

STATUS OF THREATENED MEDICINAL AND AROMATIC PLANTS AND THEIR USE BY THE BHOTIYA COMMUNITY IN NITI VALLEY, NANDA DEVI BIOSPHERE RESERVE, UTTARAKHAND





भारतीय वन्यजीव संस्थान
Wildlife Institute of India

Status of threatened medicinal and aromatic plants and their use by the Bhotiya community in Niti valley, Nanda Devi Biosphere Reserve, Uttarakhand

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Front cover:
A Bhotiya women crushing
Allium stracheyi (Jambu pharan)
in traditional pastel and mortar
for drying

Back cover:
National Anthem written by a
Bhotiya on the papery bark of
Betula utilis (Bhojpatra)

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ABBREVIATIONS USED

APPEDA	:	Agriculture and Processed Food Products Export Development Authority
CAMP	:	Conservation Assessment and Management Prioritization
CAP	:	Centre for Aromatic Plants
CITES	:	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CSS	:	Centrally Sponsored Scheme
HRDI	:	Herbal Research and Development Institute
IUCN	:	International Union for Conservation of Nature
LCHP	:	Locally common heavy pressure
LCLP	:	Locally common low pressure
MAPs	:	Medicinal and aromatic plants
MPCA	:	Medicinal Plant Conservation Areas
MPCAs	:	Medicinal Plants Conservation Areas
NDBR	:	Nanda Devi Biosphere Reserve.
NGO	:	Non-governmental organization
NMPB	:	National Medicinal Plant Board
NMPB	:	National medicinal plant board
PKVY	:	Paramparagat Krishi Vikas Yojana
RDHP	:	Restricted distribution heavy pressure
RDLP	:	Restricted distribution low pressure
SMPB	:	State medicinal plant board
SSS	:	State Sector Scheme
UCLP	:	Under cultivation low pressure
UKFD	:	Uttarakhand forest department
WDHP	:	Wide distribution high pressure
WDLP	:	Wide distribution low pressure
WPA	:	Wildlife protection act

EXECUTIVE SUMMARY

Nested in the Western Himalaya, the state of Uttarakhand, also known as the 'herbal state of India,' harbors more than 5000 species of vascular plants, of which one-third species have medicinal uses. The state abounds in a rich and varied flora and fauna, constituting the most species-rich part of the whole of the Western Himalaya. The extreme north of the state contributes approximately 1% (*ca.* >1,000 km²) of the total Trans-Himalayan region (*ca.* 98,660 km²) of India. However, in spite of rich floral diversity, the cold-arid regions of Nilang, Niti, Mana, Johar, Darma and Byans valleys of Uttarakhand along the northern frontiers that falls under Trans-Himalayan Biogeographic Province (1C) are underexplored in terms of the current levels of pressure and patterns of biodiversity. These areas have also been facing tremendous pressure due to over-exploitation of forest resources including the unscientific and illegal harvesting of MAPs from the wild.

The current study was conducted to study selected threatened and high use value MAPs in Niti valley, a cold-arid region of Nanda Devi Biosphere Reserve with a focus to (i) assess the status, abundance, and use of MAPs, and (ii) suggest their sustainable harvesting and cultivation framework.

The information on the focal species was gathered through primary viz., semi-structured open-ended and closed-ended questions including individual interactions and group discussions in selected villages (7) and secondary information through offline and online sources. After reconnaissance and stratification of habitats, population status of focal species was assessed using stratified random sampling. Based on extensive interactions with younger generation, elder people including local healers, plant collectors and local traders, a total of five high value (with significant economic end usage) MAPs namely *Allium stracheyi*, *Carum carvi*, *Dactylorhiza hatagirea*, *Picrorhiza kurroa* and *Sinopodophyllum hexandrum* were selected in Niti valley, NDBR. The

selection of MAPs was based mainly on highest quantum of collection and high threat due to removal and usages.

The current study highlights that the population of the focal species (except *Carum carvi*) are sparse albeit rapidly declining due to excessive exploitation, unscientific, illegal and premature harvesting. Therefore, keeping their current population status in view, preparation of micro-plans, assessment of available growing stock and sustainable management and utilization of dwindling populations is recommended.

Besides over-exploitation of MAPs, knowledge on their available stock, lack of information on end users and middlemen and inadequate information on quantity of raw material traded due to secretive nature of the markets were reported. In Niti valley, the market trend, price *vis a vis* trade route is indiscernible for highly traded medicinal species such as *Gucchi*, *Morchella esculenta* and *Keedajadi*, *Ophiocordyceps sinensis* which sells in the market like a hot cake, and therefore has created hue and cry state among the locals. Hence, these issues need to be addressed to ensure long-term conservation of the MAPs in a way that livelihood needs of the locals depending on such resources are not compromised.

The focal species are one of the highly traded MAPs from the Western Himalaya, in general and Niti valley, particularly. Therefore, considering the existing threats, habitat specificity, population size and pressure level, the focus of conservation and regulated harvest is particularly needed for (i) restricted distribution heavy pressure (RDHP) species such as *Picrorhiza kurroa* and *Dactylorhiza hatagirea*, and (ii) locally common heavy pressure (LCHP) species such as *Allium stracheyi*, *Sinopodophyllum hexandrum* and *Carum carvi* in Niti valley, NDBR.

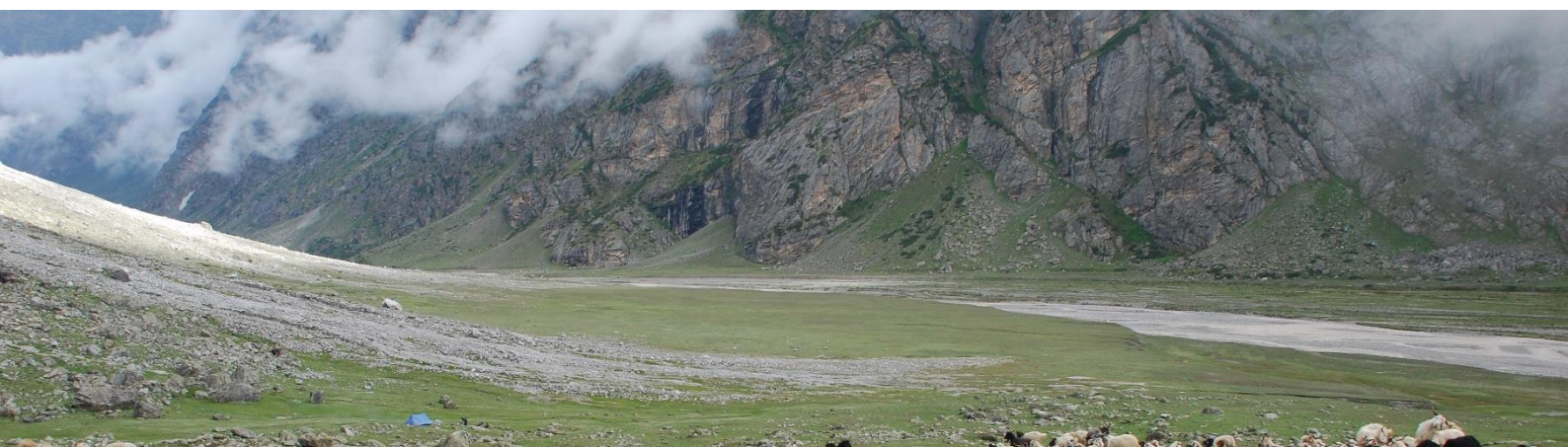
Bhotiyas, ethnic community of Indo-Mongoloid origin mainly depend on natural resources from the adjacent forests and alpine pastures or meadows (locally known as *payar*) for their livelihood. Therefore, considering the high use value, market opportunities, price of the produce, and ease of cultivation or harvesting processes, the current study proposes *Allium stracheyi*, *Carum carvi* and *Saussurea costus* as the

potential species that can be encouraged for their cultivation in Niti valley. It will not only provide livelihood opportunities to the local inhabitants but also check ruthless exploitation of the wild MAPs.

The local inhabitants are dependent on the wild MAPs for their traditional health care system. They are knowledgeable of about 72 MAPs that are locally utilized consumption and for curing at least 24 different human ailments. However, the practice of utilising MAPs in their local healthcare system is sharply declining due to lack of education facility and market, which has led to lack of knowledge as well as transfer of knowledge to younger generations.

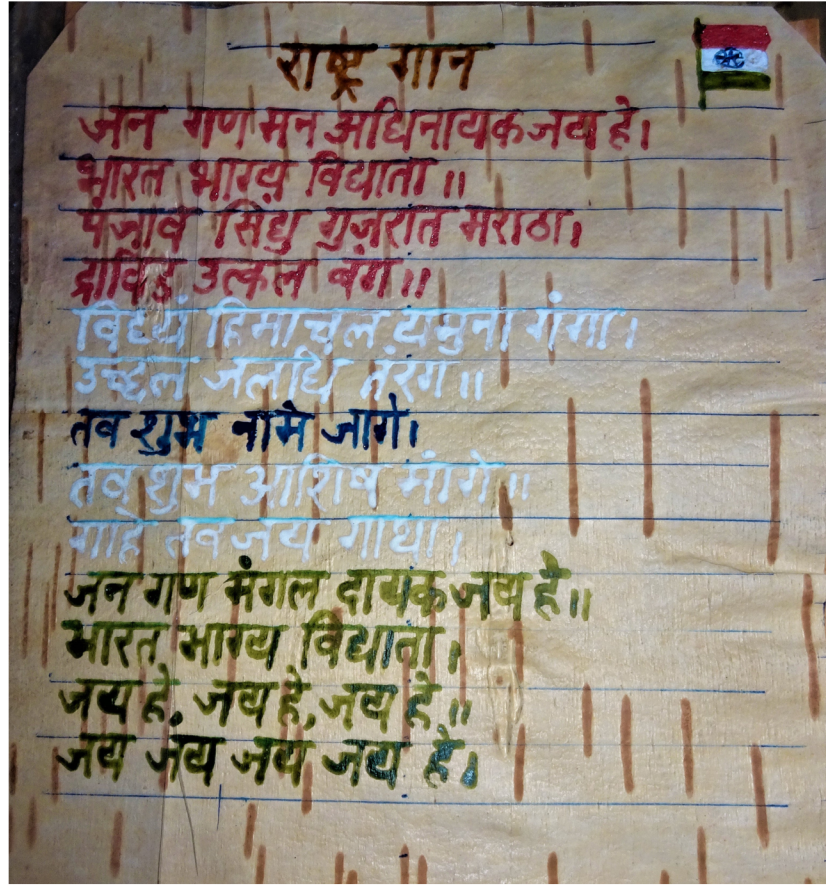
The *payar* such as Bamplas, Lang, Goting, Rekhana (base of Mount Kamet) and Geldung in Ganesh Ganga; Timersain and Thali enroute Kalajowar, and Daman towards Sagar glacier in Amrit Ganga are rich in medicinal plant diversity. Thus, considering the unique medicinal diversity and traditional ways of their conservation in view, rotation grazing in the forested areas including heavily grazed *payars* such as Daman, Thali, Timersain and Goting in a cycle of 2-3 years is proposed.

Owing to excessive human population, it is evident that the demand *vis-a-vis* harvesting pressure on wild populations of several MAPs is increasing every year. Thus, in order to meet the accelerating demand of high use value MAPs, there is an urgent need to develop farm scale agro-techniques for priority MAP species in the absence of such efforts on lab to land tested techniques. In the current study, sustainable harvesting and cultivation framework have been designed for the selected 05 MAPs, although appropriate demonstration sites showcasing such agro-techniques in the cold-arid landscapes such as Niti valley in Uttarakhand be set up to build confidence of the plant growers or locals in adoption of such medicinal crops in their agricultural practices.





Preparation of Jya (butter tea), a
traditional tea by Bhotiyas



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