MEDICINAL PLANTS IN INTERNATIONAL TRADE: CONSERVATION AND EQUITY ISSUES

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Summary

Plants and other natural products play a significant role in traditional, botanical, and pharmaceutical medicine. The international trade of species for botanical or pharmaceutical markets raises distinct conservation and equity issues that are the main subject of this chapter. Traditional medical systems are diverse and vary significantly by region and community. Some traditional medical systems serve growing urban populations or draw upon species from wide geographic areas, and can place pressure on wild populations, but many involve the harvest and use of only locally-available species, with minimal impact. International botanical medicine markets are primarily fed by raw material traded as a bulk commodity, purchased by companies and consumers remote from where species are harvested, as part of markets subject to 'booms' and 'busts'. Despite increasing industry interest in cultivated material, the result is that species in these markets are often harvested unsustainably, and there is limited awareness of new ethical and legal obligations associated with accessing traditional knowledge. Pharmaceuticals are usually synthesized or starting material is cultivated, but in some cases the harvest of wild plants for research and manufacturing

has created pressure on species. Given the high value of pharmaceutical drugs, and the cost of drug discovery and development, this industry tends to invest heavily in reliable raw material supplies. Attention from policy-makers has focused in recent years on how genetic resources and traditional knowledge are accessed while 'bioprospecting' for new leads, and how benefits from commercialization are shared.

1. Introduction

Traditional, largely plant-based, medical systems provide primary healthcare to more than 75% of the world's population. These medical systems, of varying scale and formality, have developed over hundreds, or thousands, of years through complex and dynamic interactions between people and their environment. At the same time, medicinal plants feed large international markets for botanical medicines, and—along with microorganisms and other natural products—are the origins of many of our pharmaceutical drugs. While most of the species found in international markets grow from traditional medical systems and knowledge, the commercial trade and international consumption of these species raise conservation and equity issues that are distinct from those of traditional use.

Following a brief review of the conservation and equity issues associated with medicinal plant use and trade, this chapter will look more closely at these issues in the international botanical and pharmaceutical sectors. For each, we will briefly review the market for and use of natural products, the use of traditional knowledge, and the conservation implications of raw material sourcing.

2. Conservation and Sustainable Use of Medicinal Plants

Traditional medical systems, and local and regional trade of species, are extremely diverse and vary significantly by region and community. Many traditional medical systems make use of species that are locally, and sustainably, harvested and used as part of well-established subsistence medical practices. Other traditional systems serve growing urban populations, or—like Traditional Chinese Medicine (TCM) and Ayurveda—incorporate species with diverse geographic origins that are part of complex trade networks, with the result that pressure is often brought to bear on wild populations. Although the diversity of species in international trade is low compared with that consumed or traded locally, international botanical medicine markets are fed by raw material largely traded in bulk as commodities. As such, these markets can place enormous burdens on wild resources which are remote from consumers, and are often consumed outside of the cultures from which their use originated. Pharmaceuticals are usually synthesized or starting material is cultivated, but in some cases harvesting of plant material from the wild for research and manufacturing has created pressures on species.

Although there is enormous diversity in each case, a common suite of market, legal, socioeconomic, cultural, and ecological features combine to create conditions that promote or discourage sustainable species management and harvest. Of most immediate impact is the strength of the market for species, with high demand of the kind exerted by

international 'boom' markets, or growing urban centers, placing a great deal more pressure on species and local management strategies than subsistence traditional use. Socioeconomic factors like widespread rural poverty or unemployment then create strong local incentives to 'mine' resources, particularly in areas where customary controls over the management and harvest of wild species have broken down and statutory laws are weak or confusing.

Ecological factors are also central to the sustainability of harvests and species management. At the habitat level, widespread degradation and destruction results in sometimes dramatic reductions in the availability of species. At the species level, certain ecological qualities make sustainable harvests and domestication a great deal more difficult, and species more vulnerable, including those which are slow-growing and slow to reproduce, with limited distribution and specific habitat requirements. Additionally, the type of plant form and the part which is used play a central role in the sustainability of wild harvest. For example, the harvest of leaves, seeds or fruits can have less impact on individuals than the harvest of bark, roots, bulbs or the whole plant. And although poorly monitored, concerns are increasingly raised about genetic erosion of species over-harvested for many years, particularly from areas with rapidly declining natural habitats.

For the most part, concerns associated with medicinal plant conservation focus on species. Fourteen plant species have been listed on the Appendices to the Convention on International Trade of Endangered Species of Wild Flora and Fauna (CITES) as a result of concerns expressed about international trade as medicinals. Of roughly 50,000 medicinal plants worldwide, it is estimated that at least 4000 are threatened..

Destructive medicinal plant harvesting can impact more than the species harvested, however. In some cases destructive harvesting of individual or multiple species in conserved areas, e.g. widespread ring-barking of a tree, can change the forest structure and lead to an influx of invasive species. Intensive harvesting of reproductive propagules (fruit and seeds) might result in shortfalls in recruitment and changes in the structure of wild populations.

Conservation and sustainable use of medicinal plants involves more than ameliorating negative impacts on species and habitats, however. Medicinal plants have also contributed in significant, if often indirect, ways to broader ecosystem conservation. At an international level, medicinal plants have generated popular interest in and support for rainforest and biodiversity conservation, and at a local level they have spurred interest on the part of communities to engage with conservation and sustainable management of natural habitats.

Medicine and health are central concerns for people everywhere. A range of strategies have been employed in recent decades to build upon this interest and address conservation issues associated with medicinal plants. These include international and national policy processes; programs to support *in situ* conservation of species both within and outside conservation areas; *ex situ* conservation in botanic gardens, seed banks, and community gardens; education and outreach programs; development of sustainable management strategies for wild populations; and cultivation of species in

high demand. These programs are often designed to address the dual objectives of improved local livelihoods, and species and habitat conservation.

At the same time, a range of approaches have encouraged companies and consumers to purchase raw material and products that are sustainably and equitably produced and harvested. These include certification, corporate and industry association policies, 'green' brokers of raw material, and direct and longer-term partnerships between buyers and producers of raw material. These strategies address the addition of a new suite of players—e.g. companies along the chain of custody, consumers, overseas governments—that internationally-traded medicinal plant material involves, as well as the commercial (rather than traditional) nature of resource use. They also address issues unique to commodity-based trade including the scale of demand; boom-bust market cycles; a tendency for companies to mine resources; and an extreme dislocation between consumers of raw material and finished products on the one hand, and producers and harvesters on the other.

3. Equity Issues in the Medicinal Plant Trade

In addition to issues associated with the sustainability of resource harvest and management, medicinal plants in trade raise issues of equity and what are commonly referred to as 'intellectual property rights'. These include the relationships associated with sourcing raw materials, such as the ways benefits are distributed along the chain of custody (e.g. how much harvesters and producers are paid, compared with others along the chain), the working conditions of producers and harvesters, and the fairness of supply agreements (with longer term commitments at a fair price more likely to provide significant benefits for producers and harvesters). 'Intellectual property rights" issues relate to how traditional knowledge is accessed and used, including whether holders of traditional knowledge provide prior informed consent for its use, the terms under which knowledge is provided, and the nature and extent of benefits received by holders of traditional knowledge.

Equity and intellectual property issues associated with medicinal plants are most acute in cases where resources are harvested for commercial trade, and traditional knowledge is used to develop, process, and market commercial botanical and pharmaceutical products to consumers. Ethnopharmacology and related disciplines, by combining the study of traditional medical systems and scientific methods that identify, isolate and characterize active compounds responsible for bioactivity, often provide a bridge between traditional and commercial industrial use of medicinal plants. As a result, it is critical that ethnopharmacologists and other researchers follow codes of ethics and research guidelines that formalize their legal and ethical obligations to the traditional knowledge holders with whom they work (see *Professional Ethics and Ethnopharmacology*).

4. The Botanical Medicine Industry

4.1. Overview of the Market

The global market for 'supplements' includes vitamins and minerals, herbs and botanicals, and sports, homeopathic and specialty products, and was valued at more than $50 billion for 2002. The botanical segment of this is roughly $20 billion. In addition, the natural personal care sector had global consumer sales of close to $14 billion in 2002, and 'functional foods and drinks', some of which contain botanical ingredients, had global markets of more than $50 billion. USA, Europe and Japan account for more than three quarters of the global supplements market. While growth rates for markets in some regions have declined from highs in the 1990s, demand for botanicals continues to be strong (Table 1).

REGION	Vitamin and minerals	Herbs/ botanicals	Sports, meal, homeopathy and specialty	TOTAL supplements
North America	7.95	4.6	6.2	19
Europe	6.0	6.6	2.6	15.5
Japan	3.3	2.4	1.4	7.0
Asia	1.6	3.6	1.2	6.4
Australia/NZ	.3	.2	.07	.5
Latin America	.7	.3	.3	1.3
Africa	.2	.09	.08	.34
TOTAL	20.3	17.7	12.4	50.4

Source: Nutrition Business Journal, 2003. NBJs Supplement Business Report 2003. Penton Media Inc., San Diego, CA.

Table 1. Global nutrition industry, 2001.

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Biographical Sketch

Sarah Laird has worked in the field of forest and biodiversity conservation since 1989. In part her work has focused on building equity into the genetic resources trade, and the development of policies to guide 'access and benefit sharing' under the Convention on Biological Diversity. Her recent publications in this field include *Biodiversity and Traditional Knowledge: Equitable Partnerships in Practice* (2002) and *The Commercial Use of Biodiversity: Access to Genetic Resources and Benefit-Sharing* (1999). Sarah also undertakes and manages research and applied projects on non-timber forest products (NTFPs). Publications in this area include: *Sustainable Botanicals: In Search of Comprehensive Standards for Non-Timber Forest Products in the Botanicals Trade* (2003); *Tapping the Green Market: The Management and Certification of Non-Timber Forest Products (2002);* and *Medicinal Plants of the Limbe Botanic*

Garden (1996). Since 1997, Sarah has undertaken ethnobiological research around Mt. Cameroon with Bakweri and other groups living in the area. This project examines change and diversity in non-timber forest product use by local groups, and the factors that influence resource management choices, and local perceptions of the environment. Sarah received a BA in History from McGill University, and a MSc in Forestry from the University of Oxford. She is currently a part-time doctoral student in the Department of Anthropology at University College London.