



Challenges with Cultivation and Marketing of Medicinal Plants

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Medicinal plants have been a cornerstone of healthcare for millennia. They continue to be essential components of traditional medical systems, especially in developing nations where they support ecological, social, and economic well-being. There is still a significant market for these plants both domestically and internationally.

Currently, 80 percent of people in developing nations get the majority of their medical care from plant-based medications, and the World Health Organisation predicts that in the next few decades, a similar proportion of people worldwide may also rely on plant-based medications. 30 per cent of drugs that are sold all over the world include substances that are derived from plants.

A renewed interest in bio-prospecting by the multinational pharmaceutical business can be attributed to the growing demand for herbal treatments among consumers in both developed and developing nations. However, "slaughter harvesting" of medicinal plants and significant biodiversity loss are the results of a lack of national legislation and practical international agreements on biodiversity protection and sustainable use.

Given India's rich biodiversity, a primary responsibility for all parties involved, including the policy planners, is the identify and direct the creation of new goods have a significant potential for export, such as therapeutic plants. Regretfully, there aren't any combined national regulations on herbal remedies that could support health administrators, drug regulators, and medical experts, both conventional and contemporary professionals to control the market and guarantee consumer protection in addition to preservation of intellectual property preservation and long-term application of therapeutic herbs.

Status of Medicinal Plants in India

The Indian Subcontinent is home to over 45,000 plant species or close to 20% of all species worldwide. Approximately 3,500 species belonging to both lower and higher plant groupings have therapeutic properties. Approximately 80% of the 500 or so kinds of medicinal plants employed in the modern Ayurvedic industry come from natural locations, most of which are designated as forests. 10 percent of all medicinal plants in active trade are obtained from privately owned, farmed fields. The most significant Indian medicinal plants have been recognized based on their potential for further study, commercial value, and medical significance.

Table 1: lists the priority medicinal plant species according to their commercial value.

Plant	Common Name
Adhatoda Zeylanica	Vasaka
Pluchea lanceolata	Rasna
Saraca indica	Ashoka

Plant	Common Name
Terminalia	Chebula
Terminalia arjuna	Arjun
Azadirachta indica	Neem

Source: Export Import Bank of India, Indian Medicinal Plants: A Sector Study (1997)

Table 2: Priority medicinal plant species according to significance

Plant	Common Name
Plantago ovata	Isabgol
Bacopa monnieri	Brahmi
Centella asiatica	Mandukparni
Withania somnifera	Aswagandha
Andrographis paniculata	Kalmegh
Swertia chirata	Chirayta
Tinospora	Guduchi
Emblica	Amla
Commiphora wightii	Guggul
Phyllanthus amarus	Bhumyamalaki
Podophyllum	Papra
Asparagus racemosus	Shatavari
Piccorhiza kurroa	Kutki
Streblus asper	Shakhotaka

Source: Export Import Bank of India, Indian Medicinal Plants: A Sector Study (1997)

Table 3: medicinal plant species prioritized according to potential for further research

Plant	Common Name
Holarrhena	Kutaja
Crataeva nurvala	Varun
Valeriana jatamansi	Tagar
Vilo odorata	Banafsha
Aconitum	Ativisha
Aloe barbadensis	Ghrit
Ocimum sanctum	Tulsi

Source: Export Import Bank of India, Indian Medicinal Plants: A Sector Study (1997)

It has been suggested by the Scientific Advisory Committee on Herbal Products that the government concentrate its efforts on the production and promotion of, 45 medicinal plants over the following 20 years. These herbs have been selected for further consideration based on proven application in the conventional medical system and the extent of their export and domestic market demands aside from the plants' endemic status. The cultivation procedures are one of the planned tasks, clinical trials, post-harvest procedures, and establishment of associations at the national level for every plant.

Economic Potential of Medicinal Plants

The market for herbal goods is predicted to reach US\$ 5 trillion by 2050, up from US\$ 62 billion in 2004 due to its continual growth. Even though it is a key player, India only contributes 0.5% of the world's Medicinal and Aromatic Plants (MAPs) trade, while nations like China export medicines, plants, raw medications, and other MAPs valued at Rs 18,000 crores per year (Singh, 2005). India has one of the richest sources of many kinds of MAPs but it has achieved only limited success in tapping the potentials of these plants because of

low level of awareness among the farmers about the economic potential and returns (Purohit and Vyas 2004).

Ayurvedic medicine is anticipated to expand at a 20% annual pace. India experienced the greatest growth rate in the world in MP sales during the ten years spanning from 1987 to 1996, with an approximate 25% increase. Despite this, India has some of the lowest yearly pharmaceutical spending rates among wealthy countries worldwide. In many developing nations, plants serve as the main source of medicine. China and India are among the top global consumers of herbal remedies. In traditional Chinese and Indian medicine, around 7,000 different plant species are used. As per the Export-Import Bank of the United States, the global market for commerce associated with MP has had an annual growth of 7%. China owns more than half of the world's herbal market, whereas just 1% is owned by India.

According to estimates, the global market for herbal medicines derived from plants was estimated to be worth 18 billion dollars in 2005. By 2019, that amount had increased to 83 billion dollars, and a report from the Globe-News Wire stated that by 2030, it is predicted to reach 550 billion dollars. It is hardly surprising that China and India control the majority of the global herb trade sector. China is estimated to export over 120,000 tonnes of herbal medicines annually, with India following closely behind with about 32,000 tonnes. Conversely, Europe is the world's biggest importer of MP, bringing in about 400,000 tonnes annually.

Challenges associated with medicinal plants

The most frequent problems faced by growers of medicinal plants were:

(a) The market: Due to the extreme diversity in reports and information regarding the amount of material in plantations and natural populations, it is always challenging to forecast market trends for herbs. Climate, depression from unreasonable collecting, the number of collectors available, and the profitability of farming are the main elements that influence the annual oscillations in the number of plants that are often placed on the market.

Once agricultural raw materials are available, the market's supply is expected to stabilize and prices will drop to a position where farmers and the pharmaceutical industry may both benefit. Natural populations could repopulate concurrently via means of in situ conservation, reintroduction, or spontaneous regeneration, as well as the implementation of protection measures. As a result, a balance between the quantity of raw materials provided by cultivation and sustainable collection is achieved, meeting market demand.

b) Environmental Conditions: A major constraint on agricultural output, including MAP, is the yearly amount and distribution of rainfall. While certain medicinal plants need a lot of water for their unhindered growth and development, others experience natural physiological disturbances when their soil retains an excessive amount of water. The second constraint is the texture of the soil. The majority of medicinal plants, where the drug is a subterranean organ, cannot be grown in soils with a "heavy" texture, such as rocky or clayey soils. Furthermore, large levels of subsurface water and poor water drainage of the arable layer are common in soils with a lot of clay and/or silt, which may be a production-limiting factor.

c) the cost and availability of labor: Paying competitive wages is challenging in the production of medicinal plants due to the comparatively low profit margins when compared to other crops, which causes a labour shortage. Increased production costs and narrower profit margins for growers of medicinal plants are two effects of wage inflation in the agriculture sector. Unorganised labour is a major component of medicinal plant production in many areas, which can result in pay volatility and exploitation.

d) Machinery Investments: Certain procedures in the production of therapeutic plants can be made easier with the use of specialized equipment. It is conceivable to use significant crop production machinery for some procedures, either exactly as is or with a few little

adjustments. Planters can be used for planting, harvesters or mowers can be used for harvesting, and potato diggers and ploughs are effective tools for digging roots. Specialised harvesters are used to collect certain herbs; these harvesters might also be used, with little adjustments, to harvest other medicinal plants. Production costs are greatly increased by expenditures and facilities for raw material drying; these higher expenses must be justified by the final cost of raw materials.

e) Post-Harvest Processing: A large variety of equipment is available for postharvest processing of raw materials from fresh and dried medicinal plants. Processing equipment for dry plant material is primarily used for the extraction of leaves from stems, flowering stalk cutting machines, and vibrational or air separators. In the case of fresh plant material processing, the most frequent steps are lines of washing, chopping, and size separation. A few post-harvest procedures are essential, and skipping them would result in an irreversible loss of raw material quality.

Some other issues related to cultivation and management of medicinal plants

- i) Lack of knowledge about cultivation technology;
- ii) Lack of understanding of medicinal cultivation economics plants alone might not be a profitable harvest;
- iii) Land availability due to Land Ceiling Act and state Forest Act
- iv) Inadequate infrastructure for irrigation;
- v) Lack of access to planting supplies;
- vi) Insufficient expertise and instruction in the post-harvest management of medicinal plants; Insufficient quality control and standardization of therapeutic plants;

One of the main obstacles facing the medicinal plant industry is the lack of coordination amongst different Indian stakeholders, including the Ministry of Agriculture, the Ministry of Environment and Forests, the Ministry of Commerce, the Department of Indian System of Medicine and Homoeopathy (ISM&H), the Department of Science and Technology, the State Governments, the private traditional medicine sector, research institutes, non-governmental organizations, and the international network. Each of these parties involved has a distinct goal. The medicinal plant industry has underdeveloped as a consequence of this manner of functioning in isolation without considering other stakeholders' goals.

Many government institutes, organizations, and departments conduct various experiments and research on various medicinal plants with different objectives. The absence of collaboration and an interdisciplinary approach in the system hinders the access to utilization of the maximum potential of medicinal plants.

The absence of herbal APMC contributes to various unfair practices by the traders to source medicinal plants. unavailability of district collection centre and authentic place to market the produce poses a significant challenge to the cultivators of medicinal plants.

Conclusion

Medicinal plants have enormous promise for both economic growth and healthcare, particularly in countries like India that are rich in biodiversity. In spite of their historical importance and the anticipated rise in worldwide demand (expected to reach US\$550 billion by 2030), India continues to contribute relatively little to the trade in medicinal plants. This underperformance is the result of several issues coming together.

- i) Market Uncertainties: Stable growth is impeded by market forecasts caused by fluctuations in supply and demand, which are impacted by environmental factors and non-standardized farming.
- ii) Environmental Constraints: Different medicinal plants have varying requirements for climate and soil, which limits the potential for growth and necessitates region-specific farming techniques.

iii) Problems with Labour and Equipment: Exorbitant labour expenses, a lack of competent labour, and the requirement for specialized equipment drive up production costs and reduce growers' profit margins.

iv) Deficiencies in Post-Harvest Processing: Poor infrastructure for quality control and processing results in subpar product standards, which hurts a company's ability to compete in the market.

v) Institutional Fragmentation: Ineffective coordination between different government agencies, academic institutions, and interested parties leads to redundant work, resource waste, and lost chances for comprehensive growth.

vi) Market Access Barriers: Cultivators are exposed to exploitative practices when there are no organized marketplaces such as district collecting centres or herbal APMCs, which discourages participation in medicinal plant agriculture.

To fully utilize medicinal herbs, a multifaceted strategy is necessary. This entails putting in place unified national policies, funding infrastructure and research, encouraging sustainable farming methods, and providing producers with equitable access to the market. In addition to protecting their rich biodiversity, nations like India can establish themselves as leaders in the rapidly expanding medicinal plant market by taking on these issues head-on.

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