

Conservation and Use of Medicinal and Aromatic Plants in Nepal: Status and Prospects

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Introduction

Medicinal and aromatic plants (MAPs) are an important part of the Nepalese economy, with exports to India, Hong Kong, Singapore, Japan, as well as France, Germany, Switzerland, the Netherlands, the USA, and Canada. These plants have a potential for contributing to the local economy, subsistence health needs, and improved natural resource management, leading to the conservation of ecosystem and biodiversity of an area (Subedi 1997). Nepal's ethnic diversity is also remarkable (HMGN 2002); so are the traditional medical practices. About 85% of total population inhabit in rural areas (HMGN 2002), and many of them rely on traditional medicines, mostly prepared from plants for health care. The majority of Nepal's population, especially the poor, tribal and ethnic groups, and mountain people, relies on traditional medical practices. A large number of products for such medical practices are derived from plants. The knowledge of such medical practices has been developed and tested through generations. In many cases this knowledge is transmitted orally from generation to generation and confined to certain people (Subedi 2000).

This paper briefly presents the conservation potentials of MAPs in Nepal in relation to opportunities and challenges for the efficient, sustainable and equitable commercial uses. The strategies for handling the challenges and enhancing the opportunities of this sector are suggested. Unlike any other business, MAPs enterprise development can be linked to biodiversity conservation by creating economic incentives for local people to conserve while safeguarding their traditional livelihood strategies as well as cultural values.

The information used in this paper came from the participatory action research process that encompassed a broader understanding of biodiversity including medicinal plants, local communities, and enterprises in Nepal and closer examinations of issues and their relationships in the past 4-8 years. Review of literatures, wider interactions with key stakeholders (workshops, meetings, seminars, conferences, interviews and dialogues), and observations were used. A long-term involvement and deep interest of the researcher in the subject provided the foundation to build on the understanding in this topic.

Resource Base, Distribution and Uses

Nepal's central location with the transitional zone between the eastern and western parts of the Himalaya makes its geographical position unique. It has species of both the Himalayan parts. Both horizontal and vertical variations contribute to the diversity and uniqueness of ecosystem, flora and fauna. Climatic variations from near tropical through temperate, alpine and tundra are found across the country, south to north.

The western region (west of 83°30' E) and eastern region (east of 86° E) show distinct west Himalayan and east Himalayan biotic components, respectively, while the central region represents the biogeographical traffic for both the regions. The Palearctic and the Indo-Malayan biogeographical regions merge in Nepal and the major floristic provinces of Asia (the Sino-Japanese, Indian, western and central Asiatic, Southeast Asiatic and African Indian desert) overlap to create a unique and rich terrestrial biodiversity.

Numerous side ranges and shoulders extend in all directions from the main Himalayan chain, creating a complex mosaic of biologically isolated high altitude ridges and deep valleys,

essentially biogeographical islands (Wilson 1992). The complex vertical topography acts to restrict gene flow across the landscape. With this biogeographical isolation and ecosystem diversity ranging from desert and semi-arid areas in the north to tropical monsoon forest in the south, as well as subtropical, montane and alpine forest, tundra, permanent snow and ice, and geothermal hotspots, the Nepalese landscape fosters a high level of biological diversity.

Nepal has significantly diverse ecosystems (Chaudhary, 1998; Subedi, 2000, 2004), producing a wide range of unique and valuable medicinal plant resources. Representing only 0.01% of earth's land area, Nepal is gifted by nature with 2.6% of all flowering plants, 9.3% birds, and 4.5% of mammals of the world. Out of an estimated 9,000 species found in the eastern Himalaya as a whole, 39% are endemic to this mountain range (Myers 1988; Myers 1990; Bajracharya *et al.* 1998; IUCN 2000). Nearly 7,000 species of higher plants are found in Nepal, of which 5% are endemic to Nepal and 10% are medicinal and aromatic plants. With 75 vegetation types ranging from dense tropical forests to alpine vegetation that covers over 50% of the total geographical area of the country forms the land resource base for the provision of medicinal and aromatic plants.

Our investigation shows more than 161 wild plant species are used to harvest NTFPs for commercial purpose (Subedi 2004). In Mountains and other Himalayan areas of Nepal, forest and other natural vegetation have been used extensively for timber, fodder, firewood, leaf litter, medicines, foods, spices, fibers, tannins, gums, resins, fatty oils, dyes, incense, cosmetics, building materials, and agricultural implements.

Our analysis based on the 161 commercial NTFPs species of Nepal shows that many of the species are used for more than one purpose. Figure 1 shows the distribution of the plant species by primary use category. Over 50% of plants are used primarily for medicinal purpose, which is followed by those for food (17%), essential oil (7%), plant fiber (6%) woods and crafts (5%), spice and flavor (4%), and dye (4%). The rest 7% are used for tonic, gum and resin, edible oil, broom, incense, soap making, etc. The uses of some plant species have been known from the time immemorial and some along with the chronological exploration, and some are being explored.

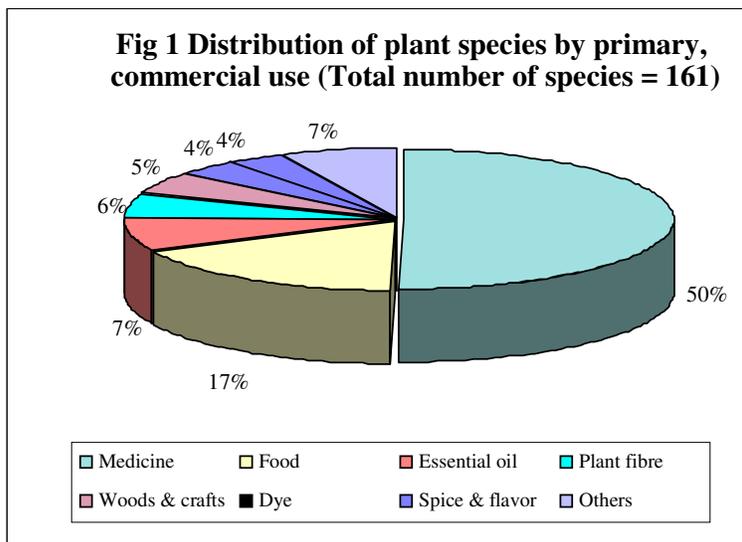
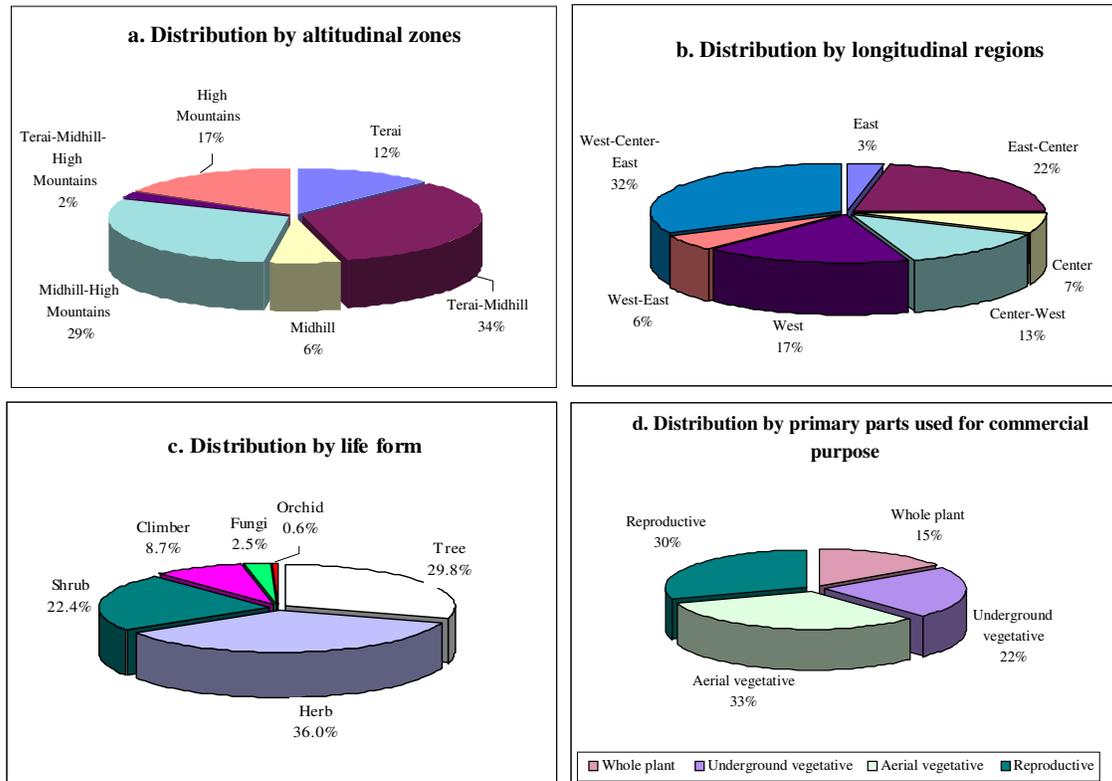


Figure 2 shows the distribution of life forms and prime parts used for commercial purpose. It also gives an idea of these plants in terms of 161 commercial NTFPs species of Nepal by ecological zones and along east-west axis. Many of the commercial species are found in more than one altitudinal range, but only 2% are found in all three major land form zones of high mountains, middle hills and wet plains (terai). Being the transitional zone, mid-hills harbor 71% of commercial species, the highest of all. High mountains and terai each contain 48% of the commercial species. But 17% of the species are found only in high mountains as compared to 12% in terai and 6% in mid-hills, indicating importance of high mountains as a centre of NTFPs.

While there are a considerable number of NTFPs in tropical and mid-hill regions, and some of which are also produced in sizable volumes, the Himalayan and trans-Himalayan regions are rich in high value NTFPs. Along the east-west axis, western Nepal is richer in commercially harvested species than the eastern part. With regard to life-form, the commercial NTFPs are as following: herbs 36% followed by trees 30% and shrubs 22%. The numbers of the fungi, orchids and climbers that are used commercially are relatively small

Fig 2 Distribution of plant species of Nepal used for commercial NTFPs (based on 161 species)



but many of them are playing important role in trade because of their high prices in the market.

The plant species are likely to be severely impacted from unmanaged harvest, as many of the commercial products are derived from whole plants (15%) and underground parts (22%). Aerial vegetative parts are used as the primary parts for commercial purpose from 33% of the species. Of these, several species are used for their bark.

Conservation Challenges and Threats

Most of the economically valuable MAPs are available in the remotest mountains where 57% people live below the poverty line. Trade of traditional non-timber forests products, especially MAPs is often the only source of cash income for the poor high mountain communities where the vast majorities (90%) are collected from wild by poorest of the poor.

Our findings show that most of rural farming people depend on forest products (both timber and non-timber) for their livelihoods whether it is for their own use (at home and farm) or for earning cash income. For many of the communities of high mountains, NTFPs are the only source of cash income, and in some cases these are more important source of income than timber. However, ecological zones rich in biodiversity have also some of the world's poorest people. These poor people depend on natural resources around them for both production and extractive purposes, and the issues of environmental sustainability are of immediate relevance to poor people as they directly depend on the viability of the resource base for their day-to-day living.

There is a rapid loss of traditional medical knowledge and practices due to their dependency on verbal transformation, impacts of modern cultural transformation, and rapid land degradation (Manandhar 1990a; 1990b; Caniago and Siebert 1998; Joshi and Joshi 2000). At the same time there is a depletion of resource bases due to over exploitation and lack of management systems (Edwards 1994; Malla et al., 1995; Edwards 1996; Subedi 1997; 1999). The result is that the poor become poorer and end up destroying their only livelihood – the biodiversity rich forest.

However, the traditional approaches to conservation promoted the protected area system models that overlooked the ownership and livelihood necessities of the poor communities. Moreover, the regulatory measures like ban and restrictions promoted illegal transaction of MAPs and made collectors and traders nearly irresponsible towards the conservation. Limited property rights and subsistence orientation even in participatory models are the other veiled reasons that helped neither improve the livelihood of community people nor conserve the important medicinal and aromatic plants.

There is no specific legal framework relating to medical plant resources in Nepal. However several policies, plans, acts and laws interact to regulate and set the context in which medicinal resources are managed and utilised for subsistence and commerce (Subedi 2000). Gaps, inconsistency and contradiction under the set of several policies and laws, often cause user groups to confuse and insecure over property rights (e.g. sometimes private companies/organisations are given exclusive collection rights for certain products even in community forests). Absence of management directives and guidelines of medicinal plants for the community forest provides no explicit scope and opportunities of these resources among user groups. The complex set of procedures (such as imposing a licensing system for harvesting, sale, transport and export, an arbitrary royalty system, controlling authority at the district and travel routes) restrict efficient use of medicinal resource (Subedi 2000). Moreover, lack of knowledge about legal provisions, market information, institutional support, production management and post-harvest operation forbid the user groups from equitable benefit sharing of medicinal resources.

We found that uncontrolled burning of pasture and forest, unmanaged harvesting of NTFPs, slash and burn farming, unmanaged harvesting of timber, fodder and firewood, overgrazing, and poaching of wild animals are the major proximate threats to biodiversity. The reasons for the above threats are complex. The threats arise from endogenous as well as exogenous

variables, and more importantly these variables interact with each other and the combined effects become more damaging than the sum of their individual effects. There are both natural and anthropogenic forces affecting biodiversity, but anthropogenic factors are posing the greatest threats in the areas. All these human activities linked to the threats to biodiversity were the results of several socioeconomic factors such as poverty, immediate cash needs of local people, lack of alternative income generating opportunities, defective property rights, lack of incentive for conservation, limited knowledge on conservation particularly silvicultural practice, and increasing market demand for these products. From participatory analyses with local communities, our observations and interactions with concerned stakeholders, we found the following underlying causes:

- a) Poverty, dependency on biodiversity for subsistence and lack of alternative income generating opportunities (immediate cash needs of local people)
- b) Property systems (the pattern of the distribution of rights and responsibilities, sanctions, and legitimacy) - both exogenous as reflected in government policy provisions and their implementation practices (government action and law enforcement), and endogenous as reflected in local customary norms, rules and practices
- c) External market demand - high and growing but the present buying practices are mostly exploitative to both the people who harvest and supply the products and the nature from which they are produced
- d) Knowledge, skills and capacity to manage and earn – unsatisfactory practices or level of skills for extraction/harvest, production management, and post-harvest operations
- e) Education and conservation awareness
- f) A poor ecosystem generally does not get enough respite to recover, because humans are always there, collecting fodder, firewood, litter and NTFPs. On a given day removal of biomass is inconspicuous, and its damaging effect keeps on accumulating, and biomass extraction never stops. No attention is paid to, for example, regeneration of species. Consequently, forests may degrade even when biomass extraction is well within the carrying capacity of productivity.

Prospects of Conservation

Our analysis of historical changes in the biodiversity conservation of Nepal and the key stakeholders' dependency on forest suggest that community-based conservation approach is a viable option to conserve MAPs resources. Even if the Protected Area System (PAS) is effective and efficient for the conservation, it is not practical to bring all the important areas of biodiversity hotspots under PAS. A vast area of globally significant biodiversity is outside the PAS and conservation problems are prominent even inside the national parks because of the high dependence of local communities and ineffective enforcement capacity of the concerned agencies.

We analyzed community forestry from a broader perspective to find out how to sustain community's interest in management and conservation, economic incentives required for enterprise-oriented management, and need of rights and technical support for improving institutional capabilities. There are many challenges and weaknesses in community forest management, some arise with its formation and some are inherent to social structure.

Experience of two decades of formal community forestry indicates that there is a need to expand local community's rights over forest resources. Mountain communities in Nepal are heavily dependent on forests for livelihoods, therefore they face problems arising from forest degradation.

Besides the necessity of resolving all the above-mentioned challenges, sustainable harvesting practice is the crucial one that necessitates acute consideration of distribution and density of product, regeneration potential, rotational period, impact of harvesting – on species, soil fertility and conservation, domestication possibility, production requirements, length of collection season and amount of time needed to harvest.

Subsequently, steps were taken to create community forest user groups with clearly defined concept and functioning. A CFUG represents a group of people, who use a particular forest land. In this there is a freedom to include all villagers or part of them or also some individuals from other villages. According to King *et al.* (1990) “the term user group is actually descriptive of a category of people, rather than a group”. The 1993 Forest Act strengthened CFUGs by giving them legal backing and autonomy to mobilize funds and resources. Thus, a CFUG became legally recognized, autonomous corporate entity with on-going succession. Its governance is defined by its constitution, which is registered in DFO and community forest management operational plan. CFUGs have also freedom to develop their constitution consistent with their needs and constraints. It represents a major innovation in participatory management of natural resources and empowerment of the poor people. This institution has made the poor communities living in remote mountains vibrant with hope and activities. The number of CFUGs and households involved and area under their management have increased dramatically during last 12 to 13 years.

Since 1978 about 1.1 million hectares or 25% of the total of forest area of Nepal has been handed over to about 13,000 CFUGs that represent nearly one-third of the total population of Nepal (CFD 2004). Such an approach was being promoted in the entire developing world, where also nearly one-fourth of total forest area was brought under community forestry (Scher *et al.* 2003), and likely to double by 2015 (Bull and White 2002). Many positive forces have been created with the progress on power devolution in forestry through community forestry (CF) policy, procedures and practices. In Nepal, over 60% of total forest land is potential for community forestry.

The organization of CFUGs proved handy for incorporating enterprise oriented initiatives. Gradually, more and more CFUGs began to opt for NTFPs-based enterprises in Nepal, in which NGOs like ANSAB and government played a facilitative role. Currently, more than 100 CFUGs are involved in Enterprise-Oriented Community Forest Management (EOCFM) activities. However, it does not mean that the hurdles in the path of EOCFM have been removed and CFUGs progress is smooth. CFUGs are still confronted with several problems relating to uncertainties in policies and legislations and distortions in their implementation. The overly bureaucratic functioning of the government and negative interpretation of regulations continue to hamper the progress of EOCFM. Then, the technical assistance required to enable EOCFM to make progress is still rudimentary.

Forest management through Community Forest Users Groups (CFUGs) is a viable and evidently potential option for conservation of MAPs in Nepal. In a study of 37 CFUGs we found that through enterprise-oriented management it is possible to generate economic incentives to local community members who take the stewardship and active management role for the sustainable production. They have initiated both system and practice to address threats to biodiversity and to enhance conservation.

The prospect of EOCFM producing MAPs is likely to be higher with the increasing trend in the use of natural products, especially health care products, flavors and fragrances worldwide. Nearly 80% of the world's population uses traditional medicine and medicinal plants. The global market of herbal drugs is over US \$20 billion (1998 estimate) and its growth is about 7% per year. Emergence of community-based enterprises and promotion of responsible buying practices that care for sustainable forest management across the world show promises in creating opportunity for the EOCFM and increasing income to rural poor to tap.

Conclusion

The study indicates that Nepal is rich in medicinal and aromatic plants, which are used locally and sold for cash income. Despite gradual socio-cultural transformation, local communities still possess substantial knowledge of plants and their uses. Enterprise-oriented community forest management can be an effective strategy for managing the forest for a sustained supply of forest resources including MAPs. With supporting policy and legislation in place, community forestry creates good opportunities to manage in a common property system. However, a paradigm shift is necessary among CFUGs from fulfilling subsistence oriented management to EOCFM. This needs detail resource assessment, productive potential, sustainable harvesting methods, domestication possibilities, market information and enterprises that add value to harvested products. Moreover, there are new issues or even the existing issues that need careful and more responsible ways of management. Social equity and good management will not occur automatically. These needs to be designed, enforced, and monitored applying appropriate tools such as forest certification. Only a concerted effort of relevant governmental and non-governmental organizations, enterprises, policy makers and other concerned stakeholders for the responsible practices from all concerned would bring the positive result in MAPs conservation in Nepal.

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