

Medicinal Plants and Phytomedicines: Challenges and Opportunities

Introduction

Information relating to medicinal plants and traditional medicine can be found in documents and databases aimed at readers in a wide range of disciplines including botany, ecology, chemistry, medicine, veterinary science, etc. However there are few publications reporting current work or reviewing and analysing recent advances. Access to relevant information by the public, decision makers and local communities is still very limited.

The Convention on Biological Diversity, an international treaty that has been signed by more than 160 member states of the United Nations provides an international legal framework for the conservation of biological diversity including access to and exchange of genetic materials. While many different approaches are being tried to minimize the loss of biodiversity, the reduction of habitat loss and its accompanying loss of biocultural diversity are still unfortunately some way off.

The need for internationally agreed methodologies for giving effect to the equity provisions of the Convention on Biological Diversity (CBD) is now widely recognized. The issue of benefit sharing has received considerable attention during the last decade. Many developing countries are behind the rest of the world in the development of national policies with respect to access to genetic resources and trade in medicinal plants. Appropriate strategies to increase awareness of policy makers and donors about the need for sustainable use and conservation medicinal plants and traditional medicine, can complement research efforts aimed to achieve this objective.

Article 15 of CBD recognizes that "States have sovereign rights over their own biological resources". It also recognizes "the close and traditional dependence of many indigenous and local communities embodying traditional lifestyles on biological resources, and the desirability of sharing equitably benefits arising from the use of traditional knowledge, innovations and practices relevant to the conservation of biological diversity and the sustainable use of its components".

Article 8(j) of the Convention on Biological Diversity (CBD) calls on the Contracting Parties to respect, preserve and maintain the knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles. It also calls for the equitable sharing of benefits arising from the utilization of such knowledge, innovations and practices. The issue of integrating equity principles in benefit sharing arrangements has been under the consideration of the Contracting Parties (COP) since the 3rd meeting of COP held at Buenos Aires in 1996.

Traditional medicine, in the estimate of the World Health Organization is used by up to 80% of the population of most developing countries. These plant-based medicines are used for primary health care needs. Between 25-50% of modern

drugs are derived from plants. Demand for medicinal plants is increasing in both developing and developed countries. At the same time, the bulk of the material traded still derives from wild-harvesting. Only a very small number of species are cultivated.

Herbal medicines and traditional healers are receiving attention from mainstream health officials and international medical research and training institutions as governments confront the high cost and inefficiencies of official health programmes .

There is growing recognition of the need for increased efforts to produce medicines from plants in the South. A number of international organizations now support projects and programmes in this area. There is still a need for substantial support at the national level and regionally to promote medicinal plants, traditional medicine and ethnopharmacology, and to assure that biological resources are being harvested at a sustainable level.

Indigenous Knowledge, Bioprospecting and Benefit Sharing:

The absence of an internationally agreed methodology for sharing economic benefits from the commercial exploitation of biodiversity with the primary conservers and holders of traditional knowledge and information is leading to a growing number of accusations of biopiracy committed by business and industry in developing countries. Biodiversity in both developing and developed countries has been accessed for a long time, for various purposes, by outside researchers, private companies as well as local communities, with little or no returns to conservation activities.

Bioprospecting has been practised for many years in different forms but in more recent times in particular with the development of CBD, the issue of sharing of benefits arising from bio-prospecting has attained significance.

However, certain critical issues remain unresolved, particularly in relation to how to go about legalizing and formalizing the bio-prospecting process in a way which ensures that there is full and prior informed consent of fair and equitable benefit sharing with the originator of the knowledge and resource that enable the bio-prospecting.

On the other hand, traditionally, bioprospecting in developing countries has been the preserve of field researchers in universities and botanical gardens. Indeed, until recently, most bioprospectors in developing countries have been individual professors or collectors who collected samples on contract with foreign companies or sold samples left over from research expeditions. These small-scale activities added little value to the biodiversity resource and in any case, are now likely to be discouraged by national legislation implementing the Biodiversity Convention.

There has been a recent growth of interest in traditional medicine from the international pharmaceutical industry, as well as from the national product industry in Europe and America. Traditional medicine has become to be viewed by the pharmaceutical industry as a source of "qualified leads" in the

identification of bioactive agents for use in the production of synthetic modern drugs.

Bioprospectors express optimism that they can help to implement the 1992 Convention on Biological Diversity by encouraging biodiversity, conservation and stimulating capacity building in developing countries. Many indigenous people and local communities however, are sceptical of existing bioprospecting agreements.

Those concerned with the development of bio-resources for human health recognise that when local custodians of biodiversity benefit from their sustainable use by others, conservation opportunities increase. The CBD codifies this benefit-sharing principle, but the absence of applicable instruments to equitably compensate all stakeholders within a country leaves it largely untested.

Currently this aspect of the debate on access and benefit sharing has not received much attention, as the focus has been on the development and establishment of policies and legislation. It is clear that many local and indigenous communities will not be able to go through this process alone and would need assistance and capacity development.

Many legal and practical problems relating to protection of IPR remain yet to be fully understood and addressed: the collective ownership/custodianship of traditional medicine; the problem of ownership and exercise of rights in traditional medicinal knowledge which exists across different countries in a region; practical means for the exercise and management of rights; mechanisms for application of customary law to protection of traditional medicine; and the need for comprehensive documentation standards, for traditional medicine.

In order to achieve better understanding and wider consensus of these issues it is necessary to address basic conceptual problems and test practical solutions to the protection of traditional medicine. There is a need to continue debate with true stakeholders-practitioners of traditional medicine, representatives of the medical community, the pharmaceutical and biotechnology industries, intergovernmental organizations, etc. Lasting solutions can only be found if all stakeholders work together in good faith and bring their specific expertise and experience towards a common understanding and solution of the problems.

Constraints in developing traditional medicine:

A large portion of the population in a number of developing countries still relies mainly on traditional practitioners, including traditional birth attendants, herbalists and bone-setters, and local medicinal plants to satisfy their primary health care needs. Practices involving use of traditional medicine vary greatly from country to country and from region to region as they are influenced by factors such as culture, mentality and philosophy.

Despite its existence over many centuries and its expansive use during the last decade, in most countries, traditional medicine, including herbal medicines has not yet been officially recognized, and in most countries the regulations and registration of herbal medicines have not been well established.

Furthermore research and training activities for traditional medicine has not received due support and attention. As a result, the quantity and quality of safety and efficacy data are far from sufficient to meet the demands for the use of traditional medicine in the world. Safety and efficacy data exist only in respect of much smaller number of plants and their extracts and active ingredients, as well as preparations containing them.

Reasons for the lack of research data involve not only policy problems, but also the research methodology for evaluating traditional medicine. There is literature and data on the research of traditional medicine in various countries, but all scientists may not accept them. There is a need for validation and standardization of phytomedicines and traditional medical practices so that this sector can be accorded its rightful place in the health care system.

As the characteristics and applications of traditional medicine are quite different from western medicine, how to evaluate traditional medicine and what kind of academic research approaches and methods may be used to evaluate the safety and efficacy of traditional medicine are new challenges which have emerged in recent years.

Along with increased interest in medicine is an increased interest in the safety aspects of the practice of herbal medicine. Private sector involved in the business of herbal drugs should take responsibility and ensure the safety and efficacy of the preparations that they put on the market.

The Role of the Private Sector:

The private sector (e.g. biotechnology industry) plays a crucial role in developing economic activities relating to herbal bioprospecting, using the skills and knowledge of local peoples and compensating them for their knowledge. Governments can promote such involvement, by improving co-operation between public organizations and companies established to improve biotechnology research and training, providing incentives for private companies to contribute to biodiversity, and establishing policies, which promote the involvement of the private sector in biodiversity conservation.

In the last few years developing countries have felt the increasing pressure of what has now become known as bioprospecting and biopiracy. The pressure has come especially in the sector of traditional medicine. Given the fact that in most countries, very little legislation is in place, civil society groups and governments have reacted increasingly strongly. Communities are looking for concrete short-term benefits and, in most cases, monetary benefits. Therefore they would not be interested in long drawn out access and benefit agreements. There is a need for funding agencies and bioprospectors to start funding the communities or the service providers to communities to work through the process of value addition to both potential and existing products, through a bottom up approach.

Research:

There are still gaps in knowledge of how traditional knowledge systems of health work, their limitations and prospects. There is lack of understanding of cosmovisions of traditional healers and of the links between spiritual and traditional healing. Successful experiences and approaches on conservation and sustainable use of medicinal plants are still rare.

With regard to research aspects pertaining to medicinal plants, traditional medicine and local communities; a number of questions are still unanswered: Which traditional remedies work, which have been tested and how? How should traditional medicine knowledge, practices and preparations be validated at the community level, using what methods and facilities? How should traditional medicines be standardized at local and traditional healer levels, using what methods and facilities? Under which conditions does traditional medicine work best? Who uses it and under which conditions? To what extent do local communities accept traditional medicine practices? What has been done to promote mutual understanding and professional respect between western doctors and traditional doctors? Which aspects of traditional medicine can be combined with western style medicine and how? Have all major medicinal plants been identified and documented? What has been lost? What is remaining? Are traditional knowledge systems relating to sustainable use and conservation of medicinal plants clearly understood? Are gender issues properly taken into consideration? How can traditional methods be incorporated in research agenda? How should local and traditional knowledge contribute to the propagation and sustainable use and conservation of medicinal plants? What are the limitations and potentials of spiritual beliefs relating to traditional healing systems? What are cultural practices and beliefs that are supportive of the conservation and sustainable utilization of medicinal plants? What effective agro-ecological methods that enhance propagation and cultivation of specific medicinal plants?

A coherent research agenda will need to address:

Health

- Safety and efficacy of traditional remedies.
- Appropriate research methodology, standardization of herbal medicines.
- Utilization of traditional medicine - reasons, demographics, economics, etc.
- Who uses it and under which conditions? medicinal practices?
- Promotion of mutual understanding and professional collaboration between modern and traditional doctors?
- Basis for integration of services.

Biodiversity

Ethnobotanical surveys and Red Data Book status of medicinal plants.
Studies of indigenous conservation and use of medicinal plants.

Effective agro-ecological methods that enhance propagation and cultivation of specific medicinal plants.

Social dimension:

Gender issues in medicinal plant use, conservation and cultivation.
The role of spiritual beliefs in traditional healing systems.

Priority Issues that need special attention include:

- a) The place and contribution of traditional medicine in primary health care, with particular attention to priority diseases such as malaria, HIV/AIDS, TB; e.g. gaps between the finality of current research with regard to public health concerns and local communities needs and priorities.
- b) The global context (bioprospecting, IPR, TRIPs, CBD, etc): Implications for promotion of the sector; e. g protection of traditional knowledge and practices relating to the uses of medicinal plants and traditional medicines.
- c) Sustainable use and conservation of medicinal plants: The contribution of forests in community health care (e.g. linkages between forestry and health, destruction of forest and its impacts and consequences to the health of people, various ways in which the health of people is affected through the destruction of forests, etc.);
- d) Propagation and domestication of medicinal plants (e.g. successful experiences at the village level), over harvesting and controlled harvesting, resource management;
- e) Economic and policy incentives and legal tools for conservation and sustainable use (e.g. encouraging private sector, researchers and local communities);
- f) Commercialisation and economic value of medicinal plants at the community level: The economics and prospects of small scale derived drug industry (status of medicinal plants production, marketing, markets and value-added processing);
- g) Strategies to enhance income generation and benefit sharing from medicinal plants and traditional medicine;
- h) Integration of traditional medicine and public health programmes and systems;
- i). Spiritual and cultural values that are supportive to medicinal plants conservation, traditional healing and practices;
- j) Tools, mechanisms and strategies to enhance information exchange, co-operation and collaboration.
- k) Benefit sharing and development of and collaboration with indigenous peoples and local communities (mechanisms, models and case studies);

- l) Options for national policies and legislation to access genetic resources and legal and financial aspects related to benefit sharing;
- m) Prospects for private sector participation in Biodiversity Prospecting in developing countries.
- n) Options for legislation, policies and incentives to add value to medicinal plant genetic resources and increase capacity in bioprospecting;
- o) Improvement of the multidisciplinary information on medicinal plants needed for conservation, agriculture, primary health-care and manufacturing activities;
- p) The economic significance of traditional medicinal knowledge and systems;
- q) The enhancement of medicinal plant usage through intellectual property rights, capacity building and information technology and transfer;
- r) Developing and using indigenous and traditional knowledge for promoting bioprospecting for the benefit of all stakeholders involved;
- s) Mechanism, strategies, partnership and co-operation for encouraging bioprospecting-based business in medicinal plants and phytomedicines;

Policy, planning and legislation:

A coherent national programme on Medicinal Plants should include the following institutions:

- **Ministry of Health:**
Formulation of national policy, legislation, regulation and licensing, collection, analysis and dissemination of information on medicinal plants, approval of selected plant remedies for use by health services.
- **Ministry of Agriculture:**
Cultivation of medicinal plants (small and large-scale production), protection of endangered species.
- **Universities:**
Pharmacy:
Inventory of indigenous medicinal plants and natural products, identification of constituents of traditional remedies, pharmacological evaluation of medicinal plants and natural products, identification of active substances, their extraction and toxicity testing, dosage and formulation.
- **Clinical Medicine:** Clinical trials and field testing
- **Public Health:** Studies on indigenous remedies and their uses (ethno-medicine), training of health personnel (manuals).
- **Botany:** Cultivation of medicinal plants, Cloning and cell culture, Taxonomy identification, studies on ethnobotany.
- **Pharmaceutical industry (government and private):** pharmaceutical development, processing and pilot production, trial marketing, full-scale production.

- Ministry of Trade: Assessment of local trade in medicinal plants, exports and imports.

A National Strategy on Medicinal Plants should highlight the following:

- Assessment of the importance of traditional medicine in the country;
- Current status of medicinal plants and traditional medicine at the national level;
- Activities and institutional framework;
- Co-ordinating and implementing agencies; support of R&D;
- Role of NGO's and traditional healers associations;
- Respective roles of public and private sectors;
- Actions and strategies to promote traditional medicine and medicinal plants - list of most common medicinal plants and their uses;
- Efforts to integrate traditional medicine in official public health systems: Advantages, disadvantages, implications, obstacles, policy options and key players.
- Lessons learnt and new perspectives:
- Limitations and potentials
- Future directions:
 - Research priorities, Technology transfer and capacity building;
 - Planning & Development, Policy options;
 - Information exchange and management;
 - Co-operative strategies and mechanisms;

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