STUDY ON CONSERVATION AND CULTIVATION OF MEDICINAL AND AROMATIC PLANTS IN PITHORAGARH DISTRICT OF UTTARAKHAND

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ORGANIZATION PROFILE

Pragya is a non-governmental development organization established in 1995. Initiated in the global South, our current operations span India, Nepal, Sub-Saharan Africa, UK, and USA.

- **Pragya NGO** *is working for the conservation and sustainable utilisation of medicinal & aromatic plants of the Himalayas. We promote the cultivation of high-value herbal species as alternative cash crops by local farmers, thereby enhancing farmer incomes. We also encourage community stewardship for protection of the plants in the wild.*

ORGANIZATION PROFILE

The Pragya mission: **'To shape & enable holistic, sustainable development with a focus on vulnerable and neglected communities and ecosystems.'**

Pragya's vision is one of marginalised communities living dignified lives free from poverty and injustice, fully enjoying the benefits of development in a manner harmonious with cultural heritage and the natural environment.

Our Values: The core values upon which Pragya is founded guide us in our fulfilling our mission.

INTRODUCTION

- People who live in and near the forest have a close connection with the forest and forest products, since more than 2 billion people worldwide rely on the forest for their livelihood (UNDP, 2000). This combination has led to a build-up of vast knowledge of different applications and environmental interrelationships between plants (Johnsy et al., 2012).
- The natives have known the use of medicinal and aromatic plants (MAPs) from the time of their existence to prevent, cure and treat various illnesses of humans and animals (Borchardt, 2002). Of the approximately 391,000 plant vascular species, 30,000 have at least one recorded application, with about 17,810 being utilized as medicines (Kew, 2016). In the developing nations, according to the WHO (1993), 3.5 billion individuals routinely use MAPs, representing 80 percent of the overall use of MAPs. Since ancient times, socio-cultural activities, such as plant worship, groves and landscarve promote the application of traditional plant-based knowledge by local people (Kala, 2005a).
- Most traditional herbal medicinal systems, including traditional folk medicine, have become trade through time (Kala, 2009). Global herbal trading is estimated at 120 billion dollars, reaching 7 trillion dollars by 2050 with China, India and Germany making the most contribution (240,000 tonnes, 80,000 tonnes, 58,000 tonnes per year). A total of about 2500 species have been estimated for MAPs in international commerce (Olsen, 1998), of which 880 are usually employed in India for trade (Tondon and Yadav, 2016). The Indian MAPs trade value was approximately US$ 5.5 billion (Exim Bank Report, 1997), a rise of 9.2 percent in export values between 2001 and 2014 at an annual average growth rate (Vasisht et al., 2016).

KEYWORD: **MAPs, Traditional Medicinal Systems in India, Uttarakhand Herbs and Aromatic Plants Production , Traditional Medicinal System in Indian Himalayan Region (IHR), Harvesting and trading of MAPs, AND Trading of MAPs**

Objectives

- To study the conservation and management issues related to medicinal and aromatic plants and to set priorities for their long-term conservation.
- To document the ethnobotanical knowledge of medicinal and aromatic plants used by local people.

Research Methodology

Sampling design: This is a qualitative and quantitative study. In this study, there is descriptive research is designed for collection of the information.

Traditional Medicinal Systems in India

- the Siddha system originated in the Indus Valley Civilisation and was brought to South India by Dravidians (Krishnamurthy and Mouli, 1984). The approach is based on old medicinal methods, spiritual disciplines, alchemy, and mysticism, among other things (Rao and Veluchamy, 1983). Unlike Ayurveda, siddha medicine stresses the use of herbs and minerals in combination, as well as the acknowledgment of Vaadham, Pitham, and Kabam in childhood, maturity, and old age, respectively, while Ayurveda emphasizes Kabam in children, Vaatham in old age, and Pitham in adults (Subbarayappa, 1997).
- The Ministry of AYUSH of the Government of India now has 7.37 lakh registered medical practitioners who practice traditional medicine. There are 3.99 lakh Ayurvedic practitioners, 2.8 lakh Homeopathic practitioners, 47683 Unani practitioners, 8173 Siddha practitioners, 1764 Naturopathy practitioners, and 21 Sowa- Rigpa clinics (AYUSH Report, 2013). Aside from practitioners, India has about 9000 registered and licensed manufacturing companies, with 90% of them being in the cottage and small-scale industry (AYUSH Report, 2015). The annual domestic commerce of the AYUSH sector is in the region of INR 80-90 billion, with annual increase of 20-25 percent anticipated, with the mountain states contributing the most (AYUSH Report, 2013).

Uttarakhand Herbs and Aromatic Plants Production

A wide variety of herbs, medicinal plants, and aromatic plants may be found in Uttrakhand.

Species	Percentage
herbs	32%
shrubs	20%
trees	33%
Climbers	12%
other	3

The distribution of medicinal plants by their habit in Uttarakhand

- Uttarakhand, located in the Himalayan foothills, has a diverse physical landscape, ranging from snow-capped high peaks in the north to tropical rainforests in the south. Garhwal Mandal in the west and Kumaon Mandal in the east have been divided into two areas.
- In 1989, the Herbal Research & Development Institute in Gopeshwar was recognized as the main agency for conservation, development, and sustainable use of Uttrakhand's vast Medicinal and Aromatic Plant resources, with responsibility for the MAP sector's many aspects. The following are the major changes: (2010, Tribuneindia.com)

Endangered medicinal plants

Plant components such as leaves, bark, roots, fruits, seeds, and sometimes the whole plant are taken indiscriminately from natural sources without regard for the plants' survival. Due to over-exploitation and habitat degradation, many key beneficial species are on the brink of extinction. More than 95% of medicinal plants are harvested from the wild, and many have become endangered in their native habitats. The growth and nurturing of these plants must be encouraged. The following species should not be collected from natural sources.

Strategies for conservation of medicinal plants

The conservation of the wild medicinal plants or any other such threatened species can be tackled by scientific techniques as well as social actions.
There are basically three scientific techniques of conservation of genetic diversity of these plants.

- Legislation
- *In-situ* conservation
- *Ex-situ* conservation

Traditional Medicinal System in Indian Himalayan Region (IHR)

The Himalayan mountain chain is home to a varied variety of floral and faunal diversity, as well as a wide range of climate variances, different social cultures, and ecological distinctions, as well as a wealth of traditional wisdom (Butt and Price, 2000). There are 8000 angiosperms, 44 gymnosperms, 600 pteridophytes, 1737 bryophytes, and 1159 lichens in the Indian Himalayan region (IHR) (Pramanik and Bhaduri, 2016). Approximately 1748 MAPs (23.2 percent of India) exist, with about 31% native, 15.5 percent endemic, and 14% endangered (Samant et al., 1998). Traditional knowledge regarding MAPs is widely known in the IHR's diverse cultural environment, which includes more than 139 tribes (Nandy et al., 2006). Many ancient medical systems, including as Ayurveda, Homeopathy, Unani, and Tibetan medicinal systems, are prevalent in the IHR area. In the area, around 89 percent of the population depends on these medical systems (Rai et al., 2000). Aside from the vast variety of MAPs and widespread reliance on them, the Himayalan area is a hub for several herbal manufacturing businesses. IHR is home to 12% of all AYUSH manufacturing facilities, with 55 percent of those in various regions of India relying on IHR's MAPs (AYUSH, 2015).

Harvesting and trading of MAPs

Many MAPs are commercially important because of their home use, as mentioned above. The whole system is assessed from the extraction of MAPs to the consuming end, and it is based on MAP availability and demand. With the passage of time, the demand for MAPs has grown across the globe, prompting individuals to seek out detailed information on these highly valuable commodities (Belcher and Ruiz-Perez 2005; Rasul et al., 2008). The growing commercial trade in natural goods has had an impact on wild population harvesting (Lange, 1998). The overexploitation of the natural population has resulted from the high-volume harvesting (Olsen, 2005b). In India, almost all of the 400 plant species needed in the herbal business are collected in the wild (Uniyal et al., 2000).

Trading of MAPs

The increasing indistinct trading behavior is another significant element driving the loss of MAP diversity. In the herbal industrial sector, a significant number of MAPs have been identified as high-volume trading species (Olsen and Larsen, 2003; Olsen, 2005b). With the rise in demand for MAPs products, species are being harvested at a rapid and unscientific pace (Kala, 2005b). One of the major reasons of biodiversity loss is the preference for wild species. In recent years, haphazard harvesting and overexploitation to satisfy demand has also slowed the illicit trade activity.

Every year, more than 400,000 tons of MAPs from roughly 3,000 species are trafficked on the worldwide market, according to TRAFFIC. A new International Standard for Sustainable Wild Collection of Medicinal and Aromatic Plants (ISSCMAP) was proposed to balance the needs of rural populations whose traditions and livelihoods rely on these species, and the six principles under this standard are: maintaining wild resources, preventing negative environmental impacts, respecting customary rights (for example, of indigenous peoples).

Conservation and management of MAPs

Thousands of indigenous people live in the Himalayan area, and they have long used medicinal herbs in traditional health care. Many medicinal plants are utilized for subsistence by local people, and their protection is one of the most important methods of MAPs management (Jha, 1995; Gera et al., 2003). According to Oliveira (2007), the cultural and biological themes were used to assess the local conservation and harvesting sustainability of medicinal plants.

They provided a technique for determining conservation priority based on species and geographic location.

Mountain research has set a precedent, and studies have documented the condition of medicinal and aromatic plants at the higher elevations. Ghimire et al. (2004) described the involvement of locals in the sustainable harvesting of species in the Nepal Himalayas in terms of ecological, biological, socio-cultural, and economic factors.

Harvesting practices

The extraction techniques previously established by various groups were examined to better understand the harvesting pattern. Historically, MAPs were gathered in tiny quantities by traditional healers for the aim of treating sickness and disease, or by local people for household purposes (Rai and Sharma, 1994). Local people living in woods and forest edges were well-versed in the gathering abilities of MAPs. They used to gather and preserve some of the most significant medicinal plants as a daily need or to treat illnesses.

The method of selective harvesting made it easier to gather raw materials from the wild. They used to gather plant components in particular according to a fixed schedule. Many studies have identified specific collection periods for MAPs, such as collecting young leaves in the spring, flowers and adult leaves in the summer, and fruits, seeds, and rhizomes in the fall. Plants were usually collected early in the morning or during the full moon (Samal et al., 2004).

However, the collecting of MAPs from the wild has become widespread and indiscriminate over time. Untrained individuals are hired by merchants to gather highly trafficked species. They are unfamiliar with sustainable collecting methods; therefore, their collection approach is highly damaging. They are compensated according to the amount of raw material they gather. According to Olsen (1998), they gather raw materials and sell them to local merchants with the primary goal of "high volume and least value." Local people are sometimes joined by industrial employees while collecting raw materials in certain areas (Smith and Bhattarai, 2005). Species that were formerly plentiful are now threatened.

Conclusion

The demand for therapeutic plants is growing at an exponential rate, depleting naturally existing supplies. As a result, it is critical to concentrate on medicinal plant conservation in order to compensate for the loss of wild plant diversity while also meeting the demand for medical plants.

Various conservation methods, as described above, may help to start and support medicinal plant conservation management and preservation for human healthcare requirements.

The greatest way to conserve plant populations is to ensure that they continue to develop and evolve in the wild, in their native environments.

With its diverse altitudes, deep glacier and river valleys, heavy rainfall regions, and high desert areas, the Himalayas are a rich source of biodiversity and endemism. Many tribal regions still use traditional herbal treatment, and many therapeutic plants and essential oils have shown amazing biological activity. Unfortunately, there is still a scarcity of data linking essential oil biological activity to ethnobotanical applications of plants. This may be attributed to activity in non-volatile components in many instances. Furthermore, many phytochemical researchers have overlooked bioactivity testing for ethnopharmacological applications. As a result, much more research can be done to discover phytochemicals linked to biological processes that support traditional medicinal plant applications. Several aromatic plants have also shown economic potential as flavoring agents, perfumes, cosmetics, and insecticides. Unsustainable harvesting, in part due to high demand for essential oils, herbal remedies, and pharmaceuticals, is threatening Himalayan medicinal plants [474], and growing environmental degradation, invasive plant species, and climate change are all threatening Himalayan native flora. We support the preservation of traditional Himalayan medicinal plant knowledge and applications, and we hope that further measures be made to conserve and preserve the Himalayan ecosystem.

Recommendation Cultivation Program:

The MAP cultivation programs providing the great opportunity to farmers and unemployed youth to get employment at their own places. These crops can be produced in very high altitude and those parts also where it is difficult to grow traditional crops. The environment of Uttrakhand is very supportive to the growth of these MAP. So many illiterate women and villagers are now earning good amount of money by growing MAP products under cultivation programs.

There are various schemes started by Uttarakhand government like Jari Buti Yojana, National mission on Medicinal Plants ,

Aawala Mission in Uttarakhand, tribal sub-plan projects etc focuses on increase the cultivation of Medicinal and Aromatic Plants in districts , registration of MAP cultivators/farmers ,quality planting material production in departmental nurseries ,subsidy distribution to MAP growers, establishment of distillation unit for aromatic crop ,training to MAP cultivators/ farmers etc are in main focus. Although the cultivation program is going in the right direction but there are so many areas under which there is a huge scope of improvement. These areas are quality, packaging, marketing and promotion. In Uttarakhand the marketing and promotion part of MAP needs a lot of improvement.

Supply Chain Management: Government of Uttarakhand state has established a formal supply chain of MAP products which include procurement and distribution of products through various government agencies which act as intermediaries like BHESAJ Corporation, KMVN and GMVN. But due to some short comings in the chain, very less quantity of total cultivated products is going through this chain. The prime reason for this is, the price paid by industry for MAP products directly to MAP cultivators or unofficial inter-mediatory or agents is very high, in comparison to the price that cultivators get after selling through government nodal agencies

During study it was observed, that although the Bhesag Corporation, KMVM and GMVN have three different roles as direct collector, Bandhak and commission agent, but in most of the district these organizations are focusing only on the third role i.e. Commission agent role.

- Under this role the activities of these organisations get limited and they focus primarily on the auction activity. This is relatively an easier role, as major action in this is arranging auctions at different designated places and collecting the royalty from auctioned items, based on their selling prices. In this case, the farmer is responsible for processing of the product, arranging warehouse, transportation and taking related risks. Whereas Bhesaj, KMVN or GMVN concentrate on Auction part.

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- In order to get the better results from auction, in terms of better supply chain management and better pricing, instead of various stakeholders it can be a good option to have one integrating organisation.

- The number of collections centre from all the three organisations are limited, and normally less than 100, but considering the tough and varying geographical locations in the state, these centres need to be increased, so that all farmers can have an easy access to them.

- Cultivators do not know the final destination of their crops and price in domestic and international markets. The Government can arrange a MIS (Management Information system) under Bhesag corporations from where the farmers can take the information about the price and demand of different crops. This will help farmers to cultivate the crop which will be high in demand in coming year. The government can also start a call centre which can give information to cultivator about the market price and market demand for various crops.

Auction pricing can be made dynamic and can be related to the current market demands. This will yield high income for cultivators and better earnings for governments. Price control shall be done by government based on demand and supply of different crops.

- To promote the herbs and aromatic plants cultivation and sale in state, Uttarakhand government can promote the Herbal tourism in the state. It includes government certified herbal sales counters; PPP model based Herbal spas, herbal treatment, herbal massage parlours etc. This will help in further employment generation in state directly and indirectly.

THE END

THANK YOU SO MUCH FOR LISTENING