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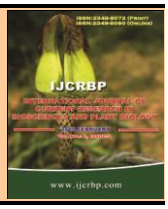

Review Article

Organic Cultivation of Medicinal Plants: Prospective and Constraints

Shweta Yadav*

Department of Zoology, School of Biological Sciences, Dr H S Gour Viswavidalaya (A Central University), Sagar-470 003, MP, India

**Corresponding author.*

Abstract

Of recent, there is a resurgence of interest in medicinal plants cultivation in India, particularly with the setting-up of an apex body, called National Medicinal Plants Board, under Department of Ayurveda, Yoga & Naturopthy, Unani, Siddha & Homoeopathy (AYUSH), Ministry of Health & Family Welfare, Govt. of India , with headquarters in New Delhi. The Board aims to make cultivation of medicinal plants and its sustainable management a people's movement. Growing medicinal plants is much more remunerative as compared to growing cereals and horticultural crops. To achieve the goal for "*Health for All*", there is a need for global movement for conservation of medicinal plants and revitalization of the native health traditions of local communities.

Keywords

Medicinal plants

Organic farming

Vermicompost

Introduction

In order to develop the medicinal plants sector in different agro-climatic zones across the country, there is a need for a coherent approach linking all stakeholders of medicinal plants viz. growers, collectors, traders, manufactures, exporters and others. A recent study by Center for Research, Planning and Action (CERPA) has made quantitative estimation for 162 selected medicinal plants which are of relatively greater importance to the ISM&H sub-sector. This indicates that during 2000-2010, the demand of crude drugs for these species accounted to the tune of 120816.80 tones whereas the total demand of medicinal plants for the same year has been estimated to be 198054.7 tones, valued to Rs. 1099.18 crores. However, during 2014-2020, the total demand of medicinal plants has raised to 272617.8 tones with annual growth rate of 16.7% and valued to Rs. 145328.1 lakh. Of this, the export demand of medicinal plants comes to 12,500 tones (2004-05). There is a phenomenal growth in the consumption of medicinal raw drugs with the increase in ISM&H market size globally. Therefore, to ensure manufacturing quality medicines of ISM&H and also enforcing their lawful marketing as per Food and Drugs Administration (FDA) and European Union (EU) requirements, there is an immediate need to create awareness about cost-effective organic farming of medicinal crops. Based on this rationale, the present study highlights the need of vermicomposting in medicinal crops, present scenario of their growth with respect to domestic demand estimates, marketing and export,

constraints identified in organic farming, vermitechnology, and problem in medicinal plants cultivation in the country (Singh and Shweta, 2012; Zafar Ali and Shweta, 2009a, b, c, d).

Important cultivated medicinal plants in India

National Medicinal Plants Board, India has identified 32 medicinal species in the first instance for development and cultivation at national level. These include Amla (*Emblica officinalis* Gaertin); Ashoka (*Saraca asoca* (Roxb. de Wilde); Ashwagandha (*Withania somnifera* (L.) Dunal); Atees (*Aconitum heterophyllum* Wall. Ex Royle); Bael (*Aegal marmelos* (L.) Corr.); Bhumi amlaki (*Phyllanthus amarus* Schum & Thonn.); Brahmi (*Bacopa monnieri* (L.) Pennell); Chandan (*Santalum album* L.) Chirata (*Swertia chirata* Buch-Ham.); Daruhaldi (*Berberis aristata* D.C.); Giloe (*Tinospora cordifolia* Miers,); Gudmar (*Gymnema sylvestre* R., Br.); Guggal (*Commiphora wightii* (Arn.) Bhandari; Isabgol (*Plantago ovata* Forst,) Jatamansi (*Nardostachys jatamansi* DC.); Kalihari (*Golriosa superba* L.); Kalmegh (*Andrographis paniculata* Wall. Ex Ness); Kesar (*Crocus sativus* L.); Kokum (*Garcinia indica* Chois.); Kuth (*Saussurea costus* C.B. Clarke (S. lappa); Kutki (*Picrorhiza kurroa* Benth ex Royle); Makoy (*Solanum nigrum* L.); Mulethi (*Glycyrrhiza glabra* L.); Safaid Musali (*Chloraphystum borivillianum* Sant.); Pather Chur (*Coleus barbatus* Benth.); Pippali (*piper longnum* L.); Sarpgandha (*Rauwolfia serpentine* Benth. Ex Kurz); Senna (*Cassia angustifolia* Vahl); Shatavari (*Asparagus racemosus* Willd.); Tulsi (*Ocimum sanctum* L.); Vai Vidang (*Embelia ribes* Burm. f.); Vatsnabh (*Aconitum ferox* Wall.).

Problems in medicinal plants cultivation

Some present day problems needed to be addressed in medicinal plants cultivation programme include: (i) lack of proper cultivation agro practices; (ii) lack of availability of proper planting material; (iii) lack of export promotion policy; (iv) lack of market potential in system; (v) lack of organic farming; (vi) need for involvement of Government & NGOs; (vii) extensive use of pesticides; (viii) lack of proper breeding procedures; (ix) lack of proper genetic techniques; (x) lack of information for value-added products; and (xi) certified wild plants.

Organic farming

Organic farming is a system of farm design and management that seeks to create a healthy ecosystem with sustained profitability. It provides weed and pest control through mutually dependent diverse life forms, recycling of plant and animal residues, crop selection and rotation, water management, tillage and cultivation. Organic agriculture has gained international recognition as a valid alternative to conventional food production.

The increasing consciousness about health hazards on account of contamination of farm produce due to excessive use of chemical fertilizers and pesticides has provided a thrust to this form of farming. The consumers today are willing to pay a premium for environmentally responsive safe products, with the trend likely to become more pronounced in the coming years. Although the state of the organic industry differs across countries, there are clear sign of a maturation process with organic agriculture becoming the fastest growing segment in the food sector.

According to popular notion organic farming is agriculture without chemical input. But it encompasses more than. Organic farming is a farmer's movement. It works along the principles found in the nature. It is a production system, which avoids or largely excludes the use of synthetically manufactured fertilizers, pesticides, growth regulators and livestock feed additives. This system relies on legumes, green manures, crop rotation, crop residues, animal manures, bio-fertilizers, bio-pesticides, bio-herbicides etc. It is holistic management agricultural system, which aims at cultivation of the land in such a way that the soil is kept healthy and dynamic with biochemical and soil microbial activities related to biodiversity. The main benefits of the organic farming are:

(i) Reduction in environmental pollution.

(ii) Food safety.

(iii) Control soil erosion, structure and improve fertility.

(iv) Renewable energy unit.

(v) Nutrient balance.

(vi) Organic content build-up.

Organic farming and medicinal plants cultivation

Traditional medicinal plants communities have depended on plants to meet their basic needs over centuries. The pharmaceutical industry views plant wealth as a source of income. The modern medicine world perceives plants as a panacea for many ills. Despites this, there is no consolidated strategy to conserve medicinal plants in the country. Today less than 70 species of medicinal plants are reportedly under commercial cultivation.

The word "Organic" means origin from a living thing and farming with the philosophy of organic is to make production systems alive with long life. Organic farming is a holistic production management system, which promotes and enhances health of agro-ecosystem related to biodiversity, nutrient bio-cycle, and soil, biological and microbial activities. Organic farming is similar to the other sustainable farming systems e.g. perm culture, eco-farming etc. which are based on harmony with nature or near to nature approach. The only distinguished character is the certification of production in organic farming. Certification is a procedure in which certain rules and regulations have to be followed. This is necessary to obtain certificate from recognized agency. The agency certifies that the product is produced strictly with organic methods. The movement for organic agriculture was initiated by the International Federation for Organic Agriculture Movements (IFOAM), a private sector International body located in Germany. The organization was founded in 1972 by 6 organizations from 3 continents. Now IFOAM membership is growing rapidly and it is now functioning as an umbrella of organic agricultural accreditation programme with some 750 member organizations in over 120 countries including India (Shweta, 2014).

International trade of medicinal plants

The present global herbal market is worth about US$ 62 billion per annum and India's share in it is only 0.2%. The annual growth of the herbal market is about 15% and the expected global herbal market by 2050 is about US$ 5 trillion. The task force appointed by Planning Commission of GOI in June 2005, after studying the export market has suggested fixing the target in the export of medicinal plants to the tune of Rs. 3000 crores by 2005 and Rs. 10,000 crores by 2010. This is the proper time for India to make relentless efforts to take substantial cultivation and share in the herbal market.

International trade in medicinal plants material for the production of pharmaceutical, nutraceutical and cosmeticeutical preparations is booming.

India exports crude drugs mainly to developed countries viz. USA, Germany, France, Switzerland, UK and Japan, who share between them 75 to 80 per cent of the total exports of crude drugs from India. The principal herbal drugs that have been finding a good market in foreign countries are Aconite, Aloe, Belladonna, *Acorus, Cinchona, Cassia tora, Dioscorea, Digitalis, Ephedro, Plantago, Cassia angustifolia* etc.

Major problems in marketing of medicinal plants

Medicinal plants market in India is today unorganized both directly and indirectly due to the following problems:

(i) Medicinal plants are exhaustible if overused.
(ii) The current practice of harvesting is unsustainable and causes depletion of resource base.
(iii) The pharmaceutical companies are also responsible for inefficient, informal and opportunistic marketing of medicinal plants.
(iv) Absence of serious policy attention where the origin of a particular drug is assigned to more than one plant due to which adulteration is common in such cases.
(v) Marketability of products is a crucial factor in determining the failure or success of this sector.
(vi) A clear understanding of both the supply-side issues and the factors driving the demand and size of the medicinal plants market is a vital step towards planning for both conservation and sustainable use of these plants.
(vii) Ensure continued availability of the basic ingredients used to address the health needs.

(viii) Decline of folk traditional medicines, a source of primary health care for an estimated 800 million people in the country.

(ix) Impoverishment of rural people, who are stewards of the resource base and the holders of traditional, ecological and medical knowledge, through inequitable marketing channels.

(x) Medicinal plants trade is inefficient, imperfect, informal and opportunistic.

(xi) Deficient toxicology studies and standard preparations to improve the quality, efficacy and effectiveness of the traditional drugs.

(xii) Lack of co-ordination amongst various stakeholders of medicinal plants sector such as Govt. of India (Ministry of Agriculture, Environment and Forests, ISM &H, Science and Technology, etc.) State Governments, Private traditional medicines sector, Research Institutes, NGOs, and International networks etc.

Why organic farming cultivation?

Organic farming is not of recent origin in India. In ancient literature such as '*Rig-Veda*', the use of animal dung as manure was emphasized, '*Atharvaveda*' indicated the importance of green manures, which was practiced before 1000 B.C. Kautilya's '*Arthashastra*' recorded manures like oil cakes, excreta of animals etc. Ayurvedic medicinal plants should be cultivated in organic manner has been emphasized. In the country like India where there is a large population and high demand of food grains, it is difficult to convert the country into fully organic immediately. There are several positive reasons for people to adopt organic farming practices. However, there are some reasons that people avoid organic produce like: (i) economics (ii) beliefs and (iii) lifestyle. The increased demand of medicinal plants leads for their commercial cultivation. Adoption of various agro technique such as application of fertilizers, irrigation and also the use of insecticides, herbicides, fungicides and pesticides, although increase the total production of these plants, however, the important metabolites and their byproducts are the key source of importance of medicinal plants and the indiscriminate use of fertilizers, pesticides and herbicides alter the basic metabolic pathways of these products of economic importance and ultimately changes the basic formulation and their market value.

In the light of above facts, the use of organic manures, which are known to be eco-friendly least alter the metabolic pathways of the medicinal plants assume importance and a combination of these factors *i.e.* growing of medicinal plants under organic farming may lead to the quality maintenance or even improvement in their quality.

Constraints identified in organic farming

The identified organic farming constraints are:

(a) Excessive cost of existing inspection and certification system which is not affordable by farmers.

(b) Heavy metal content of urban compost.

(c) Lack of quality assurance of organic inputs and non-availability of standards.

(d) Limited availability of sufficient quantity of locally available inputs like farmyard manures, compost, Vermicompost etc.

(e) Limited domestic market and lack of commodity-wise market information on domestic global demand and supply.

(f) Non-availability of organic "*package of practice*" for all corps based on locally available inputs.

(g) Non-awareness of farmers and NGOs on the inputs of organic farming.

(h) Regulatory mechanism in this regard.

(i) Risk of low production in initial years of organic farming.

(j) Slow release of nutrients from organic source which is not matching the nutritional demand of high-yielding varieties.

Vermicompost as a component of organic farming

Organic farming is alternative agriculture or rejuvenate farming or sustainable agriculture. It aims at keeping away chemical fertilizers and pesticides and promotes the use of organic fertilizers, and organic pesticides, to rejuvenate the soil health and to combat environmental pollution. Organic fertilizers are composts, vermicomposts, green manures and bio-fertilizers. Compost and

vermicompost are derived from composting and vermicomposting which are the two most efficient processes for converting solid organic residues into manures. Vermibiotechnology involves production of vermicompost by rearing of earthworms on all types of degradable wastes like cattle dung, agricultural wastes and kitchen garbage etc. It is done by the epigeic earthworm viz. *Eisenia foetida, Perionynx excavates* and *Eudrilus euginae*. In north India, however, *Eisenia foetida* (red earthworm) are very common and used for mass production of vermicompost (Shweta, 2014; Shweta and Singh, 2014).

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