CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES
OF WILD FAUNA AND FLORA

Twenty-fourth meeting of the Plants Committee
Geneva (Switzerland), 20, 21 and 23-26 July 2018

Non-timber forest products

CITES IMPLEMENTATION FOR MEDICINAL PLANT SPECIES

1. This document has been submitted by the Secretariat in relation to agenda item 20.

Relevance of medicinal plant species: conservation, trade, health, livelihoods

2. Medicinal plants are a particularly prominent category of non-timber forest products (NTFP), with important overlaps with plant products used for nutrition, spices, cosmetics and decoration. Medicinal plants are, arguably, the largest among those categories. The number of medicinal plant species in use worldwide has been, tentatively, estimated in the range of 50,000 to 70,000 (Schippmann et al. 2006). In the 90's, some 3000 among those were reportedly traded internationally (Lange and Schippmann 1997), but more recent information does not seem to be available. This seems to be in line with the World Health Organization (WHO) estimates that the global market for medicinal plant products is substantial (WHO traditional medicine strategy 2014-2023).

3. Medicinal plant species might also be the most relevant class of NTFP to CITES, since approximately two thirds of the medicinal plant species are being sourced from the wild, and relatively few are cultivated at any large scale (Canter 2005, Schippmann 2002). An estimated 15,000 medicinal plant species (some 20%) are threatened through overharvesting, habitat loss, climate change, and illegal international trade (Schippmann et al. 2006). Sustainable harvest and legal trade are thus key to ensure the sustainable use of medicinal plants.

4. Medicinal plant species are likely to be amongst the most important NTFPs in trade. According to the WHO, the output of the Chinese *materia medica* amounted to USD 83 billion in 2012, an increase of more than 20% from the previous year. Annual expenditures on traditional medicine in the Republic of Korea were USD 7.4 billion in 2009, and out of pocket spending for natural products in the Unites States was USD 14.8 billion in 2008 (WHO traditional medicine strategy 2014-2023). The European market for herbal supplements and herbal medicines is currently worth USD 7.4 billion per year (Heinrich et al. 2018). The global trade in medicinal plant material in 2014 (customs code HS1211, as reported by COMTRADE) was valued at over USD 33 billion, among which 700,000 tons of exported material were worth USD 3.6 billion. From 2001-2014, annual average growth rates of 2.4% in volume and 9.2% in export value of medicinal plant material were observed. Important supply sources are: China and India from Asia; Egypt and Morocco from Africa; Albania, Bulgaria and Poland from Europe; and Chile and Peru from South America. The European Union, Japan and the USA are the major consumers (Vasisht 2016). However, none of these market studies distinguishes between cultivated and wild origins.

5. Due to their immediate relevance to local, national and global health, medicinal plants are also a highly salient class of NTFP. WHO estimates that 80% of the population across the developing world is depending on health services from traditional medical systems, and 50% of the population in the developed world uses alternative or complementary medicine (Bodeker 2005). Medicinal plants form the basis for these health care systems (Barata et al. 2016). Likewise, most active mechanisms used in modern pharmaceutic drugs were either directly or indirectly derived from by medicinal plants. That observation still holds despite the advent of synthetic and combinatorial chemistry. Of the 1073 new chemical entities belonging to the group of small

molecules that have been approved as drugs between 1981 and 2010, only 36% were purely synthetic, while more than the half were derived from or inspired by nature (Newman and Cragg, 2012).

6. Similarly, medicinal plants play a crucial role in rural livelihoods.

   a) The collection of wild medicinal plant species secures valuable income for many rural households, especially in developing countries, and it is an important factor in the source countries' local economies (Schippmann et al. 2006, Barata et al. 2016). Medicinal plant cultivation and gathering can play a vital role in the course of livelihood diversification for marginalized populations living in remote areas. However, this requires an integration of the respective production networks that allow the producers a fair and reliable income and do not endanger rare plant species (Pauls and Franz 2013).

   b) Many species have high cultural and religious significance to local populations, and frequently are a crucial element of social networks and exchanges that link communities with healers and elders as respected local leaders. Centuries or millennia of experience and experimentation have, furthermore, provided healers and elders with deep knowledge of plant characteristics, ecological requirements, and local plant population dynamics (Heinrich et al. 2018). Thus, local and traditional knowledge and networks determine the value attached to the species. They also provide potential pathways for identifying cultivation strategies or alternative ingredients, for reaching out to local populations, and for stipulating behavioural change (see **Annex 1** of this document).

7. Reflecting their sociocultural, economic and pharmaceutical relevance to livelihoods, intellectual property rights over medicinal plant resources were a driving impetus for supplementing the Convention on Biological Diversity (CBD) with the legally binding Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization (ABS). However, complementarities, gaps and potential conflicts between the Nagoya and CITES regulations, with regard to the use of medicinal plants and its impact on livelihoods, have not been paid due attention and warrant collaborative efforts between CITES and CBD.

Medicinal plant listings in CITES

8. As recognized in document PC23 Inf. 10, the term “medicinal plant” does not have an official (or working) definition under CITES; yet there are some useful definitions developed by WHO, the International Trade Centre (ITC) and the UN Food and Agriculture Organization (FAO), amongst others. In the absence of a consensus definition, PC23 Inf. 10 compared published lists of medicinal plants from literature to CITES Appendixes. It conservatively estimates the number of medicinal plants currently listed in CITES Appendices at 365. Among the 365 identified taxa, 351 are listed in Appendix II, 9 are listed in Appendix I, and 5 are listed in appendix III. However, the used literature sources are not comprehensive, and the number of CITES-listed plant species used for medicinal purposes is likely higher.

9. Of the 365 CITES listed taxa identified as medicinal plants:
   a) 254 are orchids or aloes;
   b) 47 are either cacti, or *Euphorbia* spp, or *Dalbergia* spp.
   c) Among the remaining 64 listings, all but 21 were listed in the years 1975-77, 1990-92, or 2000-05, suggesting that CITES attention to medicinal plants might have been high during these periods.

   Since the listings in a) and b) above were higher listings (family and genus) mainly included for trade in ornamentals or timber, it seems that relatively few species were included in the CITES Appendices because of trade in medicinal products (even though there certainly are exceptions, e.g. *Prunus africana*, *Taxus spp., Panax* spp., *Adonis vernalis*). Suggestions for the inclusion of additional species for this specific reason, taking into account the growing trade in such products, are currently made, inter alia for *Commiphora wightii, Paris polyphylla,* and *Fritillaria cirrhosa* (Cunningham et al. 2018a,b,c).

CITES – listed medicinal plants in international trade

10. With support from the Republic of Korea, and within the scope of Decisions 15.57 and 17.93 on combating wildlife cybercrime, the Secretariat researched e-commerce on Amazon and Ebay in the 365 CITES-listed medicinal plant species (PC23 Inf. 10). Key outcomes of the study were:

    a) Several hundred thousands of products containing (or claiming to contain) CITES listed medicinal plant species were found on sale on these two platforms

b) Hardly any of those offers mentioned applicable CITES regulations for cross-border trade

c) Particularly high product numbers were found for the following CITES-species:

Species	Source	Species	Source
Aloe spp.	eBay	*Guaiacum* spp.	Amazon
Aloe arborescens	eBay, Amazon	*Panax ginseng*	eBay, Amazon
Aloe ferox	eBay, Amazon	*Panax quinquefolius*	eBay, Amazon
Aloe perryi	eBay	*Cactaceae* spp.	eBay
Hoodia spp.	eBay, Amazon	*Opuntia ficus-indica*	eBay, Amazon
Rauvolfia serpentina	eBay	*Saussurea costus*	eBay
Orchis mascula	eBay	*Diospyros* spp.	Amazon
Phalaenopsis amabilis	eBay	*Euphorbia* spp.	Amazon
Vanilla planifolia	eBay, Amazon	*Euphorbia antisyphilitica*	eBay
Cistanche deserticola	eBay	*Prunus Africana*	eBay
Hydrastis canadensis	eBay, Amazon	*Aquilaria* spp.	eBay, Amazon
Cyclamen spp.	Amazon	*Nardostachys grandiflora*	eBay, Amazon
Picrorhiza kurrooa	Amazon	*Guaiacum officinale*	eBay, Amazon

d) A large portion of international e-commerce in CITES-listed medicinal plant products seems to occur outside the purview of the Convention, at a scale which is currently impossible to estimate.

11. The findings reported in document PC23 Inf. 10 are supported by scientific research. Hinsley et al. (2016) found considerable trade in orchids on social media platforms, many of which openly advertised specimens sourced from the wild. Sajeva et al. (2013) monitored 24 cacti sellers on an internet auction site over six months, and recorded sales of CITES-listed live plants that were successfully completed and for which they could identify the plant's country of origin and destination. They compared this information to export permits on the CITES trade data base. Although these report trade data, rather than individual permits, they should reflect the internet trade if export permits were applied for, as required for all such transactions involving CITES Parties. Their data set contained roughly a quarter of the cactus plants for which CITES permits were issued in 2010. There were large discrepancies in the number of plants for which permits were issued and the number of plants traded in online transactions. Their results suggest that only 10% of the plants traded were even potentially legal. Major discrepancies were also apparent in the number of species and number of importing and exporting countries between the online auctions and permits issued for that year.

12. The Secretariat notes that e-commerce of medicinal plants, as described in the previous paragraph, seems to bear similarity to orchid (PC24 Doc. 28) and rosewood (PC24 Doc. 29) trade chains, since it comprises innumerable numbers of retail products containing multiple mixtures of CITES-regulated ingredients in highly processed stages, which are hard to identify, come from different sources, and are, theoretically, require CITES trading permissions at several points in the processing and trading chain.

General characteristics of medicinal plant trade that warrant targeted attention by CITES

13. As the previous sections illustrate, assuring sustainable trade and management of wild medicinal plants has particular challenges that transcend individual species, such as:

a) High numbers of mostly wild sourced species in trade, endangering the populations of many species,

b) Economically substantial and quickly growing trade volumes and values,

c) An extraordinary diversity of highly processed products traded on e-commerce platforms, which are hard to trace, and entail an unknown but presumably substantial share of illicit trade,

d) Immediate relevance to health and livelihoods of the majority of the global population, which far exceeds utilitarian values attached to many other CITES-listed species,

e) Highly relevant local knowledge bases and networks, due to long-term, intense familiarity of local knowledge keepers with medicinal plant populations and their ecological characteristics, and due to the cultural and medical salience of many species, and

f) A demand side which is characterized by a high complexity of actors: ranging from a decentralized general population ordering products online, to traditional or alternative medical practitioners, to highly centralized structures dominated by the pharmaceutic industry.

CITES provisions for CITES-listed medicinal plants in international trade

14. The Secretariat notes that medicinal plants are currently not considered at the Plant Committee as a group of taxa by themselves, but species-specific regulation, subject to dedicated CITES Decisions or Resolutions, is ongoing on a continuous basis. Medicinal taxa which appear as species-specific agenda item at PC24 include:

    a) *Prunus africana*: Current focus is on methodologies for inventories (including the sampling design and the inventory data), sustainable harvesting techniques, monitoring and traceability systems, and perspectives in terms of developing plantations or agroforestry systems as a possible complementary means of sourcing bark in the wild (Decision 17.250, PC24 Doc. 20).

    b) Agarwood: Current focus on identification manuals, plantation programmes that integrate forest recovery programmes; and strengthening networks for sharing information on planting stocks, management, technologies, harvest and trade (Decisions 17.194, 17.197, Res. Conf. 16.10, Doc. PC24 17.2);

    c) *Osyris lanceolata*: Current focus is on reviewing and gathering further information on the conservation status of, trade in and use of *Osyris* species and look-alike species and, assessing their impact in the conservation status of *Osyris lanceolata*; assessing the data required to make non-detriment findings following the existing guidance; and to share and exchange data, information, intelligence and law enforcement measures, in combating illegal trade in the species (Decisions 16.153 and 16.154 (Rev. CoP17), PC24 Agenda item 23);

    d) Orchids: Current focus is on the revision of annotations for Appendix II orchids, with a view to whether certain finished products should be exempted from CITES regulation (Decision 17.318, PC24 Doc. 28). The secretariat notes that the trade patterns in cosmetic products seem to share many similarities with those described in the present document.

15. On a generic level, several resolutions stand out for their relevance to medicinal plant species as outlined in par. 13:

    a) Res. Conf. 10.19 (Rev. CoP14) on traditional medicines, stipulating to
    - work closely with groups of traditional-medicine practitioners and consumers in developing public education and awareness programmes towards the elimination of illegal use of endangered species, and developing awareness of the need to avoid over-exploitation of other wild species,
    - facilitate, encourage and investigate the further use in traditional medicines of alternative ingredients to specimens of threatened wild species, such as synthetic compounds and derivatives of less threatened species, ensuring that this does not lead to other species becoming threatened, and to
    - ensure that traditional medicines intended for domestic use are clearly marked as such and effectively prevented from being exported.

    b) Res. Conf. 13.2 (Rev. CoP14) on the sustainable use of biodiversity, highlighting in particular the Addis Ababa principles and guidelines 1-14, which focus on decision making and governance structures and emphasize systemic approaches, adaptive mechanisms and participation.

    c) Res. Conf. 10.4 (Rev. CoP14), 16.4 and 16.5) on synergies with the convention for biological diversity and other biodiversity-oriented conventions, in particular the Global Strategy for Plant Conservation, which are currently up for extension and re-definition for the post-2020 phase (PC24 Doc. 12).

    d) Conf. Res. 16.6 (Rev. CoP17) on livelihoods, which
    - directs the attention of parties to livelihood implications of international trade in CITES-listed species,
    - encourages parties to work with key stakeholder groups to design, implement and monitor effective strategies with regard to the implementation of CITES listings, and to
    - support livelihood options contributing to the conservation of wildlife as an integral part of the response to address illegal trade in wildlife.

e) Res. Conf. 16.7 (Rev. CoP17) on NDF's, which stipulates adaptive management, including monitoring as important considerations in the making of NDF's, and to base NDF's in resource assessment methodologies, which may include relevant knowledge and expertise of local and indigenous communities; consultations with relevant local, regional and international experts; and local knowledge on trade.

16. Comprehensive overviews of documents and guidance's on CITES with relevance to medicinal plants can be found on the CITES website and in section 1 of PC23 Inf. 10. At PC24, a pertinent lunchtime side event will be held at Wednesday, 25th of July, in room 7 of the Plants Committee's venue, to present and further discuss the content of this document, with a view to identifying positions, priorities and any other recommendations from concerned parties and other attending stakeholders.

Potential strategy and action lines to strengthen CITES regulation and implementation regarding medicinal plants

17. Based on the presented background and trade data, this paragraph outlines a potential Strategy on Medicinal Plants. Its potential objectives, activities, and action lines aim to improve CITES regulation and implementation regarding medicinal plant species. Preliminary priorities have been identified, considering the relevance and urgency of each potential action line, as follows: High (H) Highly relevant and urgent, Medium (M): intermediate relevance and urgency, Low (L): intermediate relevance but limited urgency. These suggestions will be presented for discussion and feedback at the side event, and might pave the way for a possible working document for consideration of the Standing Committee, and the 18th Conference of the Parties, as appropriate.

Potential objective	Potential activity	Potential action lines for discussion / preliminary priority	
1. Understand emerging e-commerce trade networks	Hire a consultant or contract an institution with pertinent expertise for in-depth analysis of e-commerce trade networks	I. Assess the findings of PC23 Inf. 10 to determine the illicit share of e-trade for high-priority species (e.g. those listed in par. 10c). II. Analyse the structure of supply networks, with a focus on identifying key players or "nodes", e.g. key producers, intermediate traders, or distribution platforms to end consumers. III. Analyse the structure of the demand side, with a focus on identifying influential key players or nodes, e.g. institutions influencing the demand for medicinal plant products in biomedical, traditional and alternative medical systems.	**H**
2. Strengthen enforcement of existing CITES regulations	Liaise with key supply players to raise awareness for CITES regulation of medicinal plants	I. Reach out to key players as identified in objective 1 action line II, to raise awareness for CITES regulation of medicinal plants. II. Collaborate with the Global Coalition to End Wildlife Trafficking Online, which brings together internet companies from across the world in partnership with wildlife experts at WWF, TRAFFIC the wildlife trade monitoring network, and the International Fund for Animal Welfare (IFAW) for an industry-wide approach to reduce wildlife trafficking online by 80% by 2020.	**H**
3. Reduce market demand for illegally sourced medicinal plant specimens	Identify and liaise with key demand side players to raise awareness of CITES regulation and assess alternative treatment options	Conduct workshops with key stakeholders identified in objective 1 action line III, in line with Res. Conf. 10.19 (Rev. CoP14) on traditional medicines. This could entail: I. Developing public education and awareness programmes towards the elimination of illegal use of endangered species, and developing awareness of the need to avoid over-exploitation of other wild species. II. With regard to high-priority species (e.g. those listed in par. 10c) to facilitate, encourage and investigate the further use of alternative ingredients to specimens of threatened wild species, such as synthetic compounds and derivatives of less threatened species, ensuring that this does not lead to other species becoming threatened.	**M**
4. Enable efficient and effective procedures for legal acquisition findings	Improve traceability systems	I. Collaboration with UNCTAD or other institutions with expertise in traceability systems. II. Focus on priority species (e.g. those listed in par. 10c). In collaboration with parties, consider developing pilot systems for traceability of medicinal plant products, taking into account work on BioTrade traceability of CITES listed medicinal and ornamental species, undertaken by UNCTAD under contract with the CITES secretariat (PC23 Inf. 05, PC23 Inf. 06, PC23 Inf. 07).	**M**

Potential objective	Potential activity	Potential action lines for discussion / preliminary priority	
		III. In line with Res. Conf. 10.19 (Rev. CoP14) this might entail that traditional medicines intended for domestic use need to be clearly marked as such and effectively prevented from being exported. IV. Achieve a working definition on "medicinal plants" (considering they represent a diverse artificial group), and pertinent product codes. V. Assess the general applicability of traceability systems to this group of taxa, based on the experience with pilot systems.	
5. Enable efficient and effective procedures for legal acquisition and sustainability findings	5.1. Focus CITES regulation on products close to the first point of harvest	I. Identify the main products of specimens in international trade (e.g. products of those species listed in par. 10c). II. Assess potential revisions of annotations (Decision 16.162 (Rev. CoP17) for these products, with a view to reducing administrative burden without endangering the sustainability of trade and the populations of concerned species.	**L**
	5.2. Consider certification approaches for trade chains, rather than regulating every single cross-border trade interaction	I. Analyse possible precedents and certification systems with a view to in how far they would be able to satisfy CITES criteria of ensuring legality and sustainability of international trade in medicinal plants. In particular, consider the FairWild standard, which was developed by TRAFFIC, WWF, IUCN, the German Federal Agency for Nature Conservation (BfN) and others, and involved extensive consultation with representatives from government, private sector, academia, NGOs, and certification agencies. The standard is based on the International Standard for Sustainable Wild Collection of Medicinal and Aromatic Plants (ISSC-MAP), produced by the IUCN-SSC Medicinal Plant Specialist Group, TRAFFIC the wildlife trade monitoring network, WWF Germany and the German Federal Agency for Nature Conservation (BfN), with support from IUCN Canada (see **Annex 2**). II. Explore means to use certification approaches to reduce administrative burden of CITES regulation in long and complex trade networks such as those of medicinal plants, orchids, and rosewoods. III. Identify possible legal and regulatory changes to the CITES framework would be needed to implement such certification approaches.	**M**
6. Support CITES implementation on the ground through increased attention to livelihood implications of CITES listings to local populations	6.1. Develop best practice case studies of linking CITES implementation with local governance mechanisms and livelihood considerations	I. Identify, in line with Conf. Res. 16.6 (Rev. CoP17) on livelihoods, potential for strengthening CITES implementation by assessing, addressing and mitigating the effects of CITES decisions on livelihoods. II. Use the methods to that end provided in the Handbook on CITES and Livelihoods (Part 1, Part 2), in particular during preparations of listing proposals, NDF's, and in efforts to establish sustainable management and monitoring mechanisms. III. Liaise with key stakeholder groups to design, implement and monitor effective strategies with regard to the implementation of CITES listings, taking into account the Addis Ababa principles and guidelines for sustainable use of biodiversity (Res. Conf. 13.2 (Rev. CoP14), which focus on decision making and governance structures and emphasizing systemic approaches, adaptive mechanisms and participation. IV. In line with calls made for the management and monitoring of *Prunus africana* (Cunningham 2016), review and use resources and experiences for participative and transdisciplinary approaches developed in academia (e.g. Hitziger et al. 2018). V. Support sustainable trade practices of medicinal plants that contribute to livelihoods, and that represent a conservation incentive, as an integral part of the response to address illegal trade in wildlife. VI. Submit best practice case studies of linking CITES with local governance mechanisms and livelihood considerations to the secretariat, for dissemination on the CITES website. VII. Hold workshops with Parties, in line with Res. Conf. 10.4 (Rev. CoP14), 16.4 and 16.5, to assess and promote the use of synergies in relevant tools and guidelines, case studies, access and benefit sharing, and other aspects of sustainable use of	**H**

Potential objective	Potential activity	Potential action lines for discussion / preliminary priority	
		biodiversity provided by the convention on biological diversity, which are outlined in PC24 Inf. 6, as well as from other relevant sources. VIII. Consider developing best practice case studies of linking CITES with local governance mechanisms and livelihood considerations in a framework similar to the CITES-EU project on "*Supporting sustainable management of endangered tree species and conservation of the African Elephant".*	
	2. In lieu of the post-2020 Strategic Vision, strengthen long term synergies with CBD in relation to medicinal plants	I. In line with Res. Conf. 10.4 (Rev. CoP14), 16.4 and 16.5, and in the process of post-2020 revisions of the CITES strategic vision (Decisions 17.18-17.21), strengthen synergies with CBD regarding common priorities related to livelihoods as outlined in PC24 Doc. 12, and PC24 Inf. 6. II. Within the framework of the MoU between both Secretariats, CITES and CBD could further identify in what form long-term collaborations are of interest to it, and whether it could form part of any follow-up to the present collaboration in the framework of the global strategy for plant conservation (PC24 Doc. 12).	**L**
7. Develop specific NDF guidance for medicinal plant species	Consider the specific characteristics of relevance to findings of legal acquisition and sustainable origin that are common to medicinal plant species	I. Review materials and guidance on NDFs that are currently available to the Parties, in line with Resolution Res. Conf. 16.7 (Rev. CoP17) on NDF's, and AC30 Doc. 10.1 / PC24 Doc. 10.1. II. Assess in how far existing NDF guidelines (such as the 9-step NDF guideline for perennial plants, the guidance for agarwoods (CoP16 Inf. 11), and snakes (AC29 Doc. 31.1) are sufficient to assess resources, monitoring and adaptive management of medicinal plants. If appropriate, it might identify gaps and needs. III. Develop an NDF guidance for medicinal plant species that draw on the findings from objectives 3 to 6, which might include relevant knowledge and expertise of local and indigenous communities; consultations with relevant local, regional and international experts; and local knowledge on trade. IV. Hold one or more dedicated expert workshops to develop and agree on new or updated materials.	**H**
8. Strengthen national MA/SA capacities	Assist national MA/SA agencies in implementing specific measures that strengthen their capacities to manage CITES-listed medicinal plant species and NTFP's	I. Develop materials to enable parties MA/SA authorities to manage CITES-listed medicinal plant species, and their particular characteristics (as outlined in par. 13 c-f), in line with Decisions 17.31-17.35 on capacity building, and drawing on the finding from objectives 3 to 7. II. Upload these materials on the CITES webpage and the CITES Virtual College to make them accessible to parties. III. Include specific content in the CITES Masters curriculum at the University of Andalucía. IV. Support national capacity building efforts specific to medicinal plants and NTFP's in a framework similar to that of the *CITES-EU project on "Supporting sustainable management of endangered tree species and conservation of the African Elephant".*	**H**

Contribution of local knowledge and practices to resource assessment

(source: International Standard for Sustainable Wild Collection of Medicinal and Aromatic Plants)

Methods	Contributions / advantages	Challenges
Overall process Participation of local resource users / collectors in resource assessment and management	• Motivates and stimulates interest of local users / collectors • Reduced need for professional field staff and time in field • Local employment opportunities	• Need appropriate equipment, training, and compensation • Literacy and numeracy obstacles
Situation analysis Participatory mapping	• Mapping collection area • Mapping resource distribution	• Interface with "official" area maps
Situation analysis, assessment design Participatory Rural Appraisal	• History and general trends of resource use, collection, harvest impacts • Prediction of likely impacts of harvest levels and practices • Causes and history of other non-collection disturbances	• Participation of local communities / collectors in deciding what questions are important • Making local / collector engagement worth their time and effort
Harvest impact assessment and monitoring Local user / collector observations to collect field data	• Resource users perceptions as to why scarcity has arisen • Identify alternative harvest practices • Reassessment of local decisions on land-use options	• Setting quotas and human carrying capacities if appropriate • Development (or reassessment) of local rules which set limits on who or how many people will harvest from a set area and on harvest methods
Yield studies and monitoring	• Greater awareness of resource limits compared with demands • Change in harvest methods more readily understood and adopted.	• Use of local systems of measurement (with calibration to a more universal standard) • Development or reassessment of local rules / limits on harvest (e.g., number of harvesters per area)
Regeneration studies and monitoring	Local knowledge indicators • Change in distribution • Change in time required to collect a specific quantity	• Locate plots where a long history of collection has changed population structure, and at the resource frontier where the least collection has occurred.

Field work, record keeping
Use of field computers / palm pilots to record observations
	• GPS-linked data/records
	• Can overcome literacy and numeracy obstacles
	• Facilitates quick and easy data processing, storage, retrieval for analysis:
	  o Large amounts
	  o Over large areas
	  o Over long time
	• Can also be low-tech, e.g., dbh rulers using visual rating system and size-class symbols rather than a number scale.
		• High cost of equipment vs paper
		• Need strong technical support
		• Regular access to electricity, batteries, main computer to download data
		• May be most appropriate for conservation programmes and rural development projects
		• Use symbols or icons rather than numbers. E.g., icons need to illustrate rating systems, e.g., of harvest impacts

Source: Cunningham (2001)

ISSC-MAP principles and criteria

(source: International Standard for Sustainable Wild Collection of Medicinal and Aromatic Plants)

SECTION 1: WILD COLLECTION AND CONSERVATION REQUIREMENTS
Principle 1. Maintaining Wild MAP Resources Wild collection of MAP resources shall be conducted at a scale and rate and in a manner that maintains populations and species over the long term.
1.1 Conservation status of target MAP species The conservation status of target MAP species and populations is assessed and regularly reviewed.
1.2 Knowledge-based collection practices MAP collection and management practices are based on adequate identification, inventory, assessment, and monitoring of the target species and collection impacts.
1.3 Collection intensity and species regeneration The rate (intensity and frequency) of MAP collection does not exceed the target species' ability to regenerate over the long term.
Principle 2. Preventing Negative Environmental Impacts Negative impacts caused by MAP collection activities on other wild species, the collection area, and neighbouring areas shall be prevented.
2.1 Sensitive taxa and habitats Rare, threatened, and endangered species and habitats that are likely to be affected by MAP collection and management are identified and protected.
2.2 Habitat (landscape level) management Management activities supporting wild MAP collection do not adversely affect ecosystem diversity, processes, and functions.
SECTION II: LEGAL AND ETHICAL REQUIREMENTS
Principle 3. Complying with Laws, Regulations, and Agreements MAP collection and management activities shall be carried out under legitimate tenure arrangements, and comply with relevant laws, regulations, and agreements.
3.1 Tenure, management authority, and use rights Collectors and managers have a clear and recognized right and authority to use and manage the target MAP resources.
3.2 Laws, regulations, and administrative requirements Collection and management of MAP resources complies with all international agreements and with national, and local laws, regulations, and administrative requirements, including those related to protected species and areas.

Principle 4. Respecting Customary Rights

Local communities' and indigenous peoples' customary rights to use and manage collection areas and wild collected MAP resources shall be recognized and respected.

4.1 Traditional use, access rights, and cultural heritage

Local communities and indigenous people with legal or customary tenure or use rights maintain control, to the extent necessary to protect their rights or resources, over MAP collection operations.

4.2 Benefit sharing

Agreements with local communities and indigenous people are based on appropriate and adequate knowledge of MAP resource tenure, management requirements, and resource value.

SECTION III: MANAGEMENT AND BUSINESS REQUIREMENTS

Principle 5. Applying Responsible Management Practices

Wild collection of MAP species shall be based on adaptive, practical, participatory, and transparent management practices.

5.1 Species / area management plan

A species / area management plan defines adaptive, practical management processes and good collection practices.

5.2 Inventory, assessment, and monitoring

Management of MAP wild collection is supported by adequate and practical resource inventory, assessment, and monitoring of collection impacts.

5.3 Transparency and participation

MAP collection activities are carried out in a transparent manner with respect to management planning and implementation, recording and sharing information, and involving stakeholders.

5.4 Documentation

Procedures for collecting, managing, and sharing information required for effective collection management are established and carried out.

Principle 6. Applying Responsible Business Practices

Wild collection of wild MAP resources shall be undertaken to support quality, financial, and labour requirements of the market without sacrificing sustainability of the resource.

6.1 Market / buyer specifications

The sustainable collection and handling of MAP resources is managed and planned according to market requirements in order to prevent or minimise the collection of products unlikely to be sold.

6.2 Traceability

Storage and handling of MAP resources is managed to support traceability to collection area.

6.3 Financial viability

Mechanisms are encouraged to ensure the financial viability of systems of sustainable wild collection of MAP resources.

6.4 Training and capacity building

Resource managers and collectors have adequate skills (training, supervision, experience) to implement the provisions of the management plan, and to comply with the requirements of this standard.

6.5 Worker safety and compensation

MAP collection management provides adequate work-related health, safety, and financial compensation to collectors and other workers

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