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Study of potential and condition of medicinal plants in Bihar

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Abstract
The global demand for medicinal plants is expected to expand continuously, fuelled by the growth of sales of herbal supplements and remedies. The main goal in this paper is to status and conservation of medicinal plants of Bihar. The study shows that herbal medicine have great prospect in health care worldwide. In present medicinal plants facing threats due to depletion of natural resources as an impact of growing population size, urbanization and climate change. The major challenges on traditional medicine and medicinal plant is lack of data on seriously threatened and endangered medicinal plant species. The other challenges include inadequate and conflicting guidelines on management and utilization of medicinal plant or natural resources. So effort for conservation of medicinal plants has been suggested. The ex-situ and in-situ conservation of medicinal plants in Bihar is a great step towards the conservation of medicinal plants as well as other species

Keywords: medicinal plants, natural resources

Introduction
Many Medicinal Plants facing rare or endangered condition. But there are some people who know their uses along with the danger consequences of their extinction, so they have developed their own way of conserving these plants in nature. The demand for medicinal plants in Bihar, to meet both domestic and export market, comprising of 162 species, is expected to increase at about 15 to 16% between 2002 and 2005. Evidence shows that the total domestic potential for crude drugs and oil extracts in India is worth Rs 3 billion, of which the requirements of over-the-counter products. Including cosmetics and ethical and classical formulations, are of Rs 1.2 billion each; whereas traditional medicines of Vaidyas and hme reedial formulations acount for about Rs. 400 million and 200 million, respectively. Medicinal plants cultivation and management therefore, could become highly remunerative both in financial and economic terms for the small-scale growers.

Medicinal plants are one of the precious blessings of nature for the humans, especially for livelihood of poor communities and tribal races among all over world. Generally medicinal plants are phanerogames and more than 10 percent of higher plants are of medicinal value. In spite of human beings, animals also uses medicinal plants for their self-medication. It is found that people suffering from side effects caused by synthetic drugs. So they moves towards natural herbal products during search of other modes of treatment. An adverse drug reaction (ADRs) causes 3% death and 12% hospitalization in Sweden and 5% death in United states. However Fatal Adverse Drug Reactions (FADRs) in the plants medicine is very low thus provides a scientific explanation for utilization of medicinal plants. FADRs are regarded as seventh most common death cause in Sweden. It is widely reported that there is presence of disease inhibitory substances in the herbal medicine, which supports the use of medicinal plants in traditional practices. The country accounts for 8% of the total global biodiversity with an estimate of 49,000 species of plants, among which 4900 are endemic. The tremendous rising of global population, anthropogenic activities excessive eroding natural ecosystem so many of them facing extinction. There is no reliable figure for total number of medicinal plants on earth and number and percentage for country and region vary greatly.

Not only the plants are in increasing demand by major herbal drug industries as an essential raw material of their drugs, but also its collection, production, processing, packaging and

transportation requires high labor input, which can create job lead growth in job-starved state of Bihar. Collection from wild and selective harvesting in addition to primary processing is mostly done manually, and even at the secondary and tertiary levels, MAPs have substantial labour requirements. Moreover, not only do MAPs-based industries expand jobs, enhancing traditional uses through value added processing can increase cash earnings to the local people.

Materials and Methods

Billore *et al*. have suggested three methods to study the plants

1. In a situation where several threatened species happen to grow within a few hectares or Sq km, the whole area should be conserved as a Biosphere Reserve.
2. When a threatened species is growing in pure population of a few or more individuals, or in association with other vegetation, it becomes necessary to establish a sanctuary, for the individual plant (Gene Sanctuaries).
3. The above two methods are called in situ conservation and when it is not possible to conserve the species by any of the above two methods than conservation has to be done *ex-situ.* This conservation can be attempted by three chief methods.

a) Living plant in herbal farms or botanical garden.
b) As seeds in seed-banks and
c) As *in vitro* cultures, or tissue cultures.

A number of techniques have been developed to increase the quality and yield of many of the cultivated species. It is estimated that Indian public sector research institutions have developed standardized practices for the propagation and agronomy of a total of about 40 species.

Results and Discussion

Exploitation of plants is continuing and people are concerned with conservation of only those plants for which they are essentially concerned. Due to such negligence the maximum exploitation has been done to the plants of medicinal importance. This is mainly because of limited use the drugs obtained from plants.

Due to illicit, indiscriminate collections and number of other biotic interferences, the herbal wealth is diminishing with a last rate, throughout the country. The same is true for Bihar also. Conservation of the plant in the district is also going side by side the ratio however has not been maintained in a proper manner. There is a need to maintain it for which conservation practices should be followed by educating people. Attempt should be made to form data based glossary of the area mentioning the local names of the plants, more ethnological information from local inhabitants and to note its abundance or frequency. The present status of data based ethno botanical survey in this region is quite inadequate but it has a great potential plant revealed with ethno botanical surveys followed with laboratory and clinical research is practiced to our ailing sufferings.

Realizing the vast untapped potentials of MAPs and impediments in their development, Bihar Agricultural Management and Training Institute (BAMETI) has made remarkable efforts to promote MAPs in the state under ATMA, Patna. ATMA has followed a systematic approach while taking MAPs for pilot testing. It made assessment about the local conditions and requirements, and demand for MAPs; strengthened capacity by traing various stakeholders; played role in supporting individuals and institutions; developed relevant literature in local language; emphasized on group approach by organizing the growers; encouraged cultivation through the organized sector with linking the unorganized farmers; and evolved a pricing mechanism with buy back arrangement with partner industry under public-private partnership.

Table 1 shows details of area, production and yield of various aromatic plants in 2016-07 in Bihar. It is obvious that cultivation of medicinal plants is quite limited and only 2410 ha of land was under cultivation of these plants. Among different commercially growing species of aromatic plants, mentha and lemon grass have emerged as the major players and shared 95 per cent in total area and production of aromatic plants in the state.

Table 1: Details of aromatic crops being grown in Bihar (2007-08) [5]

MAPs	Area (ha.)	Total oil production (tons)	Oil yield (kg./Ha.)
Lemon grass	185	25.90	140
Java citronella	38	4.75	125
Mentha	2100	252.00	120
Palma rosa	20	2.00	100
Tulsi (basil)	32	3.20	100
Jama rosa/CN-5	35	5.25	155

As far as the status of medicinal plants in Bihar is concerned (table 2), it is still negligible. Merely 380 tons of medicinal plant produces are being produced over 95 ha of land. Evidence indicates that commercial cultivation of some of the species of MAPs 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 2: Details of medicinal crops being grown in Bihar (2007-08) [5]

MAPs	Area (ha.)	Production (tons)	Yield (kg./Ha.)
Safed musli (Chlorophytum borivillinum)	16	24.0	1500
Kalmegh (Andrographis penniculata)	15	45.0	3000
Sarpgandha (Rauwolfia serpentina)	12	19.2	1600
Shatawar (Asparagus racemosus)	17	127.5	7500
Buch (Acorous calamus)	6	19.2	3200
Jatropha (Jatropha curcas)	29	145.0	5000

The comparative economics of MAPs and a few major field crops reveals that returns from MAPs are comparable with any of the field crops. The returns from medicinal plants like safedi musali, sarpgandha, satawari, are fairly high. Similarly, returns from aromatic plants like lemon grass, rosa species, etc. are yield better returns and also their cost of cultivations are lower in comparasion to many of the field crops. The irony is that over 80 percent of the Bihar population is smallholder (<2ha of land size) and therefore, they generate very small marketable surplus. Such a small scale production and tiny marketable surplus fail to attract mrakets.

Table 3: Comparative economics of major crops in Bihar

Crops	Cost of cultivation (Rs/ha)	Gross income (Rs/ha)	Net income Rs/ha/year
Lemon grass	22500	42000	19500
Java citronella	19500	33750	14250
Mentha	20500	36000	15500
Palma rosa	22500	40500	18000
Tulsi (basil)	11500	20000	8500
Jama rosa/CN-5	25000	52375	25375
Safed musli (Chlorophytum borivillinum)	65000	102000	37000
Kalmegh (Andrographis penniculata)	58000	65000	7000
Sarpgandha (Rauwolfia serpentina)	30000	64000	34000
Shatawar (Asparagus racemosus)	25000	50000	25000
Buch (Acorous calamus)	25000	40000	15000
Jatropha (Jatropha curcas)	17000	30000	13000
Paddy-wheat*	42947	58853	15906
Sugarcane*	48343	84323	35980

* **Source:** Mittal and Singh, 2007.

Conclusion

The high medicinal uses of the Plants found in the area, these plants of medicinal importance are exploited by the rural people in indiscriminate manner. Many Medicinal plants facing rare or endangered condition. But there are some people who know their uses along with the danger consequences of their extinction, so they have developed their own way of conserving these plants in nature. These practices are practiced by the local and rural people and these include common socio-cultural and religions belief and cultivation practices.

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