



FACTSHEET 1

Towards sustainable herbal medicine

WHAT DOES 'SUSTAINABLE' MEAN?

At least 35,000 plant species are used medicinally around the world, most of them in traditional medicine systems, some of which are very localised. Companies producing herbal medicine need to be aware of the balance that has to be maintained in all aspects of production and marketing of Medicinal and Aromatic Plants (MAPs). Sustainability is a long-term and wide-ranging concept that requires producers to look to the future as well as the present, and globally as well as locally. Plant populations need to endure despite harvesting, and markets need to be managed so that that demand does not cause the local extinction of species or further impoverishment of harvesters who are often already economically marginalised within communities (See factsheet 2).

Today, MAPs are threatened in Europe by over-exploitation, destructive harvesting techniques, and habitat loss and alteration, largely as a result of changing agricultural practices during the past 100-200 years. Their genetic diversity is also being diminished – partially, at least. An additional impact in former Eastern Bloc countries has been the deregulation of state-controlled commerce and resulting increases in wild-collection. Some 150 species were reported to be threatened in at least one European country as a result of over-collection from the wild (Lange 1998), including pheasant's eye (*Adonis vernalis*), bearberry (*Arctostaphylos uva-ursi*), arnica or mountain tobacco (*Arnica montana*), Iceland moss (*Cetraria islandica*), round-leaved sundew (*Drosera rotundifolia*), yellow gentian (*Gentiana lutea*), liquorice (*Glycyrrhiza glabra*), bogbean (*Menyanthes trifoliata*), species collected for salep (Orchidaceae), *Paeonia* spp., *Primula* spp., butcher's broom (*Ruscus aculeatus*), *Sideritis* spp., and species collected as thyme and oregano (*Thymus*, *Oreganum* and *Thymbra* spp.) (Lange 1998).

Looking further afield, well-known North American plants at risk of extinction in the wild include some species and varieties of echinacea, Goldenseal (*Hydrastis canadensis*) and American ginseng (*Panax quinquefolium*).

For generations, many traditional rural societies have harvested from the wild at a sustainable level, but changes in these societies resulting from population growth, in-migration, conversion of land to agriculture, improved transport and accessibility to markets, as well as the global popularity of herbal medicine today, are leading to higher levels of harvesting that not only threaten species' survival but also local livelihoods. Jatamansi (*Nardostachys grandiflora*), which grows in the Himalayas and is extensively traded in Asia, is valued for the medicinal and aromatic properties of its rhizomes. Due to its popularity today, there is evidence that over-harvesting has caused a decline of this species in many regions (Mulliken 2000). It is hard to reverse such a decline rapidly, and in the meantime local people lose vital income and market share.

HOW DO WE KNOW WHAT IS SUSTAINABLE?

There are many factors that need to be taken into account in assessing sustainability, including ecological, social, cultural and economic variables. Legal and policy aspects are also significant, given that regulations and laws can help keep harvesting levels sustainable.

It is necessary to understand the ecology of a species to assess how it should be harvested and how much can safely be taken each year without causing a decline in its population. To establish a sustainable yield requires knowledge of a species' habitat and climatic requirements, its growth habit and rate, and its methods of regeneration. Detailed studies are needed to establish with scientific certainty a species' resilience to harvesting, often requiring several years of ecological monitoring. Money and expertise may not be available for such efforts. Instead, it may be more practical to predict a species' vulnerability to over-harvesting in a particular area using a combination of indicators such as the parts harvested; who uses the plants (which may be difficult to determine if there are multiple users, both local and commercial); rough ideas of the amounts traded from a particular area; and changes in amounts collected, including prices paid (Cunningham 2001).

If a medicinal plant is growing in the wild, harvesting needs to be at such a level that the plant population can continue to renew itself. The part of the plant harvested can have a major influence on the chances of its survival. If roots or bark are taken, the damage needs to be at a level that does not kill the plant or tree. For instance, plants with a single tap-root, such as the slow-growing high Himalayan plant *Saussurea gossypiphora*, will be killed when roots are harvested, whereas plants with rhizomes (for example *Neopicrorhiza scrophulariiflora*) will not necessarily be killed if only parts of these are taken. It is necessary to understand the growth patterns of a species to know how best to protect it. Selective or rotational harvesting can give plants time to regenerate.

Rates of growth and reproduction are critical factors in maintaining sustainable populations. Slow-growing plants such as many trees may not produce seed until they are at least 10 years old. If the seeds are required for medicinal purposes, this can be a deterrent to cultivation, since farmers could have to wait long to get an economic return on their investments. *Baillonella toxisperma* is a vast slow-growing tree, found in the Congo Basin, with oily seeds that are highly valued. It takes more than 20 years to reach reproductive maturity, and it is thought that fruits must pass through the gut of an elephant before the seed can germinate (Plenderleith and Brown 2001).

Climate also affects a species' rate of reproduction: mountain and desert plants need longer times for replacement than species growing in more equable conditions, and should be harvested with care. For example, Iceland moss (*Cetraria islandica*), a slow-growing lichen, is at risk in the wild from over-harvesting (Lange 1998) because it is very slow-growing and susceptible to disturbance.

It is essential to maintain a balance between production and demand: a rapid rise in demand for a herb may be a threat to its sustainability. Additionally, a surge in the popularity of a MAP may impact on other uses by local people. A plant which has local traditional or ceremonial uses may decline in availability if it becomes widely traded. Even though Kava kava (*Piper methysticum*) is traded from cultivated sources in the Pacific islands, demand recently became so great that in some places it is becoming difficult to find for local ceremonial uses (Laird 1999).

WHAT CAN BE DONE TO ENSURE CONSERVATION AND SUSTAINABILITY OF MAPS?

Conservation strategies need to be multi-faceted and focused if sustainability is the goal. Many factors at all levels in trade-chains, from the sites of growth to end-markets, have to be taken into consideration.

“Focused” means that each aspect has to be handled with individual attention. This calls for collaboration between communities, manufacturers, governments and the international community. The controls asserted by CITES go some way to providing an international framework, but these are insufficient on their own (see factsheet 6: Law).

To ensure conservation and sustainable use of MAPs, the major areas of focus are *in situ* and *ex situ* protection; enhancement of cultivation efforts; improved management of wild populations; public awareness; trade monitoring; national and international legislation; law enforcement; regulation; better information about wild-harvested plants; and certification of plant material from sustainable sources (Lange 1998a).

Both *in situ* and *ex situ* conservation have roles to play. *In situ* conservation measures can be incorporated into management systems for wild populations. Understanding the ecology of species is invaluable for developing sustainable harvesting techniques, including determination of the amounts that may be collected.

Only secure rights to land or collection of MAPs, combined with appropriate local management systems, can enable the harvesting controls needed to keep populations at a sustainable level. Otherwise, poverty and insecurity about the ownership of land and resources will lead to over-exploitation of vulnerable species, not least because of high commercial demand. If access to markets is improved, this will cause pressure on species unless suitable systems of local management are in place. Collectors and growers will often benefit from training in post-harvest treatment, improving the quality of material and cutting down on wastage.

Demonstration gardens can raise awareness of conservation issues among the end-users of MAPs. Botanic gardens have much to offer. They are visited by 150 million people annually worldwide and have great opportunities to mount themed displays and provide information packages – powerful tools when used in conjunction with the physical experience of seeing and smelling living plants. Visitors to the Chelsea Physic Garden in London can follow a thematic trail entitled *Rare plants, endangered peoples, lost knowledge*, and they can visit an ethnomedical Garden of World Medicine (Minter 1998). *Ex situ* conservation of genetic variety is best achieved through the use of back-up collections in botanic gardens and seed banks, complementing nature reserves established to conserve wild stocks (for example Medicinal Plants Conservation Areas and Production Areas, which are being tried in southern India).

Cultivation can take the pressure off wild stocks, but it is not a universal panacea. (see factsheet 2). Some species are relatively easy to cultivate in the country of origin or elsewhere, but others are not. Goldenseal (*Hydrastis canadensis*) takes between four and six years to mature, which is a long time for poorer farmers to wait for financial returns, especially given uncertainties about future market prices ([hyperlink to Goldenseal Fact Sheet](#)). Cultivation of MAPs as crops can

make it easier to develop improved strains, the subsequent growing of which can reduce the need for wild collection (BGCI factsheet).

Increased exchange of information is desirable between stakeholders in MAPs. For example, information on methods of cultivation or for improving the sustainability of wild harvests are useful for those manufacturers who genuinely work to become more responsible partners (Srivastava, 2000). TRAFFIC-Europe has carried out a feasibility study on the establishment of a European MAP information centre (Srivastava 2000), which could serve as a focal point for collecting and dissemination information relevant to conservation and sustainable use of MAPs.

Substitution by a different species with the same constituents can take pressure off a vulnerable species (e.g. *Calendula officinalis* or *Sambucus nigra* as a substitute for Goldenseal, *Hydrastis canadensis*; Behrens 2001). Different species are already frequently used for the same remedy in different places and by different cultures.

Self-regulation by manufacturers of herbal products is much needed as a first step towards independent certification (e.g. FSC, Organic and Fair Trade). This could involve asking producers or wholesalers for proof of origin and of how much was harvested from a particular area (see factsheet 4).

There should be more awareness and enforcement of national and international laws and conventions relating to the intellectual property rights of local and indigenous people concerning the uses of plants as medicines (see factsheet 6). The Convention on Biological Diversity calls for respect for the knowledge of local and indigenous people, and fair and equitable arrangements to share benefits when this knowledge contributes to new scientific advances or commercial products (Mulliken & Honnef 2000). This helps socio-economic and cultural sustainability.

There is a need for new government policies to recognise the contributions of medicinal plants to healthcare in many countries. There has already been considerable progress, as in China and India. A more holistic approach to the development of healthcare systems is to be encouraged, extending right back to the places of production of MAPs, not only to ensure their conservation and sustainable harvest, but also the quality of herbal products produced.

REFERENCES

Behrens, J. (2001) Can the utilisation and conservation of medicinal plants coexist? *European Journal of Herbal Medicine*, Vol. 5 Winter/Spring

BGCI Factsheet. Plants as medicine. Botanic Gardens International, Richmond, UK.

Cunningham, A.B. (2001) *Applied Ethnobotany*. Earthscan Publications Ltd, London.

Foster, S. (2001) Vietnamese ginseng: a rare species of *Panax*. *HerbalGram* 52: 50-54.

Hurlburt, D. (1999). Endangered echinacea: what threat, which species, and where? www.plantsavers.org/newsletter/summer1999/ee.html.

Kuipers, S.E. (no date). 'Trade in medicinal plants'. Natural Medicine Marketing, London.

- Laird, S. A. (1999). The botanical medicine industry. *In* 'The commercial use of biodiversity: access to genetic resources and benefit-sharing' (K. ten Kate and S. A. Laird, eds.), pp. 78-116. Earthscan, London.
- Lange, D. (1998). 'Europe's medicinal and aromatic plants: their use, trade and conservation'. Traffic Europe / International, Cambridge UK.
- Minter, S. (1998). Education for sustainable medicine. *In* 'Medicinal plant trade in Europe: conservation and supply' (TRAFFIC, ed.).
- Mulliken, T. (1999). An overview of medicinal plant activities in TRAFFIC. *TRAFFIC Dispatches* 12, 6-7.
- Mulliken, T. A. (2000). Implementing CITES for Himalayan medicinal plants *Nardostachys grandiflora* and *Picrorhiza kurrooa*. *In* 'TRAFFIC Bulletin', Vol. 18, pp. 63-72.
- Mulliken, T., and Honnef, S. (2000). Over 20 organisations declare support for the conservation of natural medicinal resources. *TRAFFIC Dispatches* 15, 4.
- NIMH (2001). 'European Journal of Herbal Medicine'. National Institute of Medicinal Herbalists.
- NIMH (2002). Herbal medicine and conservation. National Institute of Medicinal Herbalists.
- Pain, S. (2001). The Countess and the cure. *New Scientist*. 15 September 2001, 44-5.
- Pierce, A. (2001). 'Natural Products Expo East: Strategy meeting with TRAFFIC, Herb Research Foundation and Yellow Creek Botanicals'. WWF-US, Washington DC.
- Plenderleith, K. and Brown, N. (2001) '*Baillonella toxisperma* Pierre: a state of knowledge review'. Full report: [http://carpe.umd.edu/products/PDF_files/Report – Plenderleith.pdf](http://carpe.umd.edu/products/PDF_files/Report%20-%20Plenderleith.pdf)
- Sheldon, J.W., Balick, M. and Laird, S.A. (1997) 'Medicinal Plants: can utilisation and conservation co-exist?' *Advances in Economic Botany* 12. New York Botanical Gardens Scientific Publications Department, New York.
- Srivastava, R. (2000). Studying the information needs of medicinal plant stakeholders in Europe. *TRAFFIC Dispatches* 15, 5.
- TRAFFIC (1998). Medicinal plant trade in Europe: conservation and supply. *In* 'First international symposium on the conservation of medicinal plants in trade in Europe'. TRAFFIC Europe, Royal Botanic Gardens Kew.
- TRAFFIC (1998a). 'Europe's medicinal and aromatic plants: their use, trade and conservation - executive summary'. TRAFFIC International, Cambridge.
- TRAFFIC (1998b). 'Searching for a cure: conservation of medicinal wildlife resources in East and Southern Africa - executive summary'. TRAFFIC International, Cambridge.
- TRAFFIC (1998c). 'American ginseng: the root of North America's medicinal herb trade - executive summary'. TRAFFIC International, Cambridge.