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Biodiversity Conservation of Valuable Medicinal Plants for Livelihood Improvement (A Systematic Review)



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ABSTRACT

Biodiversity conservation through effective use and management of Medicinal plants has become a passionate agenda of many scientists and development practitioners. Medicinal plants greatly contribute in to improve livelihood, nutrition and play a key role in the development and advancement of modern studies by serving as a starting point for the development of novelties in drugs. Despite these benefits, Medicinal plants are increasingly faced with major threats from various environmental, socio-economic and institutional factors. The review aims to address the biodiversity conservation of medicinal plants for harnessing medicine, poverty reduction, and public health prevention and to link the biodiversity conservation of valuable medicinal plants with commercial development. The major focus of this review involves home nursery of medicinal plants, cultivation of medicinal plants in both private and public lands, cooperative formation and linkage with big companies. This will contribute in to decrease pressure on wild medicinal plant resources and thereby enhance bio-diversity conservation. Environmental and cultural changes are in the process of threatening the valuable resources and this signals the need for serious efforts to create public awareness so that measures are taken to conserve the medicinal plants in the natural ecosystems and other suitable environments. The domestication of the valuable medicinal plants will enhance the natural resource base in the forest.



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INTRODUCTION

A plant can be considered as medicinal plant if it is used to mitigate, avoid or treat a disease and can alter physiological and pathological process, even if it can be used as a precursor of drug then it will be categorized in same¹. The use of medicinally important plants is well established and widely acknowledged to be safe and effective, and may be accepted by health care practitioners. Medicinal plants thus embody one of the major categories within the herbs, herbal products, and the other important categories being health, nutrition supplements, perfumery, aromatic products and beauty, cosmetic, toiletry products. Medicinal plants are with immense nutritional values and are accepted by the people because of their medicinal and ritual values. The usage of herbal medicine has amplified dramatically for various diseases amongst general people over last few years not only because of their easy accessibility without prescription, low cost and appointment to the health care specialists and more with the belief that natural remedies have less lethal effects as compared to synthetic medicines.²

World Health Organization has depicted that about 60% of the world's population rely on traditional medicine and 80% of the population in developing countries depend almost completely on traditional medical practices, in particular, herbal remedies for their primary health care practices³. Traditional medicinal plants have been brought into attention for meeting the demand of a wider coverage of primary healthcare delivery in all countries of the world. It seems to be the first choice healthcare treatment for people who suffer from common ailments. Medicinal plants thus seem to greatly contribute to the improvement of livelihood, nutrition and play a key role in the development and advancement of modern studies by serving as a starting point for the development of novelties in drugs. Despite these benefits, medicinal plants are increasingly faced with major threats from various environmental, socio-economic and institutional factors. Thus biodiversity conservation through effective use and management of medicinal plants has become a passionate agenda of many scientists and development practitioners. The review aims to encourage the conservation of medicinal plants through cultivation in suitable environments.

The linkage between biodiversity and human health is well established. In the developing world, a large proportion of the rural population depends on biodiversity for their livelihood, nutrition and health. Plants provide the predominant ingredients of medicines in most medical traditions. There is no reliable figure for the total number of medicinal plants on Earth, and

numbers and percentages for countries and regions vary greatly⁴. Estimates for the numbers of species used medicinally include: 35,000-70,000 or 53,000 worldwide⁴; 10,000- 11,250 in China⁵; 7500 in India⁶; 2237 in Mexico⁷; and 2572 traditionally by North American Indians⁸.

Presently, hundreds of millions of people, especially in developing countries, derive a major part of their subsistence needs and income from collected medicinal plants and their products^{9, 10}. Meeting of valuable products like mushrooms (morels, matsutake and truffles), medicinal plants (ginseng, black cohosh, and goldenseal) also continues in developed countries for cultural and economic reasons¹¹.

Biodiversity of valuable medicinal plants will satisfy the regional and international markets, the plant sources for expanding local, regional and international markets are harvested in large volumes and mostly from wild populations^{12, 13}. Wild plant resources, in general, are increasingly inadequate by deforestation from logging and conversion to plantations, pasture and agriculture^{14, 15}.

Over 70% of the plant collections involve destructive harvesting because of the use of parts like roots, bark, wood, stem and the whole plant in case of herbs. This poses a definite threat to the genetic stocks and to the diversity of medicinal plants if biodiversity is not sustainably used. While the demand for medicinal plants is growing, some of them are increasingly being threatened in their natural habitat. For meeting, the future needs conservation and cultivation of medicinal plant is being encouraged. The Cultivation of medicinal plants is broadly viewed not only as resources for meeting current and future demands for large volume production of plant-based drugs and herbal preparations but also as a means for relieving harvest pressure on wild populations¹⁶⁻²⁰. Given the plea for an uninterrupted and constant supply of medicinal plants and the speedy depletion of forest resources, increasing the number of medicinal plants species in cultivation would appear to be a key strategy for meeting a growing demand²¹.

In April 2002, the CBD implemented the Global Strategy for Plant Conservation which encourages a policy environment that is particularly well suited to addressing the conservation challenges for medicinal plants in a lucid way. Several medicinal plants, especially the aromatic herbs, are planted in home gardens some are cultivated as field crops, either in sole cropping systems or rarely as plantation crops²². With the increased realization that some wild species are being over-exploited, a number of agencies are recommending that

wild species be brought into cultivation systems²³. Cultivation of medicinally valuable plants can be utilized deliberately enhance certain values under controlled conditions.

Presently, harvesting practices are unsustainable, resulting in depletion of resources. Medicinal plants based industries in India also lack a proactive and socially responsible approach and are therefore partly responsible for inefficient, imperfect, informal and opportunistic marketing of medicinal plants. The collections in most cases are done by villagers and tribals, without paying attention to the stage of maturity, dried haphazardly and stored for long periods under unsuitable conditions. The quality of collected material, as such is often degraded. Several medicinal plants have been assessed as endangered, vulnerable and threatened due to over-harvesting or unskillful harvesting in the wild.

Generally, in all countries, the inclination is towards a greater proportion of cultivated material.

The majority of companies, market, pharmaceutical companies as well as the larger herb companies, choose or prefer cultivated material since cultivated material can be certified biodynamic or organic²⁴. Small-scale cultivation of medicinal plants in home gardens etc. requires low economic inputs thus can be a response to diminishing local stocks, generating income and supplying regional markets. This can be a more secure income than from wild harvest which is notoriously uneven. Home gardens are increasingly and importantly a focus of medicinal plant propagation and introduction programs intended to encourage the use of traditional remedies for common ailments by making the plant sources more affordable and accessible²⁵.

CONCLUSION

This review endeavors to contribute towards the efforts, aims and aspirations for conserving valuable medicinal sources for biodiversity preservation. Despite the benefits, Medicinal plants are increasingly faced with major threats from various environmental, socio-economic and institutional factors. There are significant global benefits that could be achieved by supporting biodiversity conservation with the active participation of traditional medicinal practitioners, researchers, academics, and field and nursery personnel. In view of perception of the market, harvesting via cultivation provides a number of advantages for production of plant-based medicines. In collection of cultivated valuable medicinal plant parts, the harvest will be free of adulterated, unwanted, and harmful materials of other plant species; In fact,

cultivation provides reliable botanical identification and guarantees a steady source of raw material. Moreover, the Wholesalers and pharmaceutical companies can agree on volumes and prices over time with the grower. Cultivation allows meticulous and skillful post-harvest handling and hence quality controls can be achieved as well. Thus biodiversity conservation via cultivation will offer opportunities for the economic development of the medicinal plant species as a crop.

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