

Development of Medicinal Plants Sector in India –An Empirical Study

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Abstract

India has 15 Agroclimatic zones and 17000-18000 species of flowering plants of which 6000-7000 are estimated to have medicinal usage in folk and documented systems of medicine, like Ayurveda, Siddha, Unani and Homoeopathy. About 960 species of medicinal plants are estimated to be in trade of which 178 species have annual consumption levels in excess of 100 metric tones. Medicinal plants are not only a major resource base for the traditional medicine & herbal industry but also provide livelihood and health security to a large segment of Indian population. The domestic trade of the AYUSH industry is of the order of Rs. 80 to 90 billion (1US\$ = Rs.50). The Indian medicinal plants and their products also account of exports in the range of Rs. 10 billion. There is global resurgence in traditional and alternative health care systems resulting in world herbal trade which stands at US\$ 120 billion and is expected to reach US\$ 7 trillion by 2050. Indian share in the world trade, at present, however, is quite low. The National Medicinal Plants Board (NMPB) set-up in November 2000 by the Government of India has the primary mandate of coordinating all matters relating to medicinal plants and support policies and programmes for growth of trade, export, conservation and cultivation. The Board is located in the Department of Ayurveda, Yoga & Naturopathy, Unani, Siddha & Homeopathy (AYUSH) of the Ministry of Health & Family Welfare.

Key words: AYUSH, medicinal plants,herbal.

Introduction

India is a country known for ancient scripts, the number system, and invention of zero. And Vedas' Medicines in India are used by about 60 per cent of the world's population. These are not only used for primary health care not just in rural areas in developing countries, but also in developed countries as well where modern medicines are predominantly used. While the traditional medicines are derived from medicinal plants, minerals, and organic matter, the herbal drugs are prepared from medicinal plants only. Medicinal plants are not only a major resource base for the traditional medicine & herbal industry but also provide livelihood and health security to a large segment of Indian population. (Marichamy 2013).

Use of plants as a source of medicine has been an ancient practice and is an important component of the health care system in India. In the Indian systems of medicine, most practitioners formulate and dispense their own recipes; hence this requires proper documentation and research. In west also the use of herbal medicines is growing with approximately 40 per cent of population reporting use of herb to treat medical diseases within the past year. General Public, academic and government interest in traditional medicines is growing rapidly due to the increase side effects of the adverse drug reactions and cost factor of the modern system of medicine.

There are about 45,000 medicinal plant species in India, with concentrated spots in the region of Eastern Himalayas, Western Ghats and Andaman & Nicobar Island. The officially documented plants with medicinal potential are 3000 but traditional practitioners use more than 6000. India is the largest producer of medicinal herbs and is called the botanical garden of the world. There are currently about 250 000 registered medical practitioners of the Ayurvedic system, as compared to about 700,000 of the modern medicine system. In rural India, 70 per cent of the population depends on the traditional type of medicine, the Ayurveda.

In India, many forms of alternative medicines are available for those who do not want conventional medicine or who cannot be helped by conventional medicine. Ayurveda and Kabiraji (herbal medicine) are two important forms of alternative medicine that is widely available in India. Ayurvedic form of medicine is believed to be existent in India for thousands of years. It employs various techniques and things to provide healing or relief to the ailing patients. One of the things that ayurveda uses is medications of plant origin. With the scripts in the Atharva Veda, we have evidence of a traditional use of medicinal plants that is more than 3000 years old.

It is estimated that about 80,000 species of plants are utilized in some form or other by the different systems of Indian medicine. The knowledge about plants and plant products is detailed, sophisticated, and has evolved into a separate shastra itself, called DravyaGunaShastra. Plants have been studied on the basis of clearly defined biological parameters like rasa (taste), vipaka (metabolic property), guna (quality), prabhava (biological effect) and virya (potency). The codified traditions have about 25,000 plant drug formulations that have emerged from such studies. In addition to this, over 50,000 formulations are believed to exist in the folk and tribal traditions. All these point to the deep passion for and exhaustive knowledge about medicinal plants that have existed in this land from time immemorial. Many herbs and spices are used in Indian cooking, such as onion, garlic, ginger, turmeric, clove, cardamom, cinnamon, cumin, coriander, fenugreek, fennel, ajowan (ajwain), anise, amchur, bay leaf, hing (asafoetida) etc. Ayurvedic medicine uses all of these either in diet or as an medicine. Some of these medicinal plants have been featured on Indian postage stamps.

The Indian Scenario

India, as described earlier is a virtual treasure trove of plant species. Despite substantial pace of growth in the medicinal plant and product market, India's share in world market of medicinal plant and products is a mere 2.5 percent. The export market is growing faster than the domestic market. However, the export is being carried out in form of plants, or their parts and not as value added products. Countries that import plant and plant parts are invariably less biodiversity but are technologically advanced which show a higher capability to develop value added products from the imports.

The Indian exporters face major constraints while exporting medicinal plants. The cyclical nature of medicinal plant market makes it difficult for them to determine supply and demand in the markets. Also, competition from synthetic substitutes, non-compliance with rules and regulation of the importing countries, hoarding and manipulation by large importers, poor quality control, inadequate information on market trends, use of obsolete technology and lack of established methods for cultivation of large number of plants, etc. compound the problem of export of medicinal plants or their products from India.

It is interesting to note that India has negligible patents on plant based formulations, extracts and products. The reason is not far to seek. The existing Patent Act provides only process protection and therefore only the method for preparing a formulation can be protected and not the formulation itself. The process patents are therefore less effective in cases where variations are possible without significantly changing the effectiveness. Traditional knowledge held by communities, in the classical sense, cannot be patented. Much of the traditional knowledge that is not catalogued, is not part of the prior art. Thus knowledge of the tribal and indigenous communities has novelty, non-obviousness and industrial application which are the basic requirements for acquiring protection under Trade Related Intellectual Property Rights agreement of the World Trade Organization.

The Agreement on Trade-Related Aspects of Intellectual Property Rights (**TRIPS**) has provided the signatory countries the freedom to choose intellectual property protection either under a patent regime or a *sui generis* system or a combination thereof. An urgent shift in policy is required, if India expects to be a global player in plant based medicine and formulations. It is important to develop a *sui generis* system to provide grassroots innovators an incentive to disclose knowledge.

There are interrelated technological, institutional, socio-economic and ecological issues affecting the medicinal plant sector that have impeded its growth resulting in the depletion of plant diversity and resource

bases, and the erosion of international market share. We discuss the key challenges in developing medicinal plant sector to understand the basic nature of the problem.

Medicinal and Aromatic Plants

Botanical Survey of India (BSI) an organization working under Ministry of Environment, Forests and Climate Change, who are mandated for survey of plant diversity of the country; its documentation, including traditional knowledge associated with it at National, Regional, State and Ecosystem level and its conservation in different parts of the country has been carrying out survey and documentation of all plant resources of the country including medicinal / aromatic plants and herbs. The survey is the nodal repository for Reference Plant Collections and at present houses about 3.2 million specimens in its different herbaria, which help in taxonomic characterization and monitoring of species, including medicinal plants. It is estimated that, more than 8,000 species of medicinal herbs and medicinal plants are found in the country.

A study was got conducted by the National Medicinal Plants Board of Department of AYUSH through the Foundation for Revitalization of Local Health Tradition (FRLHT), Bangalore. According to the report of study published in year 2008, total traded quantity of medicinal plants in the country was estimated to be about 3.19 lakhs metric tonnes for the year 2005-06. In all, 960 medicinal plants are traded; out of which 178 species have annual consumption of more than 100 metric tonnes (MTs). However, State / UT-wise findings are not available in this regard.

According to the Botanical Survey of India (BSI), no hard core data on the extent of threat to the medicinal plants is readily available. Out of 19156 species of vascular plants (Angiosperms-17817; Gymnosperms – 74; Pteridophytes – 1265), about 70 medicinal and aromatic plants species are threatened due to various anthropogenic activities.

Following schemes implemented by National Medicinal Plants Board (NMPB) during 11th Plan for overall development of medicinal plants sector in the States have so far been continued.

Increase in Demand for Medicinal Plants

National Medicinal Plants Board (NMPB) of Ministry of AYUSH has been implementing the Central Sector Scheme for Conservation, Development and Sustainable Management of Medicinal Plants under which a grant of Rs.144.28 crores has been released over the last three years to various organizations including State Forest Departments, R&D institutions for taking up activities relating to overall development of medicinal plant sector. An area of about 30929 hectare has been covered for resource augmentation, in-situ conservation and setting up Medicinal Plants Conservation Areas (MPCAs) for these plants, in addition to other related activities.

Besides, under the Centrally Sponsored Scheme of “National Mission on Medicinal Plants”, the NMPB has released Rs.140.43crores to different State Governments over the last three years for cultivation of medicinal plants on farmers land, along with backward and forward linkages.

In addition to the above, a network of 670 protected areas (102 National Parks, 517 Wild Life Sanctuaries, four Community Reserves and 47 Conservations Reserves) in different bio-geographic regions of the country have been setup under the programmes of Ministry of Environment, Forest and Climate Change, for conservation and management of flora and fauna of the country, including medicinal plants.

Development of Medicinal Plants Sector

The Government of India has set up the National Medicinal Plants Board vide resolution notified on 24th November, 2000 to co-ordinate with Ministries / Departments/ organizations / state / UT Governments for development of medicinal plants sector in general and specifically in the areas relating to assessment of demand supply, advising on policy, promotion of conservation, proper harvesting, cultivation, quality control, research and development, processing, marketing of raw material in order to protect, sustain and develop this sector.

For overall development of medicinal plants sector in the country the NMPB has been implementing following Schemes since year 2008-09:

1. Central Sector Scheme for “Conservation, Development and Sustainable Management of Medicinal Plants “aimed at providing support for Survey, Inventorization, in-situ conservation, ex-situ conservation / herbal gardens, Research and Development, linkage with peoples collectives like Self Help Groups (SHGs), Joint Forests Management Committees (JFMCs) etc. The Scheme is being continued during the 12th Plan.

2. Centrally Sponsored Scheme of “National Mission on Medicinal Plants” is primarily aimed at supporting cultivation of medicinal plants on private land with backwards linkages, for establishment of nurseries for supply of quality planting material etc. and forward linkages for post-harvest management, marketing infrastructure, certification etc. Currently this Scheme is being implemented as a component (Medicinal Plants) of the National AYUSH Mission (NAM)

(i) Central Sector Scheme for “Conservation, Development and Sustainable Management of Medicinal Plants”:

Under this Scheme support is provided for undertaking activities on Survey, Inventorization, *in-situ* conservation, *ex-situ* conservation / herbal gardens, linkage with JFMCs, Research and Development etc. on Medicinal Plants. Information regarding financial assistance which includes the technical components viz. capacity building of all stakeholders, provided under the Scheme during last three years and the current year, State / UT-wise details is given below:-

Funds to the different States under Central Sector Scheme for Conservation, Development and sustainable Management of Medicinal Plants

(In lakhs)

S.No.	State Name	2011-12	2012-13	2013-14	2014-15
1	Andhra Pradesh	233.11	44.57	194.09	0.00
2	Arunachal Pradesh	48.33	0.00	4.95	0.00
3	Assam	7.44	4.33	28.99	0.00
4	Bihar	0.00	0.00	0.00	0.00
5	Chhattisgarh	125.98	178.60	374.07	0.00
6	Delhi	111.97	38.80	87.86	25.00
7	Goa	4.78	0.00	0.00	0.00
8	Gujarat	188.55	609.91	133.15	0.00
9	Haryana	47.25	0.00	10.87	0.00
10	Himachal Pradesh	326.98	11.23	40.44	0.00
11	Jammu & Kashmir	15.75	33.38	175.09	16.32
12	Jharkhand	99.67	138.95	0.00	0.00
13	Karnataka	116.32	191.87	281.20	51.58
14	Kerala	507.48	50.54	161.88	0.00
15	Madhya Pradesh	899.37	222.30	1338.91	0.00
16	Maharashtra	519.39	890.95	661.58	197.29
17	Manipur	20.65	16.00	13.00	0.00
18	Meghalaya	5.00	0.00	0.00	0.00
19	Mizoram	4.99	265.35	174.90	0.00
20	Nagaland	139.92	74.22	99.35	5.00
21	Orissa	179.62	2.78	97.10	12.00
22	Punjab	0.00	0.00	39.01	0.00
23	Rajasthan	454.65	597.93	684.36	0.00
24	Sikkim	322.16	177.01	547.38	0.00
25	Tamil Nadu	25.34	16.90	190.27	0.00
26	Tripura	51.50	89.56	0.00	0.00
27	Uttarakhand	179.02	20.64	133.14	29.34
28	Uttar Pradesh	200.30	4.28	188.53	6.00
29	West Bengal	3.00	75.47	109.00	0.00
30	Andaman & Nicobar	0.00	0.00	41.27	0.00
31	Chandigarh	0.00	17.12	5.00	0.00
32	Pondicherry	0.00	0.00	1.80	0.00
	Total	4838.52	3772.69	5817.19	342.53

(ii) Centrally Sponsored Scheme of “National Mission on Medicinal Plants”:

This scheme is primarily aimed at supporting cultivation of medicinal plants on private land with backwards linkages for establishment of nurseries, for supply of quality planting material etc. and forward linkages for post-harvest management, marketing infrastructure, certification etc. in a mission mode. Information regarding financial assistance provided under the Scheme during last three years and the current year, State / UT-wise is details is given below:-

Funds to the different States under the Centrally Sponsored Scheme of National Mission on Medicinal Plants

(In lakhs)

S.No	Name of State	2011-12	2012-13	2013-14	2014-15
1	Andhra Pradesh	512.52	834.32	963.63	Release of funds during the current year is under process
2	Arunachal Pradesh	285.14	0.00	118.65	
3	Assam	114.52	162.81	0.00	
4	Chhattisgarh	186.96	0.00	0.00	
5	Gujarat	47.35	0.00	0.00	
6	Haryana	85.46	0.00	171.14	
7	Himachal Pradesh	84.3	0.00	97.54	
8	Jharkhand	257.61	0.00	0.00	
9	Karnataka	0.00	0.00	216.71	
10	Kerala	223.17	210.41	264.27	
11	Madhya Pradesh	302.93	474.59	395.45	
12	Maharashtra	327.08	0.00	682.44	
13	Manipur	138.54	57.6	105.96	
14	Meghalaya	91.62	0.00	0.00	
15	Mizoram	160.12	8.91	18.28	
16	Nagaland	181.12	188.47	175.88	
17	Orissa	475.58	111	150.66	
18	Rajasthan	0.00	0.00	28.87	
19	Sikkim	91.1	161.94	137.59	
20	Tamil Nadu	961.39	741.5	1022.6698	
21	Tripura	84	0.00	0.00	
22	Uttar Pradesh	0.00	834.54	424.36	
23	Uttarakhand	262.73	0.00	278.86	
	Total	4873.24	3786.1	5252.96	

Promotion of AYUSH System of Medicines

Private sector in some States e.g. Karnataka and Kerala have been successful in promoting and generating interest and revenue from the foreign countries through Ayurveda, Homoeopathy, Naturopathy and Holistic treatment centres. Further, details of growing export of AYUSH products are given below:

Export of AYUSH products

(In Rs. Crore)

S. No	EXPORT ITEM	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
1	RAW HERBS (medicinal)	282.02	343.42	448.27	570.2	507.41	512.61	752.87	1077.97	1098.38
2	MEDICAMENTS	248.51	281.28	346.56	591.42	701.44	715.46	873.78	889.93	976.77
3	EXTRACTS (medicinal)	20.63	31.32	27.23	32.73	70.56	51.72	103.76	199.67	192.35
NET TOTAL		551.16	656.02	822.06	1194.35	1279.41	1279.79	1730.41	2167.57	2267.50

(Source: Pharmexcil/ DGCIS)

It also indicates contribution of private sector in global acceptance of AYUSH products.

Many countries have shown interest in promoting AYUSH systems of medicine, but no request has been received by the Department of AYUSH for establishing AYUSH institutions in foreign countries.

The Department of AYUSH has recently revised its Central Sector Scheme of International Cooperation (IC). Under the scheme, the Department supports different activities for promotion of AYUSH systems of medicine, such as international exchange of experts; organization/ participation in international conferences, seminars, workshops; participation of Indian companies in exhibitions/ fairs; offering AYUSH Fellowships/ Scholarships to foreign nationals for pursuing Under Graduate/ Post Graduate/ Ph.D in AYUSH courses at premier institutions in India. Besides, the Department under the IC Scheme establishes AYUSH information Cells in Indian Embassies/ Missions to disseminate authentic information about AYUSH abroad; and sets up AYUSH Academic Chairs at International Institutions/ Universities. Information Cells have since been set up at Malaysia, Trinidad & Tobago, Mexico, Indonesia, Mauritius, Russia and Hungary; and AYUSH Chairs at University of Western Cape, South Africa and University of West Indies, Trinidad & Tobago.

Memorandum of Understandings (MoUs) is also signed with foreign countries for cooperation in the field of Traditional Systems of Medicines. Till date MoUs have been signed with Malaysia, Trinidad & Tobago and Hungary. A letter of intent (LoI) has also been signed with Mexico.

The Department of Commerce promotes AYUSH by related to AYUSH products, medicinal herbs, nutraceuticals and dietary supplements; and by enlarging and diversifying export of identified medicinal plants and herbs through Export Promotion Council, SHEFEXIL etc. Ministry of Tourism also promotes AYUSH Systems of Medicine through organizing and participating in various wellness and medical tourism events; and by running publicity campaigns and organizing road shows in the overseas market.

Ministry of AYUSH has asked the finance ministry to hike the budgetary allocation for propagation and promotion of AYUSH to an extent of Rs.2,700 crore for fiscal 2015-16 from present level of Rs.400 crore, its Minister of State (IC) Mr. ShripadYessoNaik said.

On Inaugurating a Conference on Mainstreaming Ayush: Cultural Heritage for Healing under aegis of PHD Chamber of Commerce and Industry, the minister also disclosed that the Government has an independent drug controller for the AYUSH that will be separated from the drug controller of modern medicine.

The drug controller for AYUSH would be provided with sufficient teeth to regulate the AYUSH as per new policy prescription, who would also be provided with a mandate to issue the certificate of pharmaceutical products (COPP) for exports of AYUSH products, said the minister pointing out that manufacturers of AYUSH would not be required to run from pillar to post to obtain it from the current arrangements.

Recruitment rules are being finalized for the new drug controller and cabinet note being finalized for new regulations of AYUSH products under the new AYUSH health policy which would be unveiled very shortly, Mr. Naik said. He indicated that budgetary allocations for AYUSH until now were meager at about Rs.400 crore for fiscal 2014-15 which need to be multiplied in view of the emerging importance of evolving AYUSH and the ministry has already proposed to the finance ministry to take it to the level of Rs.2,700 crore for the next fiscal, beginning April 2015.

The fresh standards are also being worked out to ensure that quality AYUSH products are made as per new policy prescription so that such products are well tested for their authenticity, credibility and quality.

In his welcome remarks, senior vice president PHD Chamber Mr. Mahesh Gupta urged the government to enhance the yearly allocation for AYUSH to an extent of 20% of the total health budget allocations so that money generated is utilized for the expansion, diversification and broad basing AYUSH.

Chairman, AYUSH Committee of PHD Chamber Mr. PradeepMultani discussed several issues faced by the industry including issues related to COPP - Certificate of Pharmaceutical Products, Skill Development and Training for AYUSH Students, increase in AYUSH budgets, request for a system where export of AYUSH raw materials in not hindered by Forest Department officials of various States, Financial Support for establishment & Upgrade Drug Testing Laboratories. Subsidised Testing fees for micro and small AYUSH industry members to name a few. During his theme address, he focused on the small scale producers and manufacturers of AYUSH products.

Scheme proposed by the Ministry for AYUSH.

For increasing the availability of medicinal plants in the country, the NMPB(National Medicinal Plants Board) under its aforesaid Schemes is mainly supporting the activities / programmes for augmenting the existing resources and cultivation of prioritized Medicinal / herbal plants species.

Presently, as such there is no region specific programme / scheme for the cultivation of herbal plants which are endemic to specific region. However, the programme of cultivation of medicinal / herbal plants is being implemented in the States under the Scheme of National AYUSH Mission (NAM). The Scheme is being implemented in a mission mode through Mission Director identified in the States. The State Mission Directors prepare the State Annual Action Plans (SAAP) for cultivation of prioritized medicinal / herbal plants which are being approved by the Directorate of NAM. NMPB supports cultivation of herbal plants by providing financial assistance in the form of subsidy @ 30%, 50% and 75%. The endemic and endangered herbal plants are generally kept at category eligible for 75% subsidy, so as to promote their cultivation in a large scale. The 95 prioritized medicinal / herbal plants species under the NAM Scheme is annexed.

Conclusion

India is sitting on a gold mine of well-recorded and well-practiced knowledge of traditional herbal medicine. The basic requirements for gaining entry into developed countries include well-documented traditional use, Single-plant medicines, Medicinal plants free from pesticides, heavy metals etc., Standardization based on chemical and activity profile and Safety and stability. Herbal drug development is possible only through the development of standardized herbal products. The health care systems are going to become more and more expensive therefore, we have to develop technologies to essentially introduce and integrate herbal medicine system in our health care. There is an enormous scope for India also to emerge as a major player in the global herbal product based medicine. Let us hope that drug manufactured in accordance with principles of Ayurveda, Siddha and Unani will reach new horizons and make them the best in the world if the quality of the herbal drugs is maintained, efficacy would it self be maintained and then there is nothing to stop them from competing with the modern medicine with added advantages of fewer side effects and lower costs.

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