

# Towards certification of wild medicinal and aromatic plants in four Indian states

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*An innovative attempt to create a standard for certifying forest-based medicinal and aromatic plants (MAPs) by adapting global norms for national-level implementation.*

The safety and affordability of natural products as medicines, food, cosmetics and pesticides has led to a resurgence of interest in medicinal plants. Globally, wild or natural resources meet 70 to 90 percent of the market demand for medicinal and aromatic plants (MAPs), also ensuring the livelihoods of millions of rural people (Prasad and Bhattacharya, 2003). However, the recent increment in commercial demand is a threat to natural MAP resources if they are not managed to safeguard their regeneration. The threat is further intensified by forest degradation, land conversion, anthropogenic disturbances and other factors. Cultivation and domestication of wild plants is often suggested as a way to meet the growing market demand and also to create a balance between the use and conservation of MAPs, but for many species knowledge and practices are not yet advanced enough to bridge the gap between demand and supply, and it may not be economical to develop these practices. Furthermore, there are indications that some wild materials may have greater amounts of active constituents than their cultivated counterparts (Schippmann, Leaman and Cunningham, 2006).

Traditional users have emphasized good collection, storage and maintenance practices to ensure the quality of medicine prepared from plants. However, with expansion of the pharmaceutical industry and growing preference for herbal and organic products, the rapid depletion of natural MAP resources necessitates international and national regulations and guidelines to guarantee that sustainable practices are followed.

India has a rich tradition of medicinal plant use and conservation supported by socio-cultural practices such as worship of plants and animals and protection of sacred groves. However, indiscriminate collection of MAPs from wild sources has depleted these resources. Meanwhile, privately driven exploitative marketing has deprived MAP gatherers of their due remuneration (Verma, 1998). Although forests have a vital role in the national economic scenario, until recently MAPs (and non-wood forest products [NWFPs] in general) received little attention in forest-based strategic planning and development.

MAP certification could have potential for addressing these problems. Certification can be briefly defined as a market-based incentive for good management practices. Forest certification originally dealt mainly with timber production, but it has increasingly addressed NWFPs as they have gained in economic importance (Brown, Robinson and Karman, 2002).

Direct benefits of MAP certification include secured future availability of the resources through sustainable collection, improved quality leading to a price premium, and market expansion through international acceptance. These lead to indirect benefits such as conservation of biodiversity, respect for traditional rights and practices, improved benefit sharing (which can enhance the returns of gatherers and thus motivate them to conserve, manage and collect MAPs responsibly, and also to comply with policy and law) and socio-economic development. In short, MAP certification can benefit not only forest populations that rely on MAPs, but also a wider group of stakeholders

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*Testing of quality parameters of medicinal plants by a herbal industry at Indore, Madhya Pradesh; one of the direct benefits of MAP certification is improved quality leading to a price premium*

(Sindhi and Choudhury, 2003). In comparison with timber certification, however, certification of wild medicinal plants and other NWFPs requires more specific and detailed methodology, research and planning because of the variety of products and seasonality involved (Pierce and Laird, 2003; Pierce, Shanley and Laird, 2003).

The International Centre for Community Forestry (ICCF) in Bhopal, India has recently undertaken a project to evaluate the potential for MAP certification and to develop a generic standard for it, covering stages from raw material collection to marketing. Sponsored by the National Medicinal Plant Board, the MAP Certification Standard Development project covers four Indian states where MAP resources are socio-economically important and a suitable institutional framework is in place: Madhya Pradesh, Chhattisgarh, Orissa and Uttarakhand.

The project reviewed practices in the selected states, as well as existing international and national guidelines for MAPs in light of Indian conditions. A draft certification standard was developed through stakeholder consultations organized in each state. This article presents the preliminary findings and the draft standard.

#### REVIEW OF CURRENT SITUATION AND PRACTICES

Practices in each of the four states were reviewed according to the following

parameters: existing legal and policy framework, conservation activities, prevalent collection and trade practices, and benefit sharing and livelihood security. These parameters eventually formed the principles of the draft standard.

Data were collected and verified through field survey and interviews with different stakeholders such as gatherers, traders, foresters and local non-governmental organizations (NGOs). The main findings (ICCF, 2007) are outlined here.

#### Legal and policy framework

Although the financial and developmental importance of MAPs is recognized, a legal and policy framework for them is yet to be developed. NWFP and MAP policies vary widely from state to state (Sahu, 2002; IIFM, 2007).

The subsistence use rights accorded to villagers, for example, vary by state. National legislation enacted in 1996 to facilitate participatory democracy in tribal areas gives villages the power to manage and control their own resources, including NWFPs. However two related acts in Madhya Pradesh fail to mention NWFPs (Ojha, 2004).

The State Forest Policy of Chhattisgarh, issued in 2001, declares that the state will take appropriate measures through the Chhattisgarh State Minor Forest Produce (Trade and Development) Co-operative Federation Ltd (CG MFP Federation) for sustainable utilization and long-term conservation of all NWFPs from the forests of the state. The recently proposed Chhattisgarh Medicinal Plant Bill of 2007 states that only *bona fide* village

*Interview with women collectors of NWFPs regarding collection practices, Chhattisgarh*



residents may collect medicinal plants in the village area. However, there is no mention of what is to be done in the case of illegal entry or collection. Neither Madhya Pradesh nor Chhattisgarh controls commercial collection organized by traders or their agents.

In Uttarakhand, villagers can use community forest products, but the state Forest Department has authority over commercial utilization. In Orissa, however, village councils are empowered to regulate the purchase (from primary gatherers), procurement and trade of 69 NWFPs (referred to as “minor forest products”). People engaging in these activities must register with the village council; but the quality and quantity of collection is generally unregulated (*Orissa Gazette*, 2002).

As a conservation framework, Madhya Pradesh and Chhattisgarh initiated a Peoples Protected Area approach to involve local people in protection and conservation of valuable forest resources in resource-rich areas, with benefit sharing (Chhattisgarh Forest Department, 2007). In Madhya Pradesh a rotational ban is implemented on different products in different areas to promote resource conservation. However, it is not clear how these provisions are being implemented at the field level, as monitoring results are not available. Uttarakhand has adopted a unique strategy for scientific management of MAPs involving rapid inventory and mapping of MAPs following division of each forest range into three separate management units for conservation (no commercial extraction allowed), development (intensive management and cultivation) and sustainable harvesting (Planning Commission, Government of India, 2006).

Madhya Pradesh, Orissa and Chhattisgarh have systems for registering collectors. One district of Chhattisgarh has made an attempt to issue identity cards to MAP collectors through village Joint Forest Management Committees (Katiyar, 2007).



**Participatory assessment of medicinal gum yielding tree, Madhya Pradesh**

Most of the states have a transit permit system. Transit permits help forest departments record outgoing forest products and collect tax revenues from traders. They also support sustainable forest management by providing valuable information on forest product collection and commercialization. In Madhya Pradesh, however, minerals, wildlife, *tendu patta* (*Diospyros melanoxylon* or Indian ebony leaves), *sal* (*Shorea robusta*) seeds and *kullu* (*Sterculia urens*) gum are the only NWFPs subject to transit permits (*Madhya Pradesh Gazette*, 2005).

#### **WILD AREA CONSERVATION AND MANAGEMENT**

Most forest management plans, working plans or microplans address forest resources as a whole. While they generally include MAPs as a category, MAP-specific planning is rare (Misra and Jain, 2003) – although the national government recently initiated a process to incorporate MAPs in the Forest Working Plan Code for better management at the forest management unit level (Bhattacharya, 2008).

State and local organizations have mapped resources in some MAP-rich

areas; however, few of these studies apply improved technologies for ground-based or aerial mapping and documentation, and few involve local stakeholders in a truly participatory way. Although biodiversity and vegetation mapping has been carried out through remote sensing in all four states, these maps are not used for strategic planning or implementation of MAP conservation activities (Bhattacharaya, 2006).

Threat status assessment of prioritized species has been reported from Madhya Pradesh and Chhattisgarh (Ved *et al.*, 2003), but study of the ecology of MAP species and the impact of overharvesting has been insufficient to contribute much to conservation and management planning.

State forest departments and medicinal plant boards have a significant role in conservation and management of medicinal plants in forest areas, undertaking *in situ* and *ex situ* conservation projects. Statewide and local organizations have undertaken cultivation-based conservation initiatives such as nursery development and herbal gardens, but these need

to be strengthened through development of people's awareness, incentives and market linkages. State initiatives tend to be hindered by personnel and management deficiencies and failure to monitor and assess their results.

### **Responsible collection and use practices**

Despite awareness of the importance of sustainable harvesting, many collectors adopt destructive harvesting practices, compelled to do so by poor economic conditions, population pressure, consequent resource use competition and market demand for MAPs. Research organizations (e.g. the Tropical Forest Research Institute and State Forest Research Institute, Jabalpur; the Foundation for Revitalising Local Health Tradition, Bangalore; and the Indian Institute of Forest Management, Bhopal) and local agencies are working to systematize sustainable harvesting techniques and methods through field research and capacity building programmes for collectors, traders and forestry field staff, but their research findings are poorly disseminated and therefore not widely implemented (Prasad, Kotwal and Mishra, 2002; Bhattacharya and Hyat, 2004; Lawrence, 2006). Although governmental and non-governmental organizations regularly conduct awareness and training workshops on sustainable harvesting of MAPs, these efforts do not appear to have translated into sustainable harvesting practices in the field.

Collectors pay little attention to quality and continue to collect prematurely since the currently used grading system (mostly controlled by traders) and market demand put a price even on inferior material (Durst *et al.*, 2006). Quality control in local and regional markets is weak, relying mainly on personal experience, and often fails to exclude adulteration. Although chemical analysis of raw material is gaining wider acceptance, lack of local facilities restricts its implementation at the field level. Manuals or

standardized rules for quality control are generally lacking.

Lack of nearby storage facilities often compels primary collectors to sell their materials directly to local agents or traders, and improper maintenance practices during storage shortens shelf life and may diminish the quality of the material. However in some areas of Chhattisgarh and Madhya Pradesh local MAP storage facilities have been established and have improved economic returns for the collectors.

Documentation related to collection, storage and traceability of MAP materials is still rare.

### **Benefit sharing and livelihood security**

An effective marketing strategy is the most important requirement for development of the MAP sector in India. Powerful private traders' networks often hinder development in this field. Lack of state support or an organized system enables the spread of these traders' influence even in remote areas. Most stakeholders would prefer to see this problem addressed through a facilitating marketing framework rather than through regulation. Several organizations (e.g. Madhya Pradesh Minor Forest Produce Federation, Madhya Pradesh Forest Department, Uttarakhand Forest Development Corporation, CG MFP Federation, Chhattisgarh Forest Department) have undertaken initiatives to facilitate market access, for example by forming cooperatives and organizing opportunities to bring together buyers and sellers such as fairs and exhibitions. Stakeholders have also proposed the development of an electronic marketing and information system, a concept which is being taken up by the National Medicinal Plant Board.

Although individuals are still the prevalent collectors in many areas, cooperatives and federations are now becoming important at the state level and facilitate benefit sharing. A good example is the Village Satawar Committee in Sheopur

district of Madhya Pradesh, where satawar (*Asparagus racemosus*) is one of the main sources of income for villagers. The committee is responsible for satawar collection, storage and marketing, and its profits are distributed among the collectors (Bhattacharya, 2006).

Pricing strategy for MAPs is another point of concern because of the unstable nature of demand-based supply, quality and availability of material. At present, pricing is mostly controlled by traders with no regard for benefit sharing. Some products (e.g. *tendu patta*) are nationalized, which means the State has a monopoly on collection and trade; the government organizes competitive sale through public auction and the profit is distributed among the gatherers. Uttarakhand is experimenting with organized collection and open auction of some non-nationalized medicinal plants, offering 94 percent of the auction profit to the collectors' organization as royalties. In Orissa, village councils have the power to set the minimum procurement price for the 69 registered NWFPs. Stakeholders have expressed concern that government monopoly can be detrimental to local collectors and enterprises (FGLG-India, 2008).

Market information and documentation lack reliability because traders are not legally required to provide trade-related information to state forest departments and communities. The lack of a transparent and accessible information system hampers collectors in negotiating better prices (Karki and Rawat, 2004). A system of voluntary disclosure whereby traders and industry provide trade information (including source of raw material and purchase and sale price) to the state forest department has been suggested but may not be practicable under India's socio-economic conditions. Some recent interventions have been introduced to trace the product inflow in the market:

- The Chhattisgarh Medicinal Plant Bill calls for registration of all medicinal plant traders and makes it mandatory for them to submit the



**Traditional collection, processing and storage practices have focused on ensuring the quality of medicinal plant products, but upgrading these skills can ensure that local people share in the commercial benefits (processing of Indian gooseberry fruits by local communities, Chhattisgarh)**

details of any collected or traded medicinal plant or part thereof to the Chief Executive Officer.

- In Orissa, traders registered by village councils are liable to furnish information on monthly and annual returns from NWFPs.
- In Uttarakhand, registered traders at medicinal plant markets must provide a certificate of origin along with details of sales and income tax.

A number of governmental and non-governmental organizations in Chhattisgarh and Madhya Pradesh have developed activities to upgrade skills for conservation, sustainable management, processing and value addition.

#### **EXISTING STANDARDS AND CERTIFICATION SCHEMES**

In the past decade a number of organizations have endeavoured to develop standards and good practices for MAPs. The *WHO Guidelines on Good Agricultural*

*and Collection Practices (GACP) for Medicinal Plants* published by the World Health Organization (WHO, 2003) has provided a model for adaptation in national and regional guidelines. Examples include guidelines developed by the Swiss Import Promotion Programme (SIPPO) for collection of wild plants marketed as “organic”, covering details of collection, drying and processing of wild collected materials as well as purchase, processing and marketing aspects (Muller and Durbeck, 2005); and the European Medicines Agency (EMA, 2006) guidelines on specific issues associated with agricultural production and collection of medicinal plants or herbal substances in the wild, which emphasize cultivation, good harvesting practices, quality assurance, primary processing, packaging and documentation practices. The Botanical Raw Material Committee of the American Herbal Products Association, in cooperation with the American Herbal Pharmacopoeia, has recently developed draft GACPs for collectors and growers of herbs to verify the identity of herbal raw material used in drugs and other products and to minimize adulteration (AHPA and AHP, 2006).

In 2004, an expert group convened by the Worldwide Fund for Nature (WWF), the wildlife trade monitoring network TRAFFIC and the International Union for the Conservation of Nature (IUCN) conceived a set of four draft standards on ecosystem and MAP resource management; collection from the wild; domestication, cultivation and enhanced *in situ* production; and rights. In 2005, a second draft condensed these four standards into a single standard with ten principles, related criteria and proposed indicators. The most recent version, which takes into account field evaluation, stakeholder and expert opinions and other relevant international guidelines and regulations, has six principles, 18 criteria and 105 indicators covering areas from environmental, social and management issues to economic and business development issues, which are proposed to be used for certification of collection of MAPs from the wild (Medicinal Plant Specialist Group, 2007).

There is no exclusive scheme for medicinal plant certification. The Forest Stewardship Council (FSC), although developed for timber certification, also includes medicinal plants and other NWFPs under its purview. Currently, FSC provides NWFP/MAP certification for individual species on a case-by-case basis as the variety and complexity of the management criteria are much higher than for timber (Brown, Robinson and Karman, 2002). The Programme for the Endorsement of Forest Certification schemes (PEFC) recently issued a technical document on chain of custody certification for NWFPs (Brunori, 2007).

Product quality standards such as good manufacturing practices, the International Organization for Standardization (ISO) 9000 series for management systems and the ISO 14000 series for environmental management also apply to medicinal plants. International and national standards for organic certification, such as those of the International Federation of Organic Agriculture



Field-level NWFP certification workshop, Madhya Pradesh

Movements and, in India, the National Programme for Organic Production, may be applicable for both cultivated and wild medicinal plants. To achieve socio-economic goals, fair trade certification can also play a major part (Jain, 2004). However, no existing scheme is comprehensive enough to cover wild medicinal plant collection, storage, quality and marketing along with environmental, social and economic considerations. These areas can be covered by combining different schemes, but doing so would be complex and perhaps not cost effective (Wenban-Smith *et al.*, 2006).

In India, attempts to certify MAPs have started recently. In 2001, WWF India initiated a study on three medicinal plants on forest land in Himachal Pradesh to evaluate the applicability of FSC principles (Rastogi and Pant, 2004). The state of Chhattisgarh formed the Chhattisgarh Certification Society, which covers a range of NWFPs but gives priority to richness of MAPs and their economic potential for the state (CG MFP Federation and Chhattisgarh Forest

Department, 2003). A recent project sponsored by the National Medicinal Plant Board and the International Development Research Centre (IDRC) in one district of Chhattisgarh devised a set of generic standards covering good collection and other practices, as well as a set of species-specific standards for 10 species (Katiyar, 2007). Similarly, in

Uttarakhand, Winrock International has begun work on MAP certification for five medicinal plant species (including lichen), with an aim to develop some species-specific standards (Winrock India, 2007). Given the present scenario MAP certification may seem ambitious for India, but good practices can be adopted step by step.

**DRAFT CERTIFICATION STANDARD**  
The standard framework developed by the ICCF project has four tiers consisting of four principles and related criteria, indicators and verifiers. The criteria and indicators from the most recent draft are presented in the Table.

The standard was developed in several phases. First, through a series of meetings and consultations, interested policy-makers, professional foresters, academic institutions, NGOs, traders and industry representatives reviewed the different international certification frameworks, assessed their applicability and proposed adaptations. Second, the modified draft standard was tested in the field through a participatory process

Poster to raise community awareness of NWFP certification process



### Criteria and indicators from draft MAP certification standard

Criteria	Indicators
<b>Principle 1: Legal and policy framework</b>	
1.1 Use/tenure rights are well established by appropriate government order and compliance in the field ensured	1.1.1 Collectors have a clear right to access, use and manage MAP resources traditionally in known forest areas 1.1.2 a. Existence of traditional management practices or written documents such as micro plan, working plan, etc. b. Availability of the respective orders at local level 1.1.3 Compliance of government orders 1.1.4 Regulatory actions against violation 1.1.5 Availability of microplans/other management plans having regulations on different aspects of sustainable management
1.2 Laws, regulations and administrative requirements for conservation and development are in place	1.2.1 National/state/community-level conservation laws and regulations 1.2.2 Implementation at the field 1.2.3 Periodic review mechanism
1.3 Registration of collectors, collection agents, intermediaries and traders are mandatory in the area	1.3.1 Provisions for registration by village councils, Joint Forest Management Committees, Panchayat, Biodiversity Management Committee 1.3.2 Provision for periodic inspection of registration 1.3.3 Availability of registration document with all necessary details (personal information, collection details, etc.) at the local level
1.4 Regulation of forest-based MAP transit (by transit pass or other means) is required	1.4.1 Appropriate legal instrument for regulation of harvesting period, quantity and transit of wild MAPs 1.4.2 Availability of detailed information on MAPs to be transported 1.4.3 Availability of special transit provision for prioritized plants
<b>Principle 2: Wild area conservation and management</b>	
2.1 Area management plan is prepared	2.1.1 Micro plan/working plan/management plan includes local wild MAP resources and their socio-economic importance 2.1.2 Planning is done in a participatory manner 2.1.3 Plan is in parity with other management plans of the adjacent or overlapping area(s), if existing 2.1.4 Periodical review of the plan 2.1.5 Local level availability (in local language) and compliance with the plan
2.2 Inventory, assessment and monitoring of MAP resources are planned for better management	2.2.1 Local-level inventory of MAP resources 2.2.2. Conservation status assessment of socio-economically important MAPs 2.2.3 Regular monitoring of MAP resources is carried out
2.3 Sensitive species and habitat conservation plan is prepared to identify synergies	2.3.1 Maximum conservation measures for species (i.e. <i>in situ</i> , <i>ex situ</i> ) are taken into consideration 2.3.2 Habitat/ecosystem conservation planning with due emphasis on livelihood issues exists 2.3.3 Local participation in conservation activity is ensured 2.3.4 Traditional practices related to conservation are encouraged
2.4 Conservation strategy and action plan is in place to maintain germplasm	2.4.1 Peoples Protected Areas, <i>ex situ</i> conservation, herbaria, seed material, etc.

(continues)

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<b>Principle 3: Responsible collection and use practices</b>	
3.1 Good collection practices are followed	<p>3.1.1 Identification of species to be collected and regulated or discontinued</p> <p>a. Endangered or critically endangered species: no collection</p> <p>b. Vulnerable species: management strategies are defined and recommended for implementation</p> <p>c. Threatened species and other categories: regulated collection</p> <p>3.1.2 Detailed map of collection sites</p> <p>3.1.3 Collection area is free from possible contamination sites/sources (settlements/roads/other)</p> <p>3.1.4 Collection instructions for each prioritized species (time, method, instruments) made based on available scientific information and traditional practices</p> <p>3.1.5 Allowable collection quantities are defined in consultation with stakeholders and as per the record available using reliable and practical measurement methods</p> <p>3.1.6 Wastage due to poor and destructive collection practices is minimized</p> <p>3.1.7 Local level availability of and compliance with the collection instructions</p>
3.2 Collection intensity and species regeneration are studied thoroughly before the limit is set	<p>3.2.1 Baseline information is prepared on population size distribution, structure (age classes) in the collection area, habitat details (topography, geology, soil, etc.)</p> <p>3.2.2 Age and size of plants for collection is defined (e.g. plant diameter, diameter at breast height, height, flowering and fruiting)</p> <p>3.2.3 Maximum allowed frequency of collection of prioritized species does not exceed the rate of replacement (regeneration)</p>
3.3 Quality assessment of the collected material	<p>3.3.1 Quality of collected material determined by nationally/internationally accepted standards</p> <p>3.3.2 Quality assessment done through accredited laboratories/organizations</p> <p>3.3.3 Information on availability of quality assessment and testing facilities at the local/regional level</p>
3.4 Storage, maintenance and traceability of collected raw material follow standard practices	<p>3.4.1 Adequate storage facility created or exists in nearby dry area (warehouse is spacious, ventilated; pest free and clean; collected material is placed in an orderly manner)</p> <p>3.4.2 Collected materials are properly labelled with details (local and scientific name of the material, part collected, place and date of collection, collector's code, date and time of storage, sealing date, etc.)</p> <p>3.4.3 Storage register is maintained and updated regularly</p>
<b>Principle 4: Benefit sharing and livelihood security</b>	
4.1 Processing and value addition of NWFPs/MAPs are strengthened and diversified to boost local economy	<p>4.1.1 Skill upgrading at the local level</p> <p>4.1.2 Availability of storage and processing facilities</p> <p>4.1.3 Local availability of microfinance/microcredit</p> <p>4.1.4 Establishment of market linkage</p>
4.2 Market facilitation for MAP resources is promoted through more diverse buyer-seller contact	<p>4.2.1 Availability of authentic market information</p> <p>4.2.2 Market development and promotional activity</p> <p>4.2.3 Transparency in chain of custody</p>
4.3 Price fixing and benefit sharing mechanisms are based on stakeholder interests as well as market demand	<p>4.3.1 Minimum price of raw and processed material is fixed on the basis of demand-supply assessment</p> <p>4.3.2 Profits are distributed among the stakeholders on the basis of well-defined benefit sharing mechanisms</p>
4.4 Worker safety and favourable working atmosphere are provided	<p>4.4.1 Adequate safety and precautionary measures taken</p> <p>4.4.2 Necessary equipment and training provided for collection and processing</p> <p>4.4.3 Compliance with relevant laws/regulations</p>



involving gatherers, field foresters, local traders, researchers and NGOs. Third, the framework was refined in regional workshops. It is now being implemented in the field in different parts of India including the four project states.

This standard would be used to certify both sustainable collection practices and the area where resources are being extracted sustainably. Certification would be carried out by independent agencies for greater market advantage, but internally communities (e.g. Joint Forest Management Committees and village governments) and local forest department units would have to show that they satisfy the requirements of sustainable management of MAP resources as part of working plan prescriptions.

The Ministry of Environment and Forests, the Government of India and the National Medicinal Plant Board have initiated a process for ensuring that certification can be implemented in the Indian context, while including options for further improvement and development. Wide stakeholder consultation and awareness raising on the positive and negative aspects of MAP certification are required before it can be implemented. The various stakeholders are expected to report on the applicability of the elements of the draft standard on the basis of available field data and on the information collection required to show compliance with the standard.

Most stakeholders have identified the costs of certification and the requirements for documentation as major constraints. The study therefore concluded that a certification system should emphasize field inspection and verification rather than requiring cumbersome documentation.

The authors would welcome constructive feedback.

## CONCLUSION

MAP certification is a new and still emerging concept in India. Despite the rich tradition of MAP use, it is necessary

to improve practices in line with well-defined environmental and social parameters as well as international norms. Drug manufacturers and exporters are the major consumers of wild raw materials; government initiatives are necessary to encourage them to use certified raw materials which may lead to a reputation for good resource management.

Considering the varied interests of multiple stakeholders, institutions that have been established to organize the MAP sector need to take a multidimensional approach to planning and management, competitive marketing strategies and flexible policies. Legal collection, resource management, raw material quality, market facilitation, traceability and transparency, should be the thrust areas for future research and development. Traditional practices have key importance in the setting and acceptance of standards. Certification is a participatory process and so is standard setting. Both primary collectors and end users have responsibilities in developing standards and complying with them.

The development of standards and their application for certification are quite different matters. Group or phased certification is recommended to help stakeholders eventually meet certification requirements and provide the detailed documentation needed. The gap between existing practices and the use of standard parameters may seem wide, but a phased adoption of good practices or “good steps” will help to narrow it. ♦



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