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Issues and opportunities for startup of small scale enterprises through medicinal and aromatic plant cultivation in Bihar

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Abstract

India has been considered as a treasure house of valuable medicinal and aromatic plant species. Some attempts have just begun to encourage farmers to cultivate medicinal plants. In the present context of 'back to nature' in health care, it is relevant that these valuable plant species are not only conserved but also promoted for commercial cultivation in order to meet the increasing demand within the domestic and export markets. Medicinal and aromatic plants (MAPs) are perceived as diversification crops in Indian agriculture due to growing recognition of natural products, being non-narcotic, having no side-effects, easily available at affordable prices. Medicinal and Aromatic plants (MAPs) contribute significantly to rural economy and health security of the country. More than 90% of the formulations under the Indian systems of medicine contain plant-based raw materials India exports herbal materials and medicines to the tune of nearly 600 corers annually and herbal based drug industry in the country is valued more than 4000 corers annually. In Bihar, area under MAP cultivation is 2600 ha only which is far below the national average. Thus, the status of Medicinal and Aromatic Plants cultivation is still negligible in Bihar. Though commercial cultivation of *Mentha* and *Lemon grass* are picking up in the state but still a lot of efforts are required to observe the real impacts of MAPs cultivation. The time is right to utilize the global demand for Indian medicinal plants and their chemicals by sustainable production of quality herbals through scientific cultivation of these crops. Thus, development of suitable agronomic practices for MAPs is crucial to convert these plants into economically viable components in existing cropping systems of Bihar. Therefore, it is necessary for individual state to motivate farmers towards profitable cultivation of MAP crops for their livelihood security in rural area.

Keywords: small scale enterprises, medicinal, aromatic, plant cultivation Bihar

Introduction

According to World Health Organization (WHO), "a medicinal plant is any plant which, in one or more of its organs, contains substances that can be used for therapeutic purposes, or which are precursors for chemo-pharmaceutical semi-synthesis." Whereas Aromatic Plants are essential oil yielding plants. They have volatile, odoriferous oils in special cells, glands or ducts located in different parts of a plant, such as, the leaves, barks, roots, flowers and fruits

The cultivation of MAP crops provides sustainable means of natural source of high value industrial raw material for pharmaceutical, agro-chemical, food and cosmetic industries and opens up new possibilities for higher level of gains for farmer with a significant scope for progress in rural economy. The Medicinal Plant Specialist Group of the World Conservation Union (IUCN) predicts that at least 15000 plant species used in herbal products could be threatened. An estimated 40,0000 tones of MAPs are traded annually and more than 70 percent

of the plant species used in herbal medicines, cosmetics, and other plant-based products are harvested from the wild, and the demand for them is globally increasing (Leaman, 2008) [4]. The Ministry of Environment and Forests, Government of India have identified and documented over 10,500 plant species considering their importance in the pharmaceutical industry. Out of which 8000 medicinal and 2500 aromatic plants that can make India a global leader in the 21st century due to large number of consumer products with national and international demand. (Rajeswara Rao *et al.*, 2012) [6]. India regularly exports over 40000-50000 tons of dried herbs and herbal plant parts to the western world (mostly USA, Europe and Japan). In addition, the local industries and rural households consume another 270000-280000 tons (Ved and Goraya; 2008). Despite being a major player, the share of India in global trade of MAPs is merely 0.5 per cent, It is estimated that India exports herbal materials and medicines to the tune of nearly 600 corers annually (Anonymous, 2000) [11] whereas the countries, like China exports plants and raw drugs, therapeutics and other MAPs worth Rs 18,000 corers annually (Singh, 2005a) [7].

Sstatus of MAPs cultivation in India and Bihar

In India, medicinal plants and aromatic plants are cultivated over more than 1.10 lakh ha and 2 lakh ha, respectively. (Singh, 2009b) [8]. In Bihar, total gross cropped area is 84.04 lakh ha. Out of which, Medicinal and Aromatic Plants were cultivated only on 2600 ha area (Table. 1) and about 43.0% area is rain-fed as well as 4.36% lands are remains barren and non-cultivable which can be utilized for MAPs cultivation. Commercially, *Mentha* and *Lemon grass* have emerged as the major players and shared more than 95% total area and production of MAPs in the state (Das *et al.*, 2018) [3]. Thus, the status of medicinal and aromatic plants in Bihar is still negligible. Commercial cultivation of some of the species of MAPs (*Mentha* and *Lemon grass*) are picking up in the state but still a lot of efforts are required to observe the real impacts of their cultivation. Impetus in terms of planning, funding, production, processing, and strong market linkage is essential to harness the potentials of commercial production of MAPs.

Table 1: Area and production of various MAPs cultivation in Bihar

Medicinal Plants	Area (ha)	Production (tons)
Mentha	2100.00	252.00
Lemon Grass	185.00	25.90
<i>Java Citronella</i>	38.00	4.75
Jama Rosa / CN – 5	35.00	5.25
Tulsi	32.00	3.20
<i>Jatropha</i>	29.00	145.00
Palma Rosa	20.00	2.00
<i>Shatawar</i>	17.00	127.50
Safed Musli	16.00	24.0
Kalmegh	15.00	45.0
Sarpgandha	12.00	19.2
<i>Buch</i>	6.00	19.20
Others	95.00	
Total	2600	

(Source: Anonymous, 2009) [2].

Existing opportunities for MAPs cultivation in Bihar

1. Agro-climatic condition in the state is favorable
2. Use of plant as drug is quite common among rural masses from generation to generation here by rural physicians, bone-setters etc.
3. Availability of manpower is quite common feature here about 10-15 lakh labour-force migrates every year.

4. Low cost of production of MAPs in the state
5. Govt. is also encouraging and providing fund for the growth of this sector
6. Innovative nature of farmers forced them to discover new herbs as they avoid going to physician and adopting modern medicine.
7. About 4.36% land share barren and non-cultivated which can be used for the production of herbs and medicinal plants.
8. Within the state about 57% of 84.04 lakh ha. Of gross cropped area is irrigated and the rest 43% is rain-fed cultivation of medicinal plant can be in rain-fed area.

Medicinal plant products for startup of small scale enterprises

According to Rajeswara Rao *et al.* (2012) [6], small scale enterprises can be started with the following medicinal plants products:

1. **Seeds:** Production and marketing of quality seeds of high yielding varieties (seed companies).
2. **Plant parts (leaf, bark, root, seed etc.):** Enterprises such as large scale cultivation as an agro-industry, marketing of dried plant parts (crude drugs) in national and international markets, establishing market net works can be started. Grading of specific plant parts such as leaves of senna, roots of ashwagandha/ safed musli/ long pepper etc. This is the simplest but economically viable small enterprise that can be established at farm level and can add value to the harvested produce.
3. **Powders:** With the availability of electricity in villages it is pos-sible to establish medicinal plant powders industry as a cot-tage or village industry by installing simple machinery such as grinders and packing machines. Some self help groups and individual entrepreneurs have already started marketing herbal powders that are safe to use e.g. Powders of ashwagandha, triphala, stevia, isabgol etc.
4. **Herbal teas:** Dried herbal plant parts powdered to specific mesh size and packed in tea bags or sachets are becoming popular world over. China is credited with utilizing more than 200 medicinal plants as herbal teas.
5. **Herbal juices:** sherbaths, herbal drinks- These are traditionally used in several countries and are currently aggressively mar-keted by countries like China, Thailand etc. Herbal beer is being marketed by a firm in India. Herbal drinks such as nan-nari, sugandhipala etc. are well known.
6. **Herbal chocolates, sweets etc:** Sugar free sweets, drinks etc are being marketed internationally. Use of herbal extracts in food products is not a new idea.
7. **Herbal extracts:** Solvent extracts of several medicinal plants with specified minimum concentration of chemicals are traded globally. A number of small, medium and large industries are currently producing hundreds of such extracts.
8. **Extraction of medicinal chemicals:** Technologies are available for isolation of pure phyto-chemicals such as alkaloids, glyco-sides, flavonoids, steroids, coumarins etc. from several medic-inal plants and these are regularly used by the allopathic drug industry.
9. **Plant drugs:** This is an age old well known industry manufac-turing plant based drugs in traditional systems of medicine such as Ayurveda, Siddha, Homeopathy etc.
10. **Herbal cosmetics/cosmeceuticals:** Though herbs have been used since several centuries as beauty aids, products

made from medicinal plants in combination with other beauty enhancing products is becoming popular world over. Examples include many aloe products, herbal hair oils, herbal soaps etc.

11. **Nutraceuticals-** This is a sun rise industry with a large potential for small and medium enterprises.
12. **Herbal pesticides-** This enterprise has enormous potential in future.
13. **Bye product utilization-** Many enterprises can be established at rural level making use of bye products/waste material.

Issues related to MAPs cultivation

According to Malik (2007)^[5], there are various issues related to MAPs cultivation. These issues are:

1. Research priority in the first instance should focus efforts in developing suitable planting material and associated package of practices for cultivation of such species. In addition there are about 15 medicinal plants which are currently imported to meet the internal demand and therefore for the purpose of import substitution, developing suitable cultivation techniques for their cultivation is necessary
2. Systematic cultivation of medicinal and aromatic plants need specie-specific and location specific cultural practices, depending on prevailing soil, water and climatic conditions at a given location. Hence research and development work and cultivation techniques have to be tailored keeping these in view, though efforts need to be made towards standardization of cultivation practices and harvesting times to get the desired quality of medicinal and aromatic plants
3. While developing cultivated varieties, efforts need to be made towards genetic enhancement of at least some of these species, as compared to that of species found in the wild, by different methods of breeding including through traditional genetic transformation and use of biotechnology
4. Non availability of suitable and adequate planting material at the right time severely constrains the adoption by farmers of these crops. More nurseries in different parts of the State need to be developed to make planting material easily available to farmers
5. Widespread field demonstrations of species developed for cultivation will motivate the farmers to adopt cultivation of medicinal and aromatic plants. Some of the improved production technologies developed at research stations have not been transferred to the field to the required extent due to lack of sufficient extension personnel and infrastructure. More efforts need to be invested in this direction.
6. Given the growing demand for organic products, more so for medicinal and aromatic plants, efforts should be directed towards development of such species which are suitable for cultivation under organic farming conditions
7. If appropriate cultivation practices are developed and the crop economics is favorable, efforts can also be made to popularize cultivation of medicinal & aromatic plants in green houses as well as inter-crops
8. Even simple interventions, such as, better method of harvesting, storage, grading and local level value addition can substantially improve returns to local people. Lack of knowledge on these issues has been an important constraining factor in realizing these benefits. There is a

- need for capacity building of farmers and extension workers so that returns from cultivation can be improved
9. The State has a good network of State and Central institutions and research centres undertaking research on various aspects of cultivation of medicinal and aromatic plants. However there does not appear to be much coordination amongst different institutions as a result of which there are some overlaps and duplication of efforts on the part of these agencies. Apart from better coordination amongst these agencies there is a need for an added interaction and coordination between these research institutions and marketing and processing agencies so that a proper market feedback could be obtained and research efforts could be prioritized accordingly.
10. In addition, to meet the domestic as well as international quality standards, post harvest marketing operations e.g., harvesting, grading and standardization, system of certification, packing and transportation need to be improved. For international regulations it may also be necessary to have ISO systems of certification

Suggestive measures for MAPs cultivation

Farmers and entrepreneurs who wish to cultivate or start an enter-prise based on MAPs are advised to carefully consider the following points

1. Assess the suitability of the area for cultivation of MAPs: Soil and water tests are desirable.
2. Collect complete information about the MAPs intended for cultivation: Central and State Government organizations/Departments, cultivating farmers provide the desired information.
3. Discuss the proposal with all partners to establish a farming enterprise or for value addition.
4. Survey the market and satisfy yourself concerning marketing opportunities and future demand.
5. Arrange for funds through self-investment, loans, subsidies etc.
6. Create irrigation facilities and drying facilities.
7. Practice organic farming methods as far as possible and be prepared to obtain organic certification from certified agencies.
8. Procure good planting material from authentic sources. Follow the following agronomical practices for higher yields and quality
 1. Plant the crop in the right season and time to avoid delayed planting
 2. Ensure periodical supervision of the work force in case of absent landlordism particularly at inputs application (fertilizers/manures, other chemicals) time and when engaging many workers for weeding, harvesting etc.
 3. Practice organic prophylactic measures to prevent/check pests and diseases.
 4. Apply inputs (manures, fertilizers, irrigation) at appropriate time.
 5. Harvest at the right time. Delay in harvesting results in low yields and poor quality of the produce.
 6. Ensure proper drying of the harvested material before storing.
 7. Follow recommended methods for packing and storing the dried produce.
 8. Test the quality of the produce before marketing.

9. Market as soon as possible. Improper post-harvest handling and storing reduces shelf-life and quality of the produce

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Conclusion

Cultivation of medicinal and aromatic crops need to be promoted not only to conserve the fast extincting species found in the wild but also to meet the ever growing demand for consumption of these plants both from within the country and also from abroad. Shift towards cultivation of medicinal and aromatic plants, in addition, is also expected to raise the profitability from crop cultivation leading to increased incomes of the farmers. Despite the multifarious advantages associated with cultivation of medicinal and aromatic crops, their adoption for cultivation by farmers has not however so far been very encouraging. This is in large part due to the fact that medicinal and aromatic plants sector in India operates in a near policy vacuum. Though commercial cultivation of *Mentha* and *Lemon grass* are picking up in the state but some of the species of MAPs like *Java Citronella*, *Tulsi*, *Satawar*, *Safed Musali* and *Aloevera* needs to be prioritized for promotion of commercial cultivation in Bihar. Encouraging cultivation of these crops require concurrent policies and effective actions aimed at regulating collection of medicinal plants from wild; research, development and extension efforts aimed at developing newer plant varieties suitable for cultivation and their propagation and adoption by farmers; organizing effective post harvesting marketing and trade operations including their processing and exports and developing an efficient marketing infrastructure, and building an efficient information base, including marketing intelligence, and its proper and timely dissemination.

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