

General Article

**AGRIBUSINESS AND ENTREPRENEURSHIP DEVELOPMENT
THROUGH MEDICINAL AND AROMATIC PLANTS: AN INDIAN STATE
OF AFFAIRS**

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ABSTRACT

In developing countries like India, agribusiness is a generic term that refers to the various businesses involved in food production, including farming and contract farming, seed supply, agrichemicals, farm machinery, wholesale and distribution, processing, marketing, and retail sales. While in real sense agribusiness is emerging as a specialized branch of knowledge in the field of management sciences and can be defined as science and practice of activities, with backward and forward linkages, related to production, processing, marketing, trade, and distribution of raw and processed food, feed and fibre, including supply of inputs and services for these activities. India is on the threshold of a herbal revolution. In India, nearly 9,500 registered herbal industries and a multitude of unregistered cottage-level herbal units depend upon the continuous supply of medicinal plants. India's total export earnings from the crude drugs, herbal extracts and finished products stand at about Rs. 800 crores (US \$ 160 million). Being a specialised area of knowledge based production and processing, the MAPs have gained importance in agribusiness and development of entrepreneurship and also in transforming the socio-economic status of the poor farmers. Therefore, MAPs have found place in the mandate of several research institutes, government organizations, financial and promotional agencies (CSIR, ICAR, NMPB, DBT, DST, ICMR, NABARD, NMPB, NHB NHM, AYUSH, CAPART, etc.)

Key Words: *Agribusiness, Entrepreneurship, Herbal, Medicinal, Aromatic*

INTRODUCTION

India is an agriculture based country since ancient time which is considered as the backbone of our economy and the agrarian sector contributes substantially to the GDP of India. Around seventy per cent of the Indian population and more than fifty per cent of the total work force still depends on agriculture and allied areas for live hood, agriculture meets the basic needs of India's growing population. Today, agriculture has achieved commercial importance and changed from subsistence farming to commercial farming, import oriented to export oriented sector, supply driven technology to demand driven technology etc. New inputs and new technologies are hitting market every day. In the developed countries, agribusiness is defined as the total output arising from farm production and product processing at both pre- and post-farm gate levels. In developing countries like India, agribusiness is a generic term that refers to the various businesses involved in food production, including farming and contract farming, seed supply, agrichemicals, farm machinery, wholesale and distribution, processing, marketing, and retail sales. Agribusiness is widely used simply as a convenient portmanteau of agriculture and business, referring to the range of activities and disciplines encompassed by modern food production. Hence agribusiness can be defined as science and practice of activities, with backward and forward linkages, related to production, processing, marketing, trade, and distribution of raw and processed food, feed and fibre, including supply of inputs and services for these activities. This paper will discuss the agribusiness as emerging and specialized branch of knowledge in the field of management sciences and give useful

General Article

insights to the policy makers to generate the untapped potential of medicinal plants and promote the entrepreneurship.

AGRICULTURE TO AGRI-BUSINESS

A shift from 'agriculture' to 'agri-business' is being viewed as an essential pathway to revitalize Indian agriculture. While, the share of agriculture in total GDP is declining, it is still the single largest contributor to the GDP and plays a vital role in the overall socio-economic development of India. The share of agri-business will not and is bound to go up with the demand for value addition continuously increasing. In this context, agriculture redefined as the science and practice of activities relating to production, processing, marketing, distribution and trade of food, feed and fibre (Acharya, 2006). India's agricultural sector highly depends upon the monsoon season as heavy rainfall during the time leads to a rich harvest. But the entire year's agriculture cannot possibly depend upon only one season. Taking into account this fact, a second Green Revolution is likely to be formed to overcome such restrictions. An increase in the growth rate and irrigation area, improved water management, improving the soil quality, and diversifying into high value outputs, fruits, vegetables, herbs, flowers, medicinal plants, and bio-diesel are also on the list of the services to be taken by the Green Revolution to improve the agriculture in India.

In developing country like: India, Agri-business which links input supply, farm production, agro-processing and distribution network emerges as a viable option to resolve the problems of unemployment in rural sector. Thus, the prospects of agri-business rely more on off-farm sector of agriculture *viz.*, agricultural input supply, agricultural processing and agricultural marketing-distribution sectors. Therefore, it is directly related to industry and domestic market. India has a vast geographic spread, varied agro-climatic conditions, soils, which facilitates and promoting the production of variety of food and non-food crops. India is the seventh-largest country in the world, with the total land area of 3,287,263 km² and also blessed with varied agro-climatic zones. There are 20 agro-climatic zones (ACZ) and nearly 46 out of 60 soil types in the country (Meena and Pant, 2001).

Human beings are dependent on plant secondary metabolites for their medicinal and aromatic purpose since the beginning of civilization (Gantait *et al.*, 2011). Folk medicine, otherwise known as traditional, complementary or alternative medicine, co-exists with modern allopathic medicine in every country of the world. In fact, a number of important drugs, used in allopathic medicine owe their existence to observation of medicinal practices of indigenous peoples (Cotton, 1996). To name only a few of the important drugs in use today, aspirin, atropine, ephedrine, digoxin, morphine, quinine, reserpine and tubocurarine serve as examples (Rahmatullah *et al.*, 2010). In recent years, traditional medicine has received renewed interest from scientists because of the advent of multidrug resistant microorganisms, serious side-effects obtained with a number of synthetic drugs, and because of the incurable nature of a number of diseases, where modern medicine has failed to make any positive impact (Farnsworth, 1988). Globally, about 85% of the traditional medicines used for primary healthcare derived from plants (Tewari, 1999). Over 7500 plant species are used by 4635 communities for human and veterinary health care. It is estimated that 20,000 species of agricultural forms in India alone, about 9,500 species are of ethnobotanical importance and about 2,500 plant species belonging to more than 1000 genera are being used in Indigenous system of Medicine. The majority of them are higher flowering plants representing about 158 families (Tewari, 1999). It is well known throughout the world that India is the land of aromatic plants or the land of spices, or the land of traditional perfumes because it possesses favourable climatic conditions suitable for the development of aromatic plants. These plants have been used commercially as spices and as sources of raw material for essential-oil industry (Gantait *et al.*, 2011). Hence cultivation of medicinal and aromatic plants (MAPs) provides sustainable means of natural source of high value industrial raw material for pharmaceutical, agrichemical, food and cosmetic industries and also opens up new possibilities for higher level of gains for farmers with a significant scope for progress in rural economy

General Article

(Khanuja *et al.*, 2005a). These plants have been known and used since ancient times to heal and cure diseases. In India, medicinal and aromatic crops presently cover an area of about 0.5 million hectares. Some of the important MAPs currently cultivated on large scale in India are Mints (*Mentha sp.*), Damask rose, *Ocimum sp.* (Tulsi) in the Indo-gangetic belt, Lemongrass, Rosemary, Geranium, Patchouli and Eucalyptus in southern parts of India, Lavender, Pyrethrum, Clarysage in the temperate region of Northern India, Citronella in the north eastern regions and Ashwagandha, Senna and Isabgol in western and central parts of India. Hence, there is a good scope of agri-business in medicinal and aromatic plants cultivation because of the industrial demand for the medicinal plant resources has been on the rise due to the worldwide buoyancy in the herbal sector engaged in production of herbal health care formulations; herbal based cosmetic products and herbal nutritional supplements. Though a large volume of the medicinal plants are still collected from forests, the growing regular demand of MAPs and their products and greater concern towards quality has necessitated the systematic cultivation of these plants which is expected to increase with estimated annual growth rate of 10-15 % leading to significant contribution in the MAPs agribusiness.

India is on the threshold of an herbal revolution. With the rich wealth of herbs, we can command the world herbal scene. But there are so many obstacles we have to cross before we become a superpower in the herbal scene (Daniel, 2004). Herbal product exports can be accelerated with the setting up of Export Processing Zones (EPZs) in about 12 Indian states as their demand soars at a rate of over 25 per cent in countries like the US, Britain, Spain, Australia, Russia and Indonesia (Assocham, 2008). In India, nearly 9,500 registered herbal industries and a multitude of unregistered cottage-level herbal units depend upon the continuous supply of medicinal plants for manufacture of herbal medical formulations based on Indian Systems of Medicine. In addition to the industrial consumption, significant quantities of medicinal plant resources are consumed in the country under its traditional health care practices at the household level, by traditional healers and by practitioners of Indian Systems of Medicine (Ved and Goraya 2007).

ECONOMIC POTENTIAL

Medicinal and aromatic plants (MAPs) are receiving considerable attention all over the world because of their vast untapped economic potential, especially in the use of herbal medicines. India is a varietal emporium of the medicinal and aromatic plants (MAPs) and we have well-established local healthcare tradition still relevant in indigenous healthcare system (Kapoor, 2012). The Indian system of medicines derive many of their curative tools from plants (Kumar *et al.*, 2005) and the information about the plants used as drugs are also available in old Indian literature such as Charaka Samhita, Atharvaveda and Sushruta Samhita etc. (Tomar, 2009). It constitutes of 11% of total known world flora having medical property (Sati *et al.*, 2010 and Balasundaran *et al.*, 2011). The wide diversity of MAPs potential is under explored with respect to few species and over exploited in case of few other species. India with its diverse resource base of medicinal plants on one hand and its ancient knowledge on Ayurveda medicine on the other hand has a great potential in the field of MAPs (Barua, 2010). The MAPs offer a wide range of safe and cost effective, preventive and curative therapies, which are useful in achieving the goal of 'health for all'. The age long intrinsic relationship between the human races with the plant resources and scientific approach for their exploration; conservation and value addition may be the key points for entrepreneurship and agribusiness development by exploiting the indigenous technology knowledge. As per World Health Organisation (WHO) estimates, almost 80% of the population of developing countries relies on traditional medicines, mostly plant drugs, for their primary health care needs (WHO 1993; Ishtiaq *et al.*, 2006; Hamayun *et al.*, 2006; Sharma *et al.*, 2008; Kumar and Chandrashekar, 2011 and Abdel-Azim *et al.*, 2011). In fact it is well known that even in developed countries, the use of traditional medicines is quite prevalent. Also, modern pharmacopoeia still contains at least 25% drugs derived from plants (Karaman and Kocabas, 2001 and Hegazy *et al.*, 2011) and many others which are synthetic analogues built on prototype compounds isolated from plants. Demand for medicinal plants is increasing

General Article

in both developing and developed countries due to growing recognition of natural products being non-narcotic, having no side-effects, easily available at affordable prices and sometime the only source of health care available to the poor (Ishtiaq *et al.*, 2007). In India, Medicinal plants sector has traditionally occupied an important position in the socio cultural, spiritual and medicinal arena of rural and tribal lives. Recognizing its importance, the Government of India established the Department of Indian System of Medicine and Homoeopathy, and more recently the Medicinal Plants Board to develop, promote and regulate the sector for maximizing the benefits to the people as well as to ensure sustainable growth. Medicinal plants have been identified as one of the thrust areas by the Ministry and different programmes have been initiated for conservation of medicinal plants found in the forests and protected areas as well as cultivation of these plants in the degraded forest areas. During the past decade, a substantial increase in exports of MAPs attests to global interest in their products as well as in traditional health system. Commercially, these plant derived medicines, essential oil and products are worth about US \$ 72 billion (Rs. 360,000 crores) world wide which include global business of medicinal herbal material of US \$ 60 billion (Rs. 300,000 crores) (Khanuja *et al.*, 2006). According to the WHO the international market for herbal products estimates the projected demand for medicinal plants alone by the year 2050 would be US \$ 5 trillion (Rs. 250,00,000 crores) (Purohit and Vyas, 2005). India has already occupied a respectful position on the global trade of MAP and plant based pharmaceutical products. The domestic market of Indian System of Medicine and Homeopathy (ISMH) is of the order of Rs. 4000 crores (US \$ 800 million) of which ayurvedic drug market alone is about Rs. 3500 crores (US \$ 700 million). India's total export earnings from the crude drugs, herbal extracts and finished products stand at about Rs. 800 crores (US \$ 160 million). Interestingly, on the essential oils front, from the essential oil crops as against the world production of 1,10,000 t (US\$ 9200 million), India contributes about 15% in terms of production and much better proportion of 21% for the value. But amazingly, India's share in world export of essential oil and perfumery materials is merely 0.4%. It is estimated that India's annual production of MAPs raw materials may equal to about 6000 crores (US \$1200 million). The future thus holds great promise for India in the fast changing global economy as far as production and trade of natural raw material is concerned. Pharmaceutical export as a per cent of India's total export was nearly 0.55 during 1970-71, which has increased gradually and in the year 2000 it was 4.07, while in 2010-11 India's share in herbal export stands at 8.13 percent. In terms of numbers, India's share in the export of medicinal plants and herbs in the global market during the financial year 2010-11 is Rs 685.14 crore only 40 per cent is value addition and 60 per cent is export of raw medicinal plants. But neither domestic farmers be ever given better prices nor could tribal people be given more returns for collection of these medicinal plants. In India, medicinal plants are registered as a Minor Forest Produce (MFP) hence there is a need to move away from unsustainable exploitation of forest wealth to contract farming where there is a link between the producer and the grower for better livelihood. It is also more worrisome that in crops, which are grown only in India such as isabgol, psyllium, there are 848 patents in the last two decades in the USPTO and only four out of these are by Indians.

India is one of the major exporters of crude drugs (Quraishi *et al.*, 2011) mainly to the six developed countries, (USA, Germany, France, Switzerland, UK and Japan) about 75% to 80% of the total exports of crude drugs from India. Better realisation in the overseas market will also in turn result in better remuneration to the farmers. The principal herbal drugs that have been finding a good markets in foreign countries are Aconite, Aloe, Ammimajus, Belladonna, Bach, *Cinchona*, *Cassia tora*, *Dioscorea*, *Digitalis*, Ephedra, Ergot, Hyoscymus, Ipecac, Isabgol, Liquorice, Opium, Papain, *Podophyllum*, Pyrethrum, *Rauwolfia*, Rhubarb, Senna, Stramonium, Valerian, Senna leaves, Isabgol seeds/husk and *Cassia tora* seeds are in maximum demand. An integrated approach is required to promote the exports of medicinal plants right from the stage of cultivation, collection, storage, processing, packaging to marketing in an organised manner for selected medicinal plant species. India is already recognized as a highly attractive

General Article

base for RandD and clinical trials, with several of the world's leading pharmaceuticals and biotechnology companies successfully establishing their operations.

Strengthening of village's economy through innovative means demands a real participatory approach of all the components of the value chain based on resource and knowledge sharing. An alliance of farm, science and business could act as a driving force in improving villager's economy. The medicinal and aromatic plants (MAPs) are emerging as the industrial crops that require comparatively less inputs but gives better returns to the growers. These crops also fit well in the existing cropping system thus leaving no chance of adverse effect on the production of food grains and ensuring optimum utilization of available land resources, The industry's participation in this endeavour gives a boost to not only to the development of required infrastructure but also to the market development of agri produce. The majority of the farmers with small land holdings face the problems of traditional technology and management practice, input constraints like authentic and quality planting material, higher and increasing cost of inputs, inadequate infrastructure, processing and marketing. In such a scenario industry-farmer agreement for demand driven cultivation may facilitate private companies to develop a close interaction with farmers with backup of technology from public RandD organizations for uniform quality inputs technological guidance, post-harvest processing facilities and importantly marketing and assured cash returns. Such committed farming is basically an organizational arrangement that allows industries to participate in and exert control over the production process without owning or operating the farms and to be known as contract farming. This contract farming (or demand farming-a better concept) may help in developing the national market for medicinal plants. A new initiative in the form of National Mission on Medicinal Plants has been approved by the Government which seeks to promote market driven cultivation, focus on development of selected clusters with potential for inclusive growth in agri-business through medicinal plants and thereby improve the market access of growers/farmers for more remunerative prices for their produce and better quality of raw material for the Ayurvedic, Siddha and Unani industry.

Further, India presents a great investment and business opportunity in the herbal sector, with the prospects of the country emerging as a global leader in the field. In recent times, there has been an enlightened awareness among the citizens of the country about the natural advantages that this country is endowed with. Herbal tea is one of the most commonly used aromatic herbs, which has its own importance. It is gaining popularity due to its multipoint effects. The thrust area is to develop the disease-specific herbal tea. All this proves that India has one of the richest plant medical cultures in the world. There exists innumerable opportunities in the various segments of aromatic, medicinal and herbal plantations. Various efforts, both at the Central and State level, have been actively undertaken to attract significant investments into the sector and promote entrepreneurial activities therein. The drug industry in India has been importing artemisinin and the non-availability of raw material (Cyranoski, 2004; Enserink, 2005) demands sustainable cultivation of this crop for which World Health Organization (WHO) and Medicine for Malaria Venture (MMV) are highly concerned. A new replicable model of public-private partnership (PPP) facilitated to link farmers and pharma industry on a research driven business model which is leading to not only industrial productivity and business but also enhancing the rural incomes complete with improving health of society by combating deadly malaria from developing and underdeveloped world. MAPs have transformed the socio-economic status of the poor farmers with all round improvement in quality of their life with visible impacts in the form of housing, nutrition in form of balanced meals to the family, mechanization of their farms and machinery including post-harvest processing capabilities and their visible move towards literacy with their children going to school realizing the need of education in capability build up for entrepreneurship. The value chain from production to processing established the marketing right in the villages has not only provided the marketing linkages with the industry but also paved the path of innovative concept of technology dissemination for commercial agriculture enabling farmers to enhance their income. This also sets an

General Article

example of how plant varieties and linked patents (IP) will open new opportunities for business and societal health simultaneously involving pharma or other industries.

Being a specialised area of knowledge based production and processing, the MAPs have gained importance in agribusiness and development of entrepreneurship. The major players in this sector comprise of producers, processors drug manufactures, distillers perfumers, flavorists, traders, exporters, etc.

This close interaction of the scientists with farmers and industries has further indicated that development and dissemination of the location specific and need based technology packages may be amply demonstrated through technologies which are now serving as a model for crops like mint, geranium, *Artemisia*, *safed musli*, *giggul*, *vanilla*, *sarpgandha (Rauvolfia serpentina)*, *stevia*, *vetiver (Khus)*, *patchouli*, *lemongrass* and *kalmegh*. As majority of the farmers have small land holdings, industries are required to support them by providing market outlets or setting up processing facilities in the vicinity for converting the produce (green herb) from perishable to non-perishable zone. Such a hand holding by the industries world give a fillip to the overall growth of MAPs production and processing to meet the domestic demand and also to capture global market. Governments' initiatives in strengthening the necessary infrastructure to support MAPs related production and processing activities are also desirable. The role of research organizations in making available latest technologies to the farmers and entrepreneurs has resulted in establishing the replicable models in different parts of the country. With the participation of government and private industries and farming communities, the MAPs its clusters can be transferred into a viable MAPs production and export zones (MAPPEZ) in the country. The country today is witnessing a boom in retailing that has also made its presence felt in agricultural and horticultural commodities. Mentha oil has found its overdue place in commodity exchanges such as NCDEX and MCX and huge volume is now being traded. The days are not far away when the MAPs and its products shall reach to the organized retail market ensuring better prices to the in farmers and raising India's contribution to the world MAPs market to an appreciable level.

It is also pertinent to have information on the current availability of MAPs resources in the country and to assess the need of SandT interventions required to sustain it such that research and business could complement each other for the benefit of all concerned.

OPPORTUNITIES AVAILABLE

MAPs offer several opportunities towards developing agri-entrepreneurship in various ways. Some of these are enumerated as under:

- The farmer's holding small land can grow these crops in rotation or as intercrop with cereals or vegetable crops to enhance per unit area return. Some of the MAPs are also suitable for cultivation in degraded salt-affected soils, stressed conditions and as under crops in orchards thus ensuring optimal use of the available land and other resources to the economic advantage of the growers.
- Putting up of the processing facilities in the aromatic plants growing areas is another income generating opportunity for a farmer who can extend the facility to the fellow growers.
- Production of truthfully labelled seeds and propagules in collaboration with the research organizations can open new avenues in the area where possibilities of MAPs cultivation are gaining momentum.
- Companies or industries requiring quality raw material of MAPs in bulk are now coming forward to join hands with the research organizations for acquiring knowhow for cultivation and promoting the MAPs cultivation through contractual cultivation.
- Providing technical guidance and consultancy to the farmers by the qualified entrepreneurs and establishing testing facilities and agri-clinics are some of the important areas of emerging opportunities in this sector. Agriculture and horticulture department's recent initiatives in developing scientifically trained human resource through various regular farmers-scientist interaction programmes are likely to make a visible impact in this regard.

General Article

- Establishing GMP compliant processing, manufacturing and value addition facilities are some of the high-tech areas requiring attention in the near future to capture the global business opportunities. It would not be out of place to mention that with the innovation in production, processing, value addition and marketing, several new opportunities are bound to emerge which can place India on the front line in the global arena.

GLOBAL MARKETING OPPORTUNITIES

Export opportunities of natural products are tremendous, as the world is looking towards natural sources for the purposes of therapeutic use as well as nutritional dietary supplements.

The global herbal remedies market can be classified into five strategic areas:

- Phyto-Pharmaceuticals the plant based drugs containing isolated pure active compounds used to treat diseases;
- Medicinal Botanicals / Dietary Supplements -the whole plant or plant-part extracts used for maintenance of health by affecting a body structure and its function;
- Nutraceuticals-the food containing supplements from natural (botanical) sources, that deliver a specific health benefit, including prevention and treatment of disease;
- Cosmeceuticals-the cosmetic products which contain biologically active ingredients having an effect on the user and
- Herbal raw material.

Possibilities for Outsourcing

With the increase in demand of quality material for pharma, perfumery and flavour industries the research and development activities in MAPs have found place in the mandate of several research institutes, government organizations and promotional agencies (CSIR, ICAR, NMPB, DBT, DST, ICMR, etc.), state and central agriculture universities and even in private sector. Central institute of Medicinal and Aromatic Plants (CIMAP), a pioneer institute of CSIR, has exclusive mandate for RandD in MAPs contributing significantly to the overall development of these in the country for the last about five decades. Recently, the institutes have been recognized as the focal point of ICS-UNIDO in South East Asia in the area of MAPs. Few other institutes of CSIR such as IHBT, Palampur, NBRI Lucknow, Indian Institute of Integrative Medicine (IIIM) (formally RRL, Jammu) and North-East Institute of Science and Technology (NEIST) (formally RRL, Jorhat) also have some projects/ activities relating to medicinal and aromatic plants. These organization / institutes can be contacted for outsourcing of improved knowhow for cultivation (agrotechnology), quality planting material, training, processing technology, quality testing, literature and other available services. It is always essential to have marketing tie -ups in order to avoid financial loss and the institute like CIMAP can help the growers to forge linkage with buyers/ industries in some selected MAPs depending upon their requirement and market demand.

For seeking financial assistance, schemes and subsidies, the growers and processors can approach National Bank for Agriculture and Rural Development (NABARD) and other nationalized banks, National Medicinal Plants Board (NMPB), National Horticultural Board (NHB), National Horticulture Mission (NHM) of the respective states, other promotional and funding agencies of the country such as, DBT, DST, AYUSH, CAPART, etc.

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General Article

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General Article

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