Creating Livelihoods and Enhancing Biodiversity-rich Production Systems Based on Medicinal and Aromatic Plants: Preliminary Lessons from South Asia

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Keywords: medicinal and aromatic plants, market, monetary and non-monetary benefits, livelihoods

Abstract
The literature defines livelihoods as the processes comprising the capabilities, assets and activities that provide a means for living to the human beings. Livelihoods are best examined through Sustainable Livelihoods Framework (SLF), which is based on the premise that livelihood is not about resource productivity but it is about people and their lives. Livelihoods are sustainable when they are: a) resilient to shocks and stresses, b) independent of external support, c) maintain the productivity (and diversity) of natural stocks; and d) do not adversely affect the livelihoods of others. In other words, SLF: a) builds on the strengths of people, their resources and knowledge systems, b) strengthens local institutional capacity, c) attempts to remove conditions causing poverty rather than poverty itself, and d) gives priority to improving policies, processes and institutions in developing and implementing programs. Medicinal and aromatic plants (MAP)-based livelihood systems are often mediated by the market forces and/or related directly to employment and income of the poor people. Based on the research work carried out by IDRC supported research in South Asia, we find that MAP and other biodiversity-based livelihoods can not only become poverty reducing they can also be made socially equitable and gender balanced. However, the interventions have to be carefully designed to enhance and diversify livelihood strategies with a focus on strengthening existing biodiversity-based livelihoods by considering the following points: a) both non-monetary and monetary benefits from biodiversity-based livelihoods; b) improving linkages and synergies with and amongst other components of biodiversity; c) landscape-scale management practices that protect or enhance biodiversity (organic farming, mixed farming, community forest management, water management to enhance aquatic resources, opposition to enclosure of the commons, etc.). MAP-based livelihoods can be easily mainstreamed with other components to enhance human welfare, especially among the poor and marginalized communities.

INTRODUCTION AND BACKGROUND

South Asian countries have rich medicinal and aromatic plants (MAPs) resources. The Himalayas, for example, have in abundance, a diverse range of herbs, shrubs, trees and vines that have significant medicinal value whose healing properties are known to local healers and traditional doctors for centuries but are currently threatened due to lack of concerted conservation efforts. MAPs play a significant role in the subsistence economy of poor and landless people. A recent study (Singh, 2002), indicated that from a
single district of Pithoragarh in India, more than 1300 tons of MAPs are collected and traded annually, most of them illegally. Unsustainable harvesting without providing equitable benefits to the local people is of grave concern to conservation community as it leads further erosion of biodiversity. However, as local people’s dependence on these plants for their livelihoods is high (Karki, 2000) sustainable use and remunerative cultivation of MAPs become crucial.

Multi-faceted Importance of MAPs

1. **The Social Perspective.** The use of medicinal plants in meeting family’s primary health care and nutrition needs is traditional and imbedded in all cultures – a practice dating back to at least four thousand years in many countries (Farnsworth and Soejarto, 1991). There are no major problems of acceptability regarding familiarity with the usage of plant products, methods of cultivation and technologies required for processing. MAPs create socially acceptable employment avenues for women and other marginalized communities.

2. **Protection of Traditional Knowledge.** The urgency and need to protect the fast disappearing medicinal plants-based indigenous traditional knowledge (ITK) cannot be overemphasized. The indigenous people of South Asia have a rich local health tradition and a large number of traditional healers have been practicing indigenous medicine for hundreds of years (Bordekar, 2000). If proper values can be added to ITK-based health practices and subsistence-oriented MAP applications, economic incentives can be created to protect them.

3. **Environmental Perspective.** The growing apathy toward products made from chemical (allopathic) products and unsustainably harvested forest products becoming ethically unacceptable consumer goods have created new markets for quality, certified and organic herbal products. Medicinal plants have the potential to fill these needs as they provide green health alternatives and a number of other eco-friendly products of domestic and industrial usage (Bordeker, 2002; Temptesa and King, 1994).

**LIVELIHOOD IMPORTANCE OF MAPS**

**Through Potential of Equitable Commercialization**

The MAP sub-sector in South Asia has immense commercial potential to benefit local collectors and growers provided national and global markets can be tapped properly. Private sectors are interested in ensuring sustainable supply of quality raw materials for their industry and cultivators are looking for reliable and remunerative markets. The gap exists in properly linking the two together in a synergistic and sustainable manner.

**Through Trade and Enterprise Development**

Global demand for medicinal plants is expected to increase between 10 to 16% per annum (GOI, 2000; CRPA, 2001). The current gap between demand and supply is estimated to widen by 2005 (GOI, 2000; CRPA, 2001). Not only the plants are in increasing demand by major herbal drug industries, even at local levels traditional healers and traditional drug manufacturers are requiring quality materials.

**Through Domestication and Cultivation**

South Asian countries, especially uplands, have a tradition of practicing mixed farming systems that include herbal plants and therefore, cultivation of medicinal plants especially applying organic and certified farming concepts has a greater scope in the upland region. MAPs can be easily integrated into the existing cropping systems due to availability of a large number of species and choice of plant types i.e., trees, shrubs, forbs, vines and their suitability to grow in different eco-physical conditions. However, this will require an improved input and service delivery system including marketing, and post harvest technologies.
MAPs AND SUSTAINABLE LIVELIHOODS FRAMEWORK (SLF)

Livelihoods are the processes comprised of the capabilities, assets and activities that provide a means for living, while well being is the outcome of livelihoods (Cox et al., 1998). Medicinal plants can be successfully utilized to develop sustainable livelihoods of the MAP-dependent communities. Field-based research can collect information required by the SLA model and critically analyse the parameters and components that need greater emphasis. The depth and quality of the research the model may require in order for it to be a useful tool can also be studied. The following process-based data collection tools and analytical methods are suggested.

**Stakeholder Participated Process**

Local collectors, growers and traders need to be involved in planning, designing, developing and implementing research activities. The GOs and NGOs need to consult and work with community-based organizations (CBOs) and engage into a participatory process involving all stakeholders in model building process. In order to understand the complex and interrelated issues including the gaps that exist in market information, constraint and opportunities of micro-enterprise development, implementation of ‘good practices’ and creation of a suitable institutional and policy environment, a holistic model or pilot development will be critical. The tools of sub-sector analysis and supply or value-chain methods may be useful to guide the researchers.

**MAP-based Livelihoods Design**

Alleviating rural poverty in South Asia will require efforts, which go well beyond the basic income yardstick. It has to include improved access to primary health and education services, the right to foods and nutrition, protection from external shocks, and power to participate in decision-making that affects the lives of the poor and marginalized communities. Meeting all these challenges will require, in addition to enabling integrated development oriented policies, sustained income growth of rural people, sound natural resource management (NRM) practices contributing to economic growth, environmental protection and trade. The potential contribution of MAP in this regard, can be substantial in capital-poor but biodiversity-rich countries of South Asia if investment and efforts can be substantially increased in this sub-sector.

**Strengths and Benefit of MAPs**

The MAP sub-sector has much to offer, not just in the way of raising seasonal income through collection and cultivation activities, but being an integral component of forest resource management, especially in the processing and marketing and providing a means to create rural assets and wealth through the development of micro-enterprises. MAP-based community/agro/farm forests can provide opportunities for livelihoods through nursery development, plantation management and post harvest activities and local health care products and services managed by local people.

1. **Bio-partnership to Link Rural Communities with Industry.** Multiple links need to be established with collectors, growers, traders, processors and consumers at different levels in a value-chain or production-to-consumption system framework. Equitable bio-partnership arrangements between drug manufacturing and health-care companies and community-based organizations (CBOs) can be developed to ensure dependable markets for the producers and quality supply for the industry.

2. **Increasing Rural Household Income.** MAP resources and associated knowledge can be included as the inherent strengths of rural people on which sustainable livelihoods can be built. There is a potential to increase rural income to many fold provided the livelihood enhancing potential of MAP-based enterprises could be built on the strengths of the local people such as rich bio-resource, indigenous and traditional knowledge and indigenous social organizations.

Two MP-based case studies, which indicate high livelihood implications, are presented below.
CASE STUDY # 1: Cultivation of Aconitum heterophyllum in Uttranchal, India

Case Introduction
This case describes a project implemented by a NGO: Society for Himalayan Research (SHER) in Uttranchal, India focused on a large-scale cultivation of valuable and threatened medicinal plants – Aconitum heterophyllum Wall ex Royale and Saussurea costus (Falc.) Lipsch. The project collects germ plasm from elite habitats and domesticates them through ex situ trials and ‘mother plants’ nurseries involving local people.

Expected Economic Returns
The results of a preliminary cost benefit analysis reveals that as compared to the traditional crop of potato which yields a net profit $ 200/ha, the same anticipated from the cultivation of Aconitum atrox is around $1600/ha and Aconitum heterophyllum Wall ex Royale $ 6000/ha. Local farmers are willing to substitute large part of the potato acreage with a more lucrative crop of either Aconitum heterophyllum Wall ex Royale or Aconitum atrox. Farmers do minimize the risk of displacing subsistence food crops by bringing only part of their farms under MAP crops.

Marketing Strategies Adopted
Given the scarcity of these plants in the markets, drug companies have assured the market promising prices 10% above the market price. SHER has also negotiated a formal bio-partnership between certified farmers and an Ayurvedic pharmaceutical company. The arrangement ensures the farmers with a guaranteed market and a fair price for their harvest, in exchange for exclusive rights to the produce as the sole buyer. In addition, the company guarantees to pay 25% of production costs up front to the farmers, and 5% of profits are returned to the community as an investment to continue research and development in the sustainable production of MAPs.

Policy and Legal Issues Being Faced
Given that the project is located within a protected area, there are several restrictions placed on the marketing of endangered species that restrict the incentive to cultivate MAPs for income generation. The park regulations generally prevent the cultivation and sale of any endangered species for commercial purpose. However, the project has negotiated an arrangement on behalf of local farmers with the State government. Farmers receiving training and subsidized plant material through the project would be certified as growers operating under agreed-upon standards and procedures of production, and would be permitted to sell their produce.

CASE STUDY # 2: Traditional Management of Bay Leaf (C. tamala) in Meghalaya, India

Case Introduction
Bay leaf Cinamomum tamala is a medium size tree plant. The leaves are used as condiment. It grows naturally in the subtropical humid forests of Meghalaya where it is a well-husbanded wild tree. The trees growing in wild are protected and promoted to regenerate and grow in its natural habitat in association with a variety of other native trees. In areas where more intensive management is in place, its cultivation is considered to be ecologically sound because it is managed as a mixed crop along with betel nut, betel-leaf, jackfruit, timber tree and a host of shrubs and herbs. Over the years, bay leaf has emerged as a semi-domesticated tree that provides supplementary income to the forest dwellers. The local tribal communities of Khasi and Jaintia Hills in the state collect, process and market a large variety of MAPs including bay leaf and wild pepper (Piper longam) from the forests.
Traditional Management System

The villagers have developed an indigenous system of bay leaf management on their own that improves their livelihoods without degrading their forests. Large trees are pruned to give space for the growth of preferred plants. Seedlings are retained during annual clearing and weeding. Vines of betel leaf (*Piper* spp.) are planted in the base of selected trees. By clearing off weeds and tree shades, medicinal plants like bay leaf, wild pepper and herbs are assisted to regenerate and grow. Lopping and pollarding of bay leaf tree branches is usually done when the tree plant has attained a height of about 4 to 6 meters. Epiphytes like orchids, aroids and lichens that grow on the stem of the bay leaf tree are removed manually. Infected branches are cut off and burnt to remove the infected twigs and parasites. Preferred trees are allowed to regenerate in the forest gaps caused due to death of old trees. Thus the population of desired MAP species increases year after year. Weeding is repeated 2 to 3 times, when the regenerating trees are three to five years old, but for the older plants, weeding is done only once a year. Fire lines are cut annually and maintained properly. The forests near the village and on the roadsides are more intensely managed. The process has created a significant employment opportunity for local people.

Production and Harvesting of Bay Leaf

Depending upon the age and size of trees, the unit production ranges between 30-75 kg/tree/year. Harvesting is done in a very sustainable way in winter seasons. This is considered to be a specialized job requiring skilled labour only. For harvesting leaves, older branches of the right diameter size only are allowed to be cut. Harvesting can be done after a gap of 1 to 2 years depending on the age of the tree and the fertility of the soil.

Economic Returns

An estimated 2800 tons of bay leaf reaches the regulated market every year from Meghalaya. At an average purchase price of Rs 7/kg, bay leaf yields around half a million cash to the growers annually. Since the growers themselves do most of the activities, a sizable part of this money adds to the income of growers themselves. Apart from this, the Syiem (local traditional chief), the local and state governments also get royalties and taxes.

Policies and Legal Issues Faced

*C. tamala* is a notified tree species and government levies tax on sale and purchase of its produce. Farmers therefore, do not have secured access to the forest land and face numerous bureaucratic hurdles to harvest, process and market the products freely. The multiple taxes levied by local, district and state governments hinder the development of a system of marketing, trade and enterprises.

ANALYSIS AND DISCUSSION

Production and marketing of MAPs involves a large number of stakeholders. Both men and women play important and distinct roles. While men do harvesting, carry out the actual trading, transporting, drying, sorting and packing are generally done by women. Most MAP-based communities are poor villagers and therefore, a significant portion of the income earned goes to the disadvantaged sections of the society. Cultivation and gathering of MAPs has a great employment potential. Using these large groups of plants, micro-enterprises can be set up in rural areas for value-adding processing and raise income of local people.

Markets, Markets Channel and Prices

Market demand and price depend upon the quality of produce and availability of goods. Marketing is largely controlled by external demands and outside traders and wholesalers control the price. The producers generally, do not have any say in
determining the price. The regional traders have access to the market information and control the price. MAPs being forest products attract royalty and taxes. Besides, in case, illegal collections are found in the consignments of legal products, additional payments and fines are charged. These taxes and fines lower the sale price of growers. The prices also depend on the stage of the harvest, visual colour, moisture percentage, and smell of leaf, barks, seeds, fruits and roots.

DEVELOPING STRATEGIES FOR MAP-BASED LIVELIHOODS

Livelihood Enhancing Strategy

Livelihood being an overarching area, there is a need to apply a holistic approach in the development of MAPs. The base has to be the grass roots-based organizations such as women’s Self-Help Groups, Forest User Groups, Joint Forest Management Groups etc. who can plan and carry out social and financial mobilization first. Cultivation and sustainable in situ management needs to be linked with the market from the very beginning of the project. Implementation needs to be done in phases: 1) learning phase, 2) expansion phase. A typical development project should carry out step-wise activities as follow: a) assessing and prioritizing a number of target MAP species, b) developing a network of in situ conservation and ex situ production areas, c) developing nurseries for producing and distributing quality and certified seeds and seedlings as well as imparting on-site training, d) enlisting industry’s participation in entering into buyback guarantee of the cultivated products, e) continuously generating, disseminating and transferring useful and targeted research information and simple technologies; f) promoting policy reforms in collaboration with government agencies, g) promoting integrated and holistic agro-ecological farming practices giving priority to production of organic and certified MAP products, h) implementing supply-chain management to ensure remunerative returns to the farmers and collectors, and i) promoting sustainable harvesting and value-adding processing of both collected and cultivated materials.

Livelihood Supporting Activities

1. Credit and Extension Services. The collectors and growers should be provided with credit, input and extension facilities to avoid crop failures and ‘distress’ sales. Fixing minimum floor price can also work as a strong incentive for collectors and growers as they can rest assured for a certain level of income. Establishment of local institutions like growers’ forums can help increase the bargaining power of small-scale producers.

2. Market Development and Linkages. Development of market information and communication strategies using appropriate information and communication technologies (ICTs) is necessary for technology transfer and knowledge sharing. Market centres at suitable locations need to be developed to provide training on post harvest processing and storage facilities.

CONCLUSIONS

There is a growing awareness about the serious and long-term implications of over-exploitation of MAPs, caused especially by expansion in national and international trade and marketing. The loss of these valuable plant species may have far-reaching implications especially for poor rural communities who are often highly dependant upon them for their health and livelihoods. Various development and research actions have been attempted to find long-term solutions. However, these attempts have often been isolated and sometimes not based on systematic analyses of the conditions needed for success. The sustainable livelihoods approach (SLA) is found suitable to design biodiversity-based livelihoods because it asks a broad range of questions about community’s resource-base, knowledge base and other inherent strengths and builds on them. This approach helps us to reorient researchers’ mindset towards interventions that are designed to enhance existing and diversified livelihood strategies that can better cope with uncertainties and risks. The SLA remains limited, however, as a framework for
posing research and development questions on MAP-based livelihoods as it leaves actual interventions to come from the target beneficiaries.

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