NMPB) at the central level is a body under Ministry of Health & Family Welfare, Gol.
- State Medicinal Plant Board (SMPB / HRDI) is controlled by the Dept. of Horticulture & Food Processing, Govt. of UA.
- Resources of H & MP is owned and governed by Dept. of Forest, Govt. of UA.
- *Bhesaj Sangh* did marketing of H & MP / KMVN earlier and, now the responsibility has been transferred to Forest Development Corporation.
- More than dozen institutions under different ownership look after R&D.
- Policies are made and governed by the Dept. of Forest, Govt. of UA.
- Ministry of Environment & Forest, Gol prepare technical policies.
- Production is being used by Industry: Public or Private / Pharmacy / NGO's / *Vaidya's* / intermediaries / middlemen who control the entire market forces.
- Majority of Gatherers are unidentified and, posing a great threat to conservation through unscientific / destructive harvesting.
- Cultivators, majority of whom are regulated by the Forest Dept., having smaller areas under cultivation but handling much larger volumes of commercial trade from the wild resources and using

Long-term Strategy:

Herbs & Medicinal Plants (H & MP), is a specialized sector like: Horticulture; Jute; Handicrafts; Poultry; Dairy & Milk; Cotton & Textiles; etc, The dispersion of activities in these sectors have been brought under the control by creation of **Commissioner** at the central level with the corresponding Central Ministry. And, the developmental works / role in these sectors are, more-or-less, organized besides streamlining the role for intermediaries / down the line for safeguarding the sector within the State.

NMPB: Given Delegation of Powers for Handling H & MP Sector in the Country:

Therefore, it may be pertinent to mention that a **Commissioner for H & MP**, (as a specialized sector needs regulatory intervention), be set-up at the central level. The NMPB be delegated the powers of a Commissioner at the Central Level under the MoEF, Gol (because of the entire resources of raw material is owned by the Forest Department). The NMPB be delegated with all the responsibility and, made solely accountable to all the functions as notified by Gol on 24th Nov. 2000.

The NMPB could be assist by the State MPB, headed by the Development Commissioner¹ (H&MP) drawn from Forest Dept. with the rank of CCF and, appointed under the State Legislative Act. The SMPB could be accountable for all the functions of NMPB and, act as a Principal Co-ordinator between NMPB and the State Govt. and, Institutions operating within the State for development of H & MP sector.

¹ "Development Commissioner (Herbal & Medicinal Plants)" to exercise the powers and perform the functions on behalf of the State Govt. for the purpose,

Chapter – 8

SUGGESTIONS AND RECOMMENDATIONS

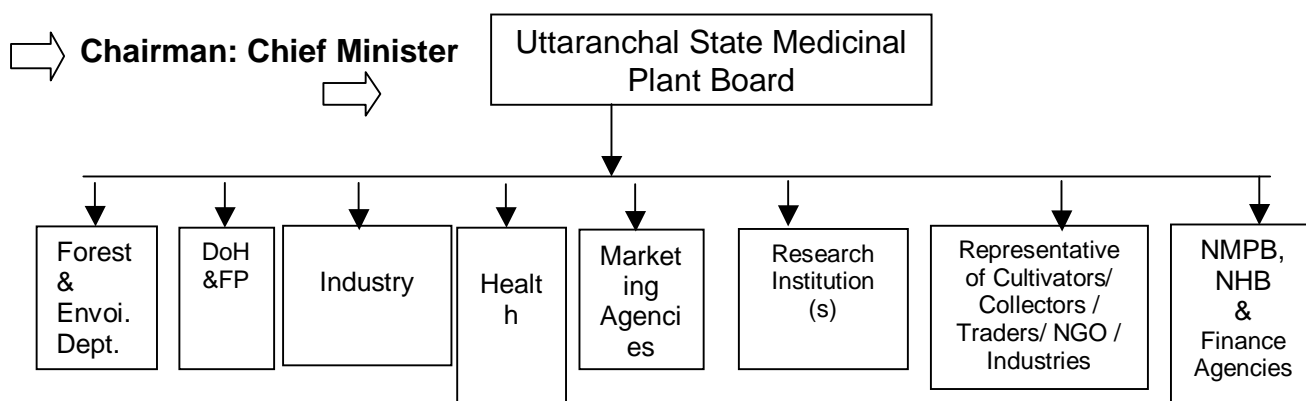
8.1 An Apex Body or a Principal Player and A Nodal Agency or an Executive Arm.

There are multiple stakeholders and multiple players in this sector. But there is no platform to bring them together:

- 1) To evolve a common perception, strategy instruments, harmonious policies, guidelines and directions for both short term or immediate and, long term action plan;
- 2) To formulate a plan for periodic survey & intervention, collection & cultivation; value addition at grassroots' level and at intermediary stages; systematically organizing community based organization (CBOs) at different levels for creating employment and income opportunities to all stakeholders; promoting transparent linkages between producers, collectors and local regional and terminal market points on one hand and amongst principal users-industries and Practitioner's, pricing and disbursement of proceeds etc.;
- 3) Implementing the plan with collaboration and coordination amongst line departments, R & D Institutions, industries, marketing institutions / agencies and representative people's body from village Sabha's to Zila Panchayat with transparency and with the principle of 'Shared Concern and Shared Governance';
- 4) Monitoring and Impact Assessment / Evaluation.

The first necessity has, therefore, been felt that An Apex Body be clearly identified. The 'Uttarakhand State Medicinal Plant Board' can possibly be such an Apex Body, if necessary with reconstitution and, act as the Principal Player. This Apex Body should have a Nodal Agency or the Executive Agency, who will be responsible for all the issues listed under serial (1) to (4) above, in relation to H & MP, conservation, cultivation, collection, value addition & livelihood generation, marketing and fair distribution of proceeds and reporting progress periodically under the given scenario. Dept. of Forest could be the Principal Player / nodal Agency.

8.2 An Apex Body or a Principal Player



The Apex Body may constitute a Standing Advisory Committee (SAC) under the Chairmanship of Chief Minister and, In charge Forest & Environment as the Member Secretary, to provide the direction on: -

- Conservation, collection, cultivation, & production;
- Value addition, pricing & marketing;
- Policy and legislation;

- Coordination and collaborations.

This SAC could meet once in a year to approve the recommendations of the SIC.

In addition there should be a Steering Implementation Committee (SIC) under the Chairmanship of Chief Secretary and, Head of the executive formation with the nodal Department of Forests, as the Member Secretary. The SIC would meet quarterly and, provide direction and modality for coordination and collaboration for the entire implementation programme. The SAC / SIC should be serviced by a Nodal Agency for a follow-up by the Forest Dept.

8.3 Nodal Agency---

It should have a separate formation with mechanisms to: -

- Implement plan activities for conservation, collection, cultivation through CBOs, Institutions, Industries etc.;
- Conduct research through relevant Research Institutions under ICFRE, CSIR, Universities etc.;
- To formulate a trade channel with consensus and ensure providing a level ground for sale purchase so that primary producers and gatherers get their share of much higher returns;
- To collaborate and coordinate development of post-harvesting technology and their transfer to grassroots' level for value addition;
- To ensure *In-situ* as well as *Ex-situ* conservation;
- To carry out in collaboration with other agencies like BSI etc. periodic survey, categorization and preparation of State of art report;
- To get regularly on quarterly and yearly basis compiled reports on market issues both for internal and export market;
- Adopt M&E system including an Online Monitoring system CPM & MIS (Computerised Project Monitoring & Management Information System)

Single-window System Under a Principal Player:

The orderly growth of Herbal & Medicinal Plants (H & MP) in the state can be achieved provided the following Chain is taken care of under a **Single-Umbrella System / Command:**

- ⇒ *In-situ* conservation; ⇒ *Ex-situ* conservation;
- ⇒ Production of quality planting material; ⇒ Cultivation;
- ⇒ Collection from wild sources; ⇒ Research, training & development;
- ⇒ Policies & strategies formulation; ⇒ Implementation;
- ⇒ Post-harvesting; ⇒ Semi-processing;
- ⇒ Extraction; ⇒ Procurement; ⇒ Prices; ⇒ Marketing; ⇒ Processing;
- ⇒ Exports; ⇒ Imports; ⇒ and, matters connected therewith to complete the Chain.

8.4 The Principal Player:

The Principle Player at State level could be constituted and, nominated as "*Uttarakhand State Medicinal Plant Board (USMPB)*", under: a State Legislative Act called as

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“Uttarakhand Herbal & Medicinal Plants (Regulation of Production and Processing) Act (UAA & MP Act)”.

- The Act could specifically stipulate USMPB be re-constituted under the Chairmanship of Chief Minister, to act as Single Umbrella System. The USMPB should have a permanent Standing Advisory Committee (SAC) to provide direction on all the issues as listed at Paragraph 8.3. The composition of the Board should include Ministers in charge of Agriculture, Finance, Horticulture, Health, Industries, Cooperative, etc. and,
- The SAC should have Steering Implementation Committee (SIC) under the Chairmanship of Chief Secretary with In charge Forests Dept. as the convener of SIC. The SIC would be responsible to provide direction and modalities for coordination and collaboration for implementation of entire action plan. The Act could also stipulate the aims and objects of the Board, and, its functions. Directors of HAPPRC, GBPIHD, NBPGR, ICFRE, CSIR; ICAR, Representative of MoEF, H & FW, GoI; Two nominated representatives each of H & MP Grower's-Pharmacies / Industries by the Govt. and, Two nominated members from CBOs involved in collection and cultivation of H & MPs could be nominated as members of the SIC.
- This Act could provide the Regulation for Orderly Growth of H & MP Species: Conservation, Maintenance, Regeneration, Cultivation, Propagation, Protection, Production, Policies, Extraction, Harvesting, Post-harvesting, Semi-processing, Procurement, Marketing (Prices, Promotion, Product, Placement & Policies), Exports, Imports, thereof and for matters related therewith.
- The act should clearly stipulate the Dept. of Forests as the Nodal agency with a direction to develop a special multidisciplinary and with specialized middle and senior level experts besides of forestry who can address to the specific task assigned in respect of H & MP along with its functions and partnership modes.

8.5 Capacity Building:

These are needed to cover the following areas:

- Collection, cultivation and handling of H & MPs;
- Identification, uses, economic prospects and, conservation, of H & MPs;
- Processing and Value Addition of H & MPs;
- Storage, transport and, disposal;
- Price negotiations and sale;
- Revolving fund, credit, advance payment and repayment schedule;
- JFM Committee / user Groups, clustering and formation of federations;
- Training Module for all aspects concerning above areas and as given for consideration at the *Annex 8.1*.

8.6 Fund Mobilization:

- As Mandatory: Industries & Individuals be encouraged to canalise percentage of their profits for H & MP sectors. Viable incentives are offered for attracting such investments from private resources. In addition a separate budget should be provided for the sector that will allocate and got approved by USMPB.

8.7 Policy Harmonization:

The policy change is a complex process, which results due to interplay of several players and factors, the learning from other State's e.g. *Madhya Pradesh; Chattisgarh; Himachal Pradesh; Kerala; and, other States*. The experience indicates the improved measures required are: -

- Conservation;
- R & D;
- Marketing (Prices, Promotion, Product; Placement and, Policies);
- Sustainability.
- Cultivation;
- Harvesting & Post-harvesting;
- Training of trainers & capacity building;
- Value addition;

A policy on H & MP s for Uttarakhand may be got formulated after taking into consideration all above and the above and the provisions of existing Acts and, Policies.

8.8 Conservation and Development of NTFP²:

A clue can be taken from the Centrally and State Govt. sponsored forestry and, forest-based programmes e.g. Ministry of Environment & Forests, Govt. of India, is promoting conservation and development of Non Timber Forest Produce (NTFP) including Medicinal Plants under National Afforestation Programme (NAP). The 100% Central Assistance Scheme and Projects sanctioned are being executed over a Five Year Period through Forest Development Agencies (FDA's), registered as society under the State Societies Registration Act under the chairmanship of Conservator of Forests. The FDA's depend on availability of degraded land and willingness of the Village Forest Committees (VFC's) through a participatory approach or the concept of User Group within the Village Forest Development Committee (VFDC) can be gradually adopted.

8.9 Medicinal Plant Protected Areas (MPPA's):

Under this scheme, area having potential for production of H & MP can be selected and developed as Medicinal Plant Protected Areas (MPPA's) with in the State, as has been successfully developed by the neighbouring hill State of Himachal Pradesh or People Protected Medicinal Plant Areas (PPMAs) as in the case of Chattisgarh, another Herbal State. The areas already included under Joint Forest Management (JFM) could also be included under this concept. In this pattern MPPA work allocated to a particular User Group within VFDC, can sign a written document or Memorandum of Understanding

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- ² **NTFP** [Earlier called as Non Wood Forest Products (NWFP) / Minor Forest Produce (MFP)]: is defined as the forest products of biological origin other than wood as well as services from forests and allied land uses. FAO defines, "Non-Wood forest products consist of all goods of biological origin other than wood in all its form, as well as, services derived from forests or any land under similar use".
 - Dr. M P Shiva (COMFORTS) defines: " All products obtained from plants of forest origin and host plant species yielding products in association with insects and animals, including their parts and, items of mineral origin except timber be defined as NTFP".

(MoU) for sharing the usufructs or other monetary benefits drawn and explained to all the stakeholders involved in the endeavour. This MoU could have the concurrence of State Dept. of Forest and, VFDC.

8.10 Medicinal Plant Conservation Area (MPCA):

The State has an area of 6,379 Sq. km. brought under Medicinal Plant Conservation Area (MPCA) within the protected areas or in the vicinity of protected areas, which are more beneficial from ecological as well as economic point of view. The PPMAs, will further advance the cause of this conservation plus economically beneficial effort.

8.11 Proposed Role of different Agencies for Selected Variables:

Keeping in view, the above administrative set-up the selective operational variables can be handled as given in the subsequent paragraphs below: -

Selected Variables	Stakeholders	Proposed Role
Conservation	FD / FDC	<ul style="list-style-type: none"> • Developing of database: • For inventory • <i>In-situ</i> conservation • <i>Ex-situ</i> conservation • Supply of quality planting material development • Plantation of tree species of H & MP • Development of extension, information, education & communication related to H & MP • Administrative control on harvesting
	Community living in and around forest / JFM	<ul style="list-style-type: none"> • Follow guidelines & regulations of FD • Encourage cultivation, micro-enterprise for semi-processing
	Cultivators / primary gatherers	<ul style="list-style-type: none"> • Follow guidelines & regulations of FD • Encourage cultivation, micro-enterprise for semi-processing
	Marketing agencies	<ul style="list-style-type: none"> • Use skilled labourers to discourage destructive & immature harvesting • Purchase produce only through community based legal organizations like JFM / VFDC's / VFC's
	Research Institutions	<ul style="list-style-type: none"> • Provide appropriate & implemental extension, information, education & communication to Forest committees or user groups • Developing standardization norms for different altitudinal species
Propagation / Cultivation	FD / FDC	<ul style="list-style-type: none"> • Provide hassle-free transit permits / licence • provide quality planting material to cultivators • Non-bureaucratic <i>in-situ</i> inspection to ascertain the origin of the product
	Research Institutions	<ul style="list-style-type: none"> • Implemental technology dissemination from lab-to-land training • Appropriate extension, harvesting, semi-processing, processing technical know-how

	Industry / Pharmacies etc.	<ul style="list-style-type: none"> Develop buy-back arrangements with the cultivators through a tripartite agreement with the approval of Development Commissioner (H & MP) Develop R&D back-up support for propagation & cultivation of H & MP Provide funds to cultivators on contract-farming- basis
	Financing Institutions / Banks / NHB / NMPB/ Refinance by NABARD including	<ul style="list-style-type: none"> Develop & propagation the techno-economic feasibility norms for cost of cultivation & production norms of different altitudinal species
Selected Variables	Stakeholders	Proposed Role
Harvesting	FD / FDC	<ul style="list-style-type: none"> Inventory norms / prescription of harvesting for different species Inspection / protection norms against destructive harvesting Training & capacity building for identification of positive harvesting techniques
	JFM / Communities / Primary Gatherers	<ul style="list-style-type: none"> Adoption of harvesting norms as per guidelines of FD Avoidance of harvesting of endangered, threatened / rear species Adoption of semi-processing practices for value addition hence less quantitative harvestings
	Cultivators	<ul style="list-style-type: none"> Approach institutions for getting training for propagation, cultivation, harvesting & related norms for backward-forward linkages etc
Post-harvesting	FD / FDC	<ul style="list-style-type: none"> Provide technical know-how & infrastructure transit set-up
	Research Institutions	<ul style="list-style-type: none"> Prescribe PH norms for species such as time of harvesting, grading, sorting, storage / shelf-life etc
	Marketing agencies	<ul style="list-style-type: none"> Collect information on production and disseminate the same for adoption of similar PH treatments
	Industry / Pharmacies etc.	<ul style="list-style-type: none"> Buy only graded and certified products through govt. approved agencies
Semi-processing	JFM / Communities / Primary Gatherers / Cultivators	<ul style="list-style-type: none"> Adopt value-addition through scientific semi-processing techniques such as: drying, shaping, colouring, debarking, peeling, cleaning, pulping, de-seeding etc
Semi-processing (Contd.)	Industry / Pharmacies etc.	<ul style="list-style-type: none"> Help develop training for semi-processing Act as bridge between industry & semi-processors
Marketing	JFMCs / Communities / VDFC / VFC / Primary Gatherers / Cultivators	<ul style="list-style-type: none"> Procurement of standardization products from local sources. Application of PH & semi-processing practices for value-addition Maintenance of receipt and deliver schedule of products fro FDC Develop mechanism for usufructs sharing norms for accruals & related issues thereof

	FDC	<ul style="list-style-type: none"> • Generate buyers on equitable price • Quality maintenance of the products • Develop appropriate apportioning of financial norms for usufructs sharing. • Develop advance buy-back arrangements with the industry and disseminate profit margins to JFM Committee / Gatherers / cultivators after adjusting trade commission • Develop perfect market intelligence system to update national, international product movement & pricing
Selected Variables	Stakeholders	Proposed Role

8.12 Two State Policy Strategy:

The scanning scenario at state level, as well as, national level has revealed that a vast majority of Uttarakhand rural families and possibly equally large number of families outside have serious livelihood on continuing and improving the State affairs as prevalent. The activities cannot be suspended to formulate and implement an improved strategy and corresponding action plan. Therefore, there has to be a short term or immediate action oriented policy strategy, as well as, along term say one year and started implementation of the same within an integrated plan within two years.

8.12.1 Short-term Policy / Strategy for H & MP:

- The disorganized and exploitative dealings related to collection and marketing which lacks transparency should be organized into a network of CBO's under the overall conceptual model of JFM;
- H & MP trade be handed over to JFM Committees on locational basis and organized into a network through formation of clusters and federations;
- Transit after sunrise and, before sunset should be reserved and left to *Panchayats* and JFM Committees for proper monitoring.
- Propagation and cultivation of banned species on non-forest land should be given top-priority;
- The JFM committees, their clusters and federations should be financially empowered by helping them create a revolving fund and acquiring necessary technical and management skills.

8.12.2 Long-term Policy Strategy for H & MP:

There has to be a comprehensive changes in the systems for extraction / cultivation, processing & storage, transportation with dependable market intelligence, outlets and, finally enhance the overall higher return from lesser volume of materials collected / utilised with much higher price to primary producers / collector's / cultivators by eliminating the hidden and distress dealings through middlemen this will have:

- A long term policy strategy and conceptual frame work for developing action plan;
- A continuous plan for upgrading processing for value addition to match market demands;

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- A complimentary plan for R & D with market driven programme;
 - A continuous plan for updating capacity of primary stakeholders as well as others in the chain;
 - To abolish transit permit and licensing (TP & L) for Tree (fruit) species of H & MP and for others the TP & L should be handed over to *Panchayats* and JFM Committees both for administering as well as monitoring.

8.13 Short-term Action plan for H & MP (Based on JFM Model):

- There need to be proper identification and involvement of local Community Based Organizations in each Circle.
- Capacity building Models for the lower functionaries of the Forest Department / JFM Committee Members be devised for:
 - For greater awareness.
 - Motivate them to work more closely and cohesively.
- Dissemination of information be through Brochures, Pamphlets and Bulletins by use of Vernacular language and appropriate technology to user groups.
 - Self Help Groups of women / JFM Committee
- Members of the JFM provided better and improvised practices in H & MP, for Promoting organic cultivation practices, Formulating Plan of Action for establishing H & MP Nurseries, Conservation of forest, Wasteland areas in region, Conservation in Forestlands, Selection of species for cultivation.
- District-wise / Circle-wise Vegetation survey and, Inventorying of H & MP be undertaken with their potential & regeneration status and, Creation of database at the village level for production and extraction of H & MP.
- The period of maximum collection period and maximum months of collection be identified.
- The market information for price details at the Block and District level be generated and, disseminated.
- List of main and small interested buyers with particular species be identified with the recording of monthly and annual demand.
- To generate employment opportunities for the JFM Committee by increasing the vegetal cover on farmlands as well as forestland – would prevent seasonal migration.
- Strategy should include attaining self-sustainability in fuel wood, fodder and small timber for house use through Agro-forestry practices with intercropping of H & MP.
- The planting along farm bunds, on agricultural fallow land be encouraged – e.g. Model of Poplar with Bach.
- The knowledge for each species has to be documented and disseminated to JFM Committee in Vernacular language.
- Collective Marketing at a common place shall strengthen the community participation – e.g. by encouraging Central sale-cum-storage Godown.
- JFM Committees can converge into a Federation of Committees and, Executive body can publish a monthly price bulletin.
- There is need to develop Silviculture for H & MPs through a Missionary Zeal.

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- The FD may establish District-wise Demonstration Centres. The forest gene banks and other JFM areas can be used for establishing demonstration gardens.
 - Each District should have such Garden-cum-Interpretations Centre.
 - The FUA-FD, with the help of "NRIF" could develop practical training Modules for the training of staff and villagers in the identification of threatened species and, in vegetation monitoring.
 - The UA-FD, with the help of "NRIF" could develop public education programme related to conservation of herbs & medicinal plants.

8.14 Long term Action Plan for H & MP Linkage with JFM:

- Undoubtedly, H&MP could work as miracle to boost economy of the forest areas if properly managed. The present system of harvesting, posts harvesting treatment and marketing are the constraints causing hindrance in its sustainable development and income generation. JFM could certainly be a right tool to improve the situation. The prime reasons for linking H&MP and JFM as viewed by the stakeholders are summarized as under:
 -
 - It will minimize destructive harvesting due to close monitoring by JFM committee and members.
 - Species wise extraction level will be defined on availability basis as they have fair idea of the resource availability and regeneration potential.
 - Accelerate propagation level even on private lands as the JFM could take care of value addition and marketing aspects.
 - Depleting and endangered species could be saved through protection and restrained harvesting level.
 - Sharing mechanism will be well defined as it will become a community resource and stake level of every family and member will be fixed. It will ensure equitable distribution of products and income.
 - JFM as an institution will have a better strength to receive institutional support and interact with the FDs for technical and financial assistance.
 - It will help to reduce unemployment in the area and stop destruction to forests through uncontrolled head loading of fuel wood. JFM committee will be strengthened financially to take up in addition to forest development some community developmental activities also.
 - JFM committee will have better bargaining strength to fetch better prices for H & MP based on market intelligence system and institutional support of FDA and NGOs.
 - It will free the villagers from exploiting grip of traders, middlemen and industries.
 - JFM will be able to get more institutional support and avail of governments development initiatives in the area.

8.15 Alternative Models for Marketing:

In the light of policy strategy and action plans proposed under paragraphs 8.12 to 8.14, the two conceptual models-one for **Short term** and, the other for **long term** are proposed here under. There could be two alternative models to optimize and to smooth the marketing

systems in Uttarakhand. These alternative models are discussed in succeeding paragraphs and based on clustering variables e.g. conservation, cultivation, value addition and marketing the most suitable strategy options have been analysed in Chapter 6 of the Main Report.

8.15.1: SHORT TERM OR IMMEDIATE ACTION ORIENTED MODEL:

Model-I: has been described as: PHARMACY-GATHERER / CULTIVATOR MODEL OR NTFP MODEL

In this model, optimization strategy should start immediately from bringing improvement in harvesting methods. The open system of harvesting appears to be good from humanity point of view but is not able to serve its objective. Hence, optimized system should follow the sequence as involved in the first activity or collection and evaluation following JFM Models. This is illustrated in Fig 8.1 to 8.4 below:

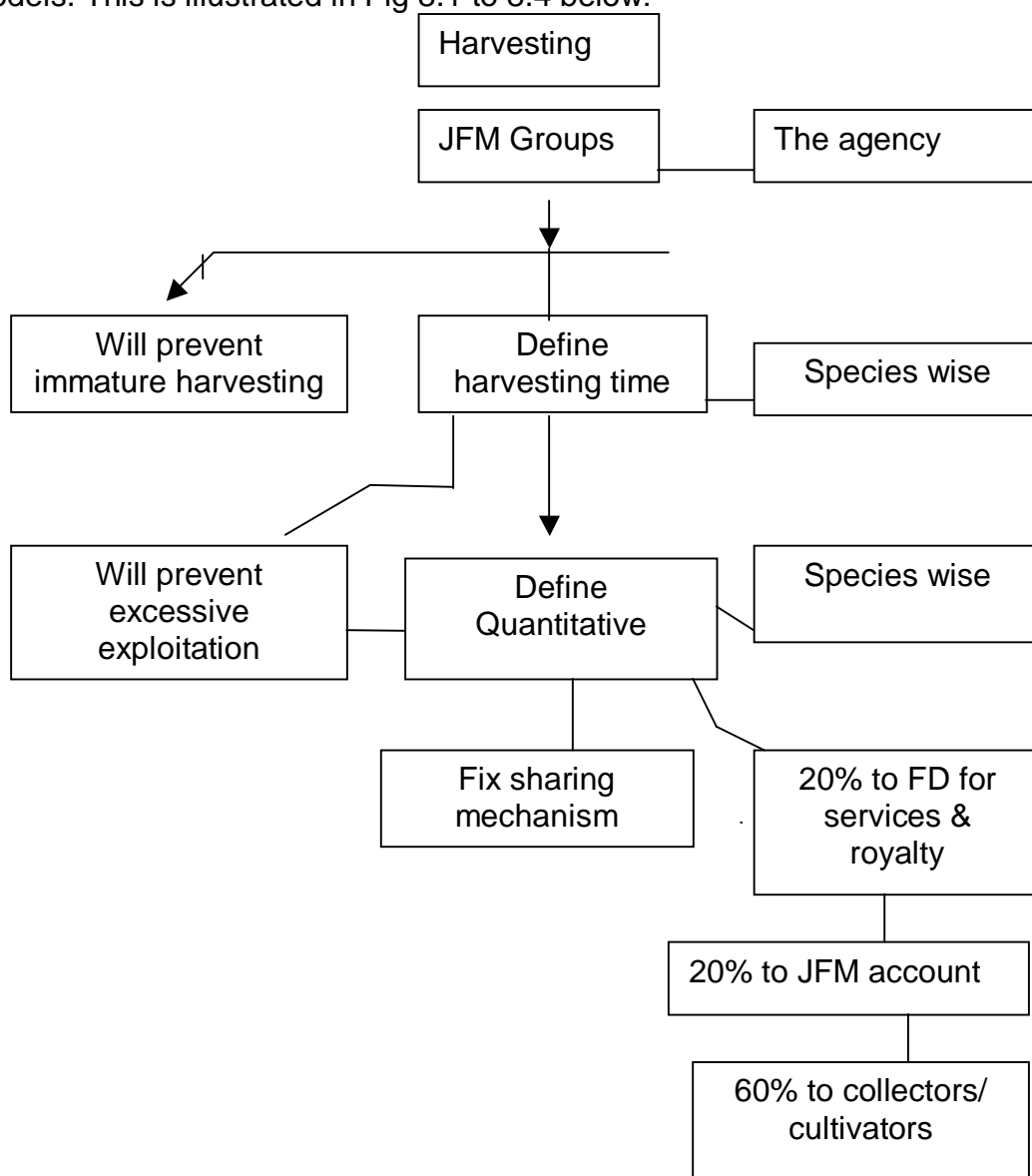


Fig 8.1: Sequence or Short term Action related to Collection and Cultivation of H & MP

Post harvest treatment is the next important factor to be optimized. It will not only provide value addition to products but also increase income of the stakeholders and create better demand base and ease for marketing. The optimization strategy should follow the pathway shown in Fig 8.2 below: -

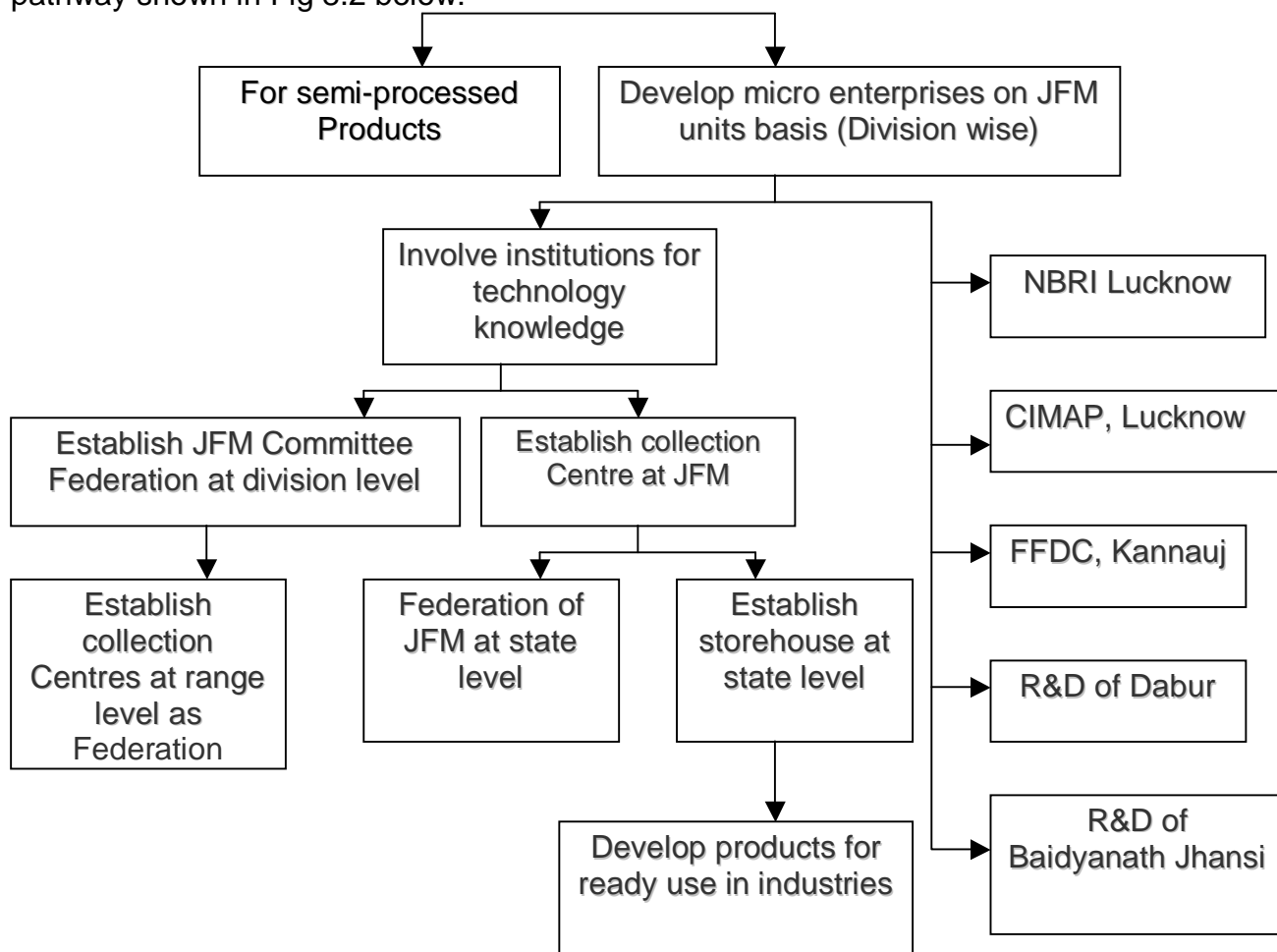


Fig 8.2: Pathway for Post-harvest Action Plan for H & MP

The field surveys clearly indicate failure of the existing marketing and development systems as there have been concealing more than revealing actual scenario. *The findings suggest that all the H & MP should be brought under the purview of one agency here the Dept. of Forests.* The agencies such as FC, *Bhesaj Sangh* and KVMN should be oriented to play with transparency, as their role in maintenance; conservation and bio-diversity enhancement has not been proactive. The role of FD thus becomes crucial and difficult. Even though the department by now has good experience in JFM for somewhat protection and harvest of consumable produces mostly. H & MP, on the other hand provides all complications antecedents to market driven action plan to which both partners JFM Committee as well as Dept. of Forest will have reorient and acquire skills. The strategy in marketing optimization could follow the sequence as shown in Fig 8.3 below.

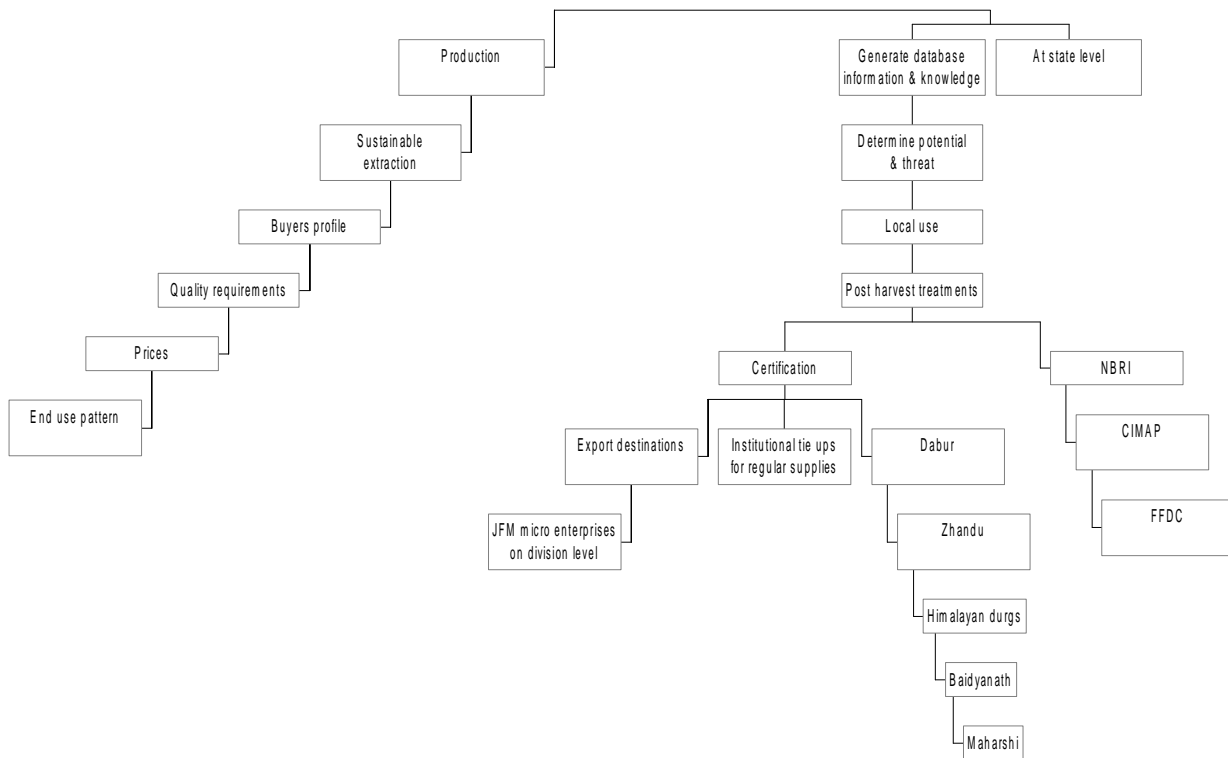


Fig 8.3: Action Plan for option in the marketing of H & MP

The market intelligence system should be supported by modern IT systems.

Sustainable development of H & MP is of course the root of the above criterion considered for optimization. This variable requires a continuous maintenance, conservation and enhancement of bio-diversity as illustrated in Fig 8.4 below.

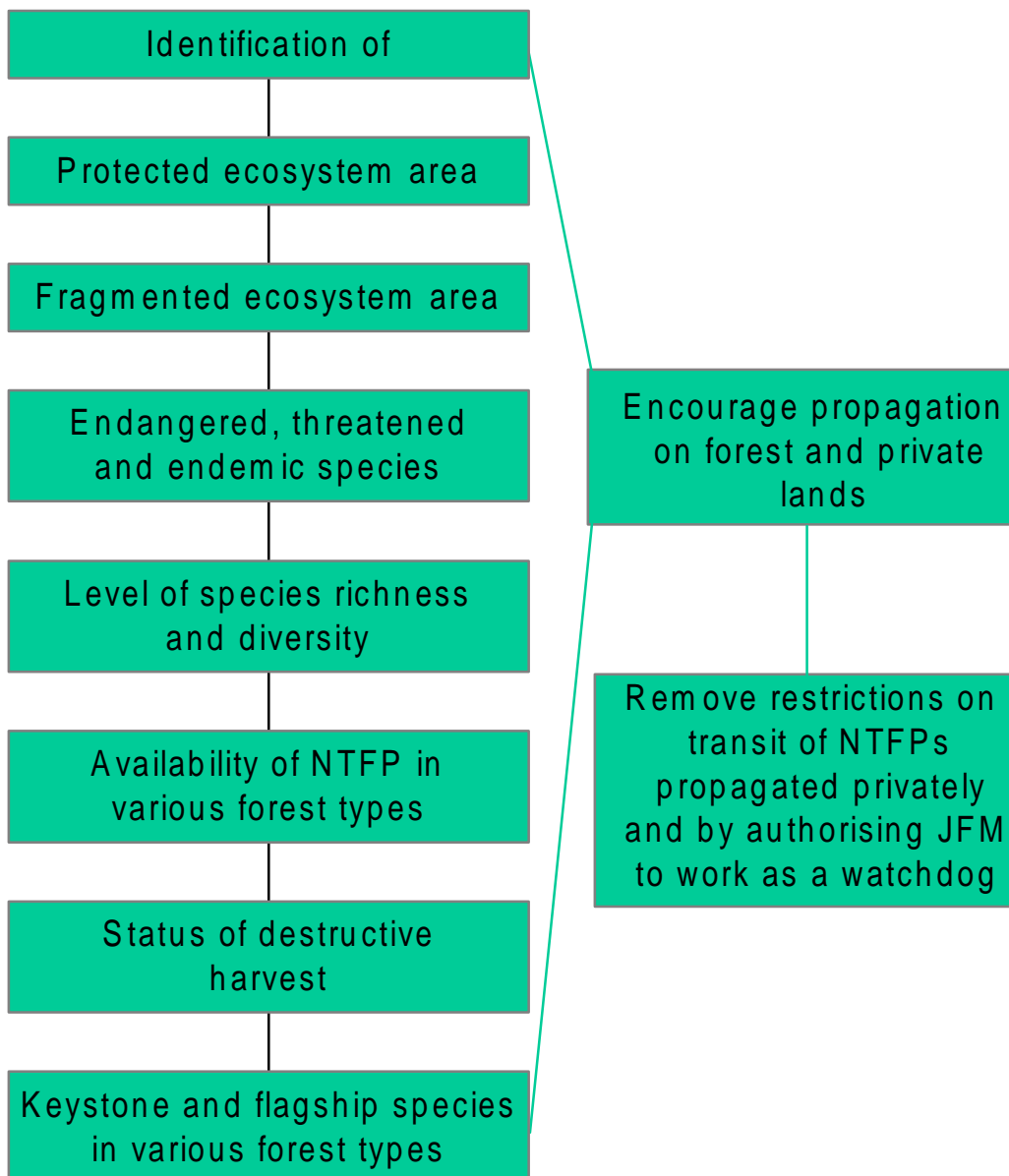
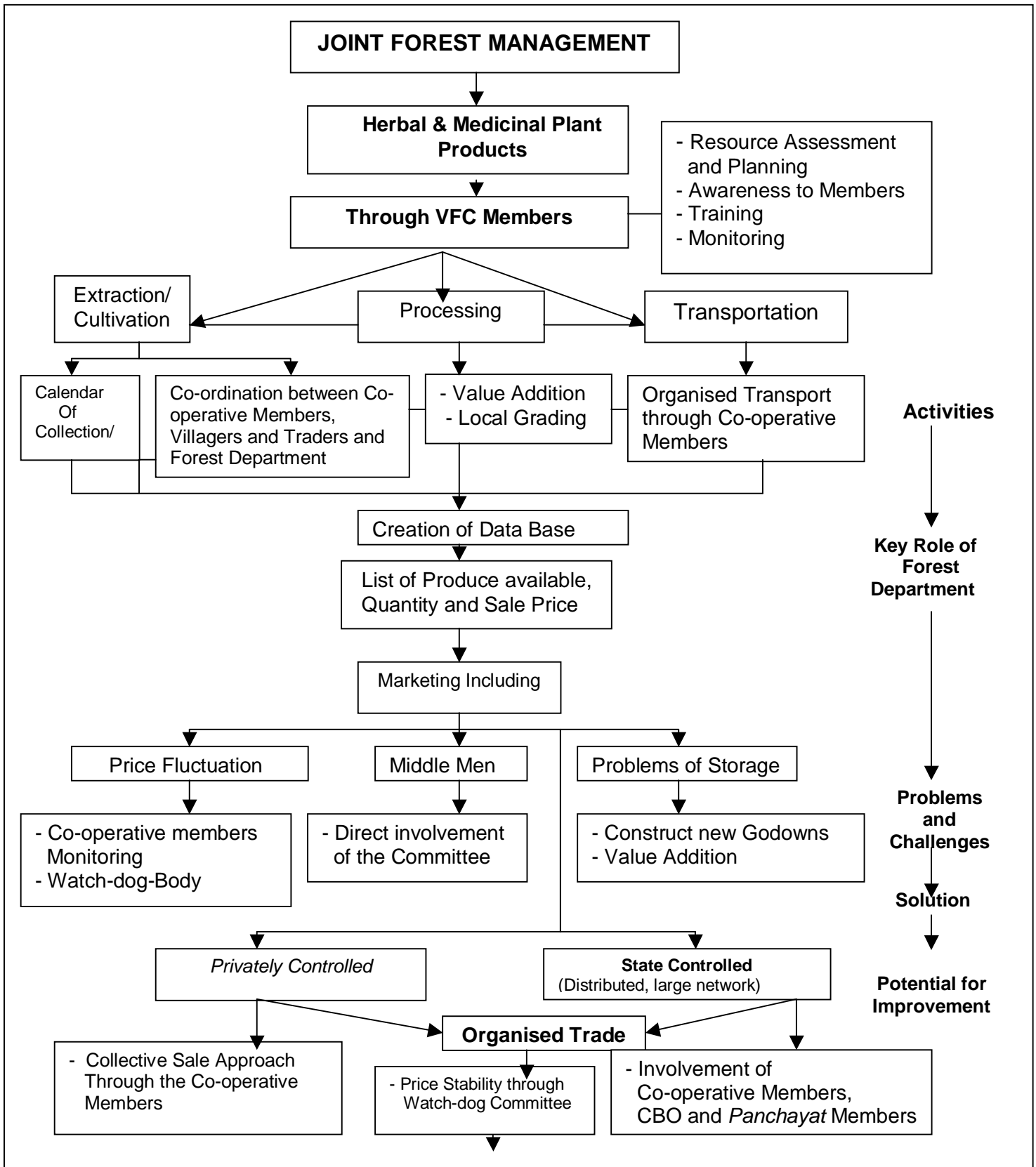


Fig 8.4: Steps required to bring in a comprehensive Improvement through a long term strategy and action Plan

8.15.2: LONG TERM MODEL: for Perspective Action Oriented Model. This has been defined as:
HERBAL AND MEDICINAL PLANTS MODEL

(Silvo-ethno-socio-economic management Model - I gives the complete Implementation strategy).

Fig 8.5: HERBAL & MEDICINAL PLANTS MODEL FOR SUSTAINABLE MANAGEMENT (Long Term Model)



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In this case too the three stages sequential pathways depicted for Short term immediate action i.e. Fig 8.1 to 8.3 would be there but perhaps after these are especially modified.

ANALYSIS:

To achieve this the Long Term Conceptual Model for Comprehensive action plan that could be ushered through a considered study by the Standing Advisory Committee (SAC) of the Apex Body –Uttarakhand State Medicinal Plant Board and, discussed in Chapter-6, and given in Fig 8.5.

8.16 Potential Regarding Applicability of C & I:

The 'Criteria' & 'Indicators' (C & I), as given in Chapter-5, can be developed into a reliable tool for measuring the success of conservation and development measures. This can simultaneously indicate the social, economic and ecological contribution of medicinal plants. Measurement of all indicators may have some limitations, as all of them cannot be measured in one-go. Therefore, measurability can be grouped into three categories

1. The ones measured that can be measured from the existing secondary sources of Information.
2. The ones for which information can be gathered from the field with little effort; and,
3. For the ones which require long-term research. As resources develop and the potential of medicinal plants grows, the third category of indicators can also be measured through investment in research and development.

8.17 Constraints Regarding Applicability of C & I:

In an unorganised market business C & I may not make sense to the traders and agents, as there are no bills involved, no policies; forest officials are easy to please and local communities have no option but to further their business interests. In fact the traders and agents literally are controlling the market prices. Hence there is little incentive to support efforts to streamline market transactions. The identification and organisation of buyers who demand certified products offers the most likely means of encouraging a more sustainable system.

8.18 Independent Agencies Could Monitor Indicators and Certify the System as Sustainable:

Independent certification agencies could monitor the indicators and certify the system as sustainable. For example, institutions like the GBPIHED / GBPUA&T / ICFRE within the State could act as an impartial agency for such work. They could further provide training in certification issues with the help of WWF/ World Bank Alliance initiative. A number of NGOs (Including NRIF) and other autonomous institutions in different parts of the country

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could be identified to undertake certification. The development of group certification schemes will help to lower the cost of certification.

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Annex 8.1: Training Module for Conservation and Propagation of Medicinal and Herbal Plants

A Training Module for **two days schedule** is envisaged. On the **first day** besides ice breaking, the:

Session – 1 could give details on: JFM, FDA and Watershed Management.

Session – 2 could focus on: Micro-planning and how to implement various works.

Session – 3 could focus on: Monitoring and Evaluation and how to assess the Changes through simple indicators.

On the **second day** the:

Session – 4 could plan practical training in nearby areas for understanding the Concepts through demonstration based on the theoretical inputs.

Constitution of Spear Head Team (SHT)

Under JFM Programme and FDA, the village community will have to take new responsibilities. For achieving the objectives of the programme they have to be motivated and organized into sustainable institutions. It is envisaged that the **FDA** will constitute a Spear Head Team (SHT) that will be responsible for promoting village institutions and their federations and also to assist them in discharge of the responsibilities.

A Spear Head Team at the **District level** will be a multidisciplinary team and shall consist of 5 persons (*preferably two women members*) – trained in social skills; forestry; watershed management; gender sensitisation and conflict resolution. The multi-disciplinary team shall have representatives from Forestry, field Botanist and social discipline headed by an Assistant Conservator of Forests besides a Range Officer and other members.

The other **SHT** members shall be graduates in their disciplines. SHT may appoint community organizers who may be diploma holders in social / technical disciplines. They would be general-purpose organizers and motivators to be located in different parts of the District, depending upon the scope for promoting JFM.

It would be a great advantage, if FDA and SHT can identify **NGOs**³ in the District who would be willing to support participatory management. They could be given assistance for deploying their staff to work as community organisers and for undertaking community organising and capacity building activities at promotion stage as well as during implementation.

³ NRIF, as NGO can provide the necessary support to the State FD, for the purpose.

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The members of the SHT will be drawn from Government Department as well as from outside. For the Government officials to join SHT, there will be need to provide incentives. The SHT will be appointed by FDA and will be responsible to the Member Secretary of the FDA. The leader of the SHT should be given autonomy in functioning with responsibility for reporting the progress against the programme decided in their consultation with FDA.

The FDA will have to invite applications from various Government Departments as also by public notice. A Committee on which officers as well as NGO representatives shall be placed will make the selection. The SHT shall be responsible for imparting training to the JFMCs in the FDA. But to sensitise the SHT an institution having expertise in this field could conduct a four days training programme is proposed that.

Training Programme for Spear Head Team Members – Batch of 25 each

I - Schedule

Day – 1

- Ice breaking.
- Familiarization with concept of JFM / FDA / Watershed.
- Microplanning process.

Day – 2

- Latest Field level Technologies developed for conservation and propagation of Herbal and Medicinal plants.

Day – 3

- Seed and Nursery Technology, cultivation practices.
- Value addition.

Day – 4

- Field visit and Demonstration.

II - Budget:

- a) Rs. 5000 per participant which includes course material; lectures, field visit, Boarding and meals; and Honorarium to the guest faculty.
- b) Travel cost has to be borne by the FDA or any other agency concerned.

Besides the above efforts it will be a good idea to develop a School package for sensitising the children and teachers for conserving the medicinal and herbal plants. Documentation can be done of all the trees, shrubs and herbs growing around the village having herbal and medicinal value. This can be in the form of book in local language or in visual form as was displayed at the end of the presentation presided by Honourable Dy. Chairman, Planning Commission, held on 15th March 2004.