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Production of Herbal and Medicinal Plant: An Innovative Effort Towards Sustainable Development (A Case Study of Bihar)

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1. Introduction

The insatiable hunger of new civilization is threatening the healthy and diverse biological order as it is consuming resource at a much faster rate and thus posing great danger to the future generation smooth survival. So there is strong need of innovation regarding sustainable development. Local innovations have played an essential role in this direction for long-term sustainable development. Innovations for sustainable development often involves local communities utilizing locally used knowledge which is evident in the production of Herbal and Medicinal Plants.

Economy of Bihar development is almost exclusively upon agriculture, which is full of potentialities of Innovation regarding sustainable development. Those who are engaged in cultivation of different crops are small and marginal farmers with small holding (less than 1 ha.). Due to weak economic status they do not use vital inputs to their crop in time. Obviously this result in low productivity of crops, so in Bihar who started medicinal plants cultivation are innovative farmers.Especially in flood prone area farmers tends towards non-traditional in between February-July that means before rainy season" (Report from National mission or Medicinal plants-Govt.of Bihar).

In Bihar there are ample opportunities exist for diversified sustainable agriculture in different agro eco-system. Systematic cultivation of high value medicinal and aromatic plants under prevailing agro ecological condition is one of the sincere efforts in the direction of sustainable development.

2. Objective

Therefore, the objective of my study is –

(1) To find out the potentialities in the production of herbal and medicinal plant in Bihar,
(2) What are the problems in its farming in Bihar,
(3) What effort has been done by the govt. for increasing its production and

(4) Lastly I want to suggest some measures for its growth.

3. Methodology

My study is based on secondary data derived from different Journals and Reports of Govt. of India, Govt. of Bihar, National Horticulture Board, Economic Survey of Bihar, State Horticulture Mission Bihar, Dept. of Agriculture Govt. of Bihar etc. and report of Medicinal Plants Conservation Centre India.

4. Hypothesis

My hypothesis is that production of herbal and medicinal plants is really an innovative effort towards sustainable development. In Bihar there is ample scope of growing medicinal plants. It will help in increasing the income of farmers.

5. Review of Literature

So many studies have been done in this area. WHO(2002) has estimated that over 80% of the world population still depends on plant based traditional medicine Stephen Schinerer (Centre forIndigenous Fisheries and Biodiversity related Knowledge School of environmental Science and Management Southern Cross University Lismore Australia) has stated that through observation, assessment and experimentation indigenouspeople have successfully adapted their mode of production to agricultural system, harvesting routine, fishing and pharmaceutical properties of different plants.

Purohit and Vyas in 2004 have also focused that there is huge demand for herbal products in global market. But India's share in global trade of Medicinal and Herbal plant is less than 1%. Apart from them Nautiyal in 1995 and Rao and Saxena in 1994 have studied on this issue. Indian Council for Agricultural Research (ICAR), National Research Centre for Medicinal and Aromatic Plants, The Council for Scientific and Industrial Research (CSIR) and National Horticulture Board have also made study on it. Equator Initiative Environment and energy group United Nations Development Programme (UNDP) has worked on so many projects of conservation of medicinal plants.

6. Result and Discussion

India has rich diversity of medicinal plants. The supply base of 90% herbal raw drugs is used in the manufacture of Ayurveda, Siddha, Unani and homeopathy system of medicine. Conservation and sustainable use of medicinal plants is a need of today as their base is shrinking day by day. Cultivation of it is a potential provider of returns to the farmers. As estimated by the WHO (2002) on primary health care of over 80% of the world's population still depends on plant based traditional medicines. The global market of herbal product is continuously expanding yet India's share is only 0.5%. As

stated by Purohit (2004) that due to lacking in the awareness among farmers they do not recognize the potential of these plants.Bihar is located in the eastern part of the country. If we divide this state according to agro- climatic zone we find its three categories:-

1) Agro-Climatic Zone -i
2) Agro- Climatic Zone –ii
3) Agro-Climatic Zone -iii

West-Champaran,East-Champaran, Siwan, Saran, Sitamarhi, Sheohar, Muzaffarpur, Vaishali, Madhubani, Darbhanga,Samastipur, Gopalganj and Begusarai are Zone-I districts.

Purnea, Katihar, saharsa, Supaul, Madhepura, Khagaria, Araria and Kishanganj are Zone-II districts, while Rohtas, Bhojpur, Buxer, Bhabhua, Arwal, Patna, Nalanda, Nawadah, Shekhpura, Jahanabad, Aurangabad, Gaya, Munger, Bhagalpur, Banka, Jamui and Lakhisari are Zone-iii districts.

7. Suitability of crops proposed with reference to Agro-climatic Zone

a) **In agro climatic zone-I**, soil is mostly calcareous or sandy loam and loam (Economic Survey of Bihar). Average rainfall is 1040-1050 mms. In this zone Buch,Kalmegh, Shatawar,ShewtMusli, Amla, Tulsi, Ashwagandha, Sarpgandha, Kalihari, and Mint are the main medicinal crops.
b) **In agro climatic zone-II,** soil is mostly loam and clay loam. Here average rainfall is from 1200-1700 mms. In this zone also Buch, Artimisia, Tulsi, Pippli, Patherchur, Mint and Cybopogan spp. are the main medicinal plant.
c) **In agro climatic zone-III,**soil is sandy loam, clay loam, loam and clay. This zone receives annual rainfall around 990-1300 mms. Here Buch, Ghritkumari, Kalmegh, Shatawar, Brahmi, Ratalu, Amla, Tulsi, Ashwagandha, Tejpat, Dalchini, Patherchur, Sarpgandha, Kalihari, Gugaletc are cultivated.

8. Potential for development of Medicinal plants

The Geographical area of Bihar was 9359.57 thousand hectare in 2009-10. Out of which 6.6% is forest area, 14.2% is land area and net sown area is 57% while cropping intensity is 1.37% (Directorate of Economics and Statistics, Govt. of Bihar). Land use pattern in Bihar exhibit substantial variation due to different agro-climate zones. So Bihar is the state where 81% of the population employed in the agricultural production system and about 42% of GDP of the state derived from agriculture sector. 90% of the population lives in rural areas. The Gross and net sown area in the state is estimated at 80.26 lakh hectares and 56.38 lakh hectaresrespectively. Out of total land area, horticulture occupies only 15%. Among the available option the need is to develop a sustainable agro economy growth strategy for pro-poor orientation towards a viable technology development.

Being located in the middleGangetic plain region there is scope of multiplication of precious plant genetic resource for utilization of raw genetic material for drug development and Biotechnology Industry (Report of NMMP Govt. of Bihar 2009-10). A rough estimate shows that cultivation of medicinal plant in Bihar is expanding in 2600 hectare. And among all the species of medicinal plant Mentha and Lemongrass have major importance shared more than 95% total area and production of medicinal plants in the state.

Table 1: Production of Medicinal Crops in Bihar.

Medicinal Plants	Area (ha.)	Total Production (Tons)	Soil yield Kg/ha
Leman Gras	185	25.90	140
Java Citronella	38	4.75	125
Mentha	2100	252	120
Palma Rosa	20	2.00	100
Tulsi	32	3.20	100
Jama Rosa/CN-5	35	5.25	155
SafedMusli	16	24	1500
Kalmegh	15	45	3000
Sarpgandha	12	19.2	1600
Shatawar	17	127.5	7500
Buch	6	19.2	3200
Jatropha	29	145	5000
Others	95	-	-
Total	2600		

Source: - Report of NMMP

Table reveals that during 2007-08 two plants Lemon grass and Menthaemerged as main medicinal plant in Bihar. Table reveals that most of the medicinal plants need lots if efforts to observe the real impacts of their cultivation. Singh (2007) also focus on this point.

Almost in all the 38 districts of the state Herbal plants are growing out of in which district like Bhojpur, Saharsa, Begusarai, Buxer, Kaimur and Nalanda have given the best result as stated by the Director, Deppt. Of Horticulture,Govt. of Bihar. He had given assurance about 50% subsidies on the production of ‘Bael’,Sarpgandha, Chitrak and Kalihari while 75% subsidy on Guggul.

As far as income generation from the production of these plants is concern it is quite adjustable although there is scope of increasing it. For example in the production of Mentha cost of cultivation was 20500 Rs/ha while gross income was 33750 and net income was 15500 Rs/ha. Similarly gross income derived from the production of Lemongrass was 42000rs/ha and net income 19500Rs/ha at cost of Rs.22500 per ha.

At the same time the cost was 11500 Rs/ha in the production of Tulsi and gross income and net income was 20000 and 8500 Rs/ha respectively. The situation is somehow different in the production of Shatawar because where its cost is 25000 Rs/ha its gross income was 50000 per ha.alongwith the net income of Rs25000 per ha.so we can say that there is wide scope of increasing production of medicinal plant in Bihar.

9. Justification for its growth

Potentiality of increasing production in Bihar can be justified by following reasons:

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 hereabout 1o-15 lakh Labour-force migrates every year.
4. In developed countries the cost of production is high while in the state it is 1/3.
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 to go to physician and adopting modern medicine.
7. About 4.36% landsare 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.

10. Problems faced by this sector

1. Due to lack of proper education and training farmers do not even know the benefits of its cultivation.
2. Lack of organic cultivation which is the most useful factor for the medicinal plant.
3. Lack of organized market facility and inadequate infrastructure for storage facility. It is clear from the fact that there are only 243 cold-storage exit in the state. (Report from Horticulture mission, Govt. of Bihar.)
4. The high productivity achieved on experimental farms is rarely witness on farmer fields.
5. No attention on research work and for growing domestic demand.

11. Suggestions for its Improvement

1. There should be a co-ordination between research centers and cultivation. There should be a demonstration of each and everyresearch before the farmers in the field.

2. The uncultivable and cultivable wasteland should be brought under its cultivation.
3. Training of farmers for the cultivation in tune with latest technology, post-harvest management is necessary.
4. There should be interred cropping with Horticulture and agro-forestry plantations as suggested in the annual action plan of NMMP Govt. of Bihar. The forest area in Bihar is only 6.16 lakh ha that is 6.59% of the total area of the state. This small area provides very little space for the natural and regeneration of medicinal plant wealth. While the area under orchard is 2.86 lakh ha providing fruits about 3.02 million tones that is only 1% return in a year and in off year hardly any produce is available. Therefore this area can be used for the cultivation of medicinal plants.
5. For increasing demand of Herbal ad Medicinal plants it is essential to develop Ayurvedik system of therapy. Those companies who produce Herbal and Medicinal plants based product should be given full priority in the domestic market. Bio partnership between certified farmers and Ayurvedik Pharmaceutical Company like Dabur, Jhandu, Baidyanath should be encouraged.
6. Existing infrastructure in Bihar is not adequate. For example Rajendra Agriculture University PusaSamastipur is working with the capacity of producing planting materials of 1, 00,000 yet not sufficient. Not only this the no. of cold storage for Horticulture crops was 243 only, market were 1600,Ayurvedik mfg. units 322, Unani mfg. units were 22 and Nurseries (private/public)were only 252. Out of 252 nurseries only 10 nos. were identified for medicinal plant under NMMP Govt. of Bihar. Only 195 Primary distillation units were working. As far as farmers association and co-operatives were concerned they are 326 with only 01 R and D institution. Therefore, proper infrastructural facility should be provided by the Government.

12.Steps Taken by The Government

Bihar Horticulture Development Society had taken some initiative in this direction. Due to this 10 small nurseries are in establishment process as in E.Champaran,Muzaffarpur and Samastipur nurseries are going to be established for the production of Sarpgandha,Anola and mixed medicinal plants. In Patna it was production of Ghritkumari, in Nawadah for Tulsi,and in Bhagalpur for Kalmegh nurseries going to be established.Similarly in 2009-10 for the production of Aloe Vera 400 ha area has been proposed and for Kalmegh 200 ha area is proposed to bring under cultivation.

13.Conclusion

So there is thrust on development of medicinal plant sector by Govt. of India and Govt. of Bihar only farmer's awareness is needed for fruitful result.

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