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Medicinal Plant Cultivation: Current Scenario, Challenges, and Opportunities from Indian Farmer's Perspective

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Abstract:

Objective: Plants are the source of medicine in Ayurvedic, allopathic & Unani systems. Globally 72000–77000 (17–18%) of the world's flora is currently utilized for medicinal purposes. More than 200 therapies employed by different cultures to treat physical and psychological ailments use medicinal plants as curative medicines, substantiating the immense scope for commercial medicinal plant cultivation. This present study was undertaken to find out the difficulties, challenges and opportunities in medicinal plant cultivation from the perspective of farmers in the state of Odisha, India, and to suggest possible support that could promote medicinal plant cultivation.

Material and Methods: A survey was conducted among 700 farmers using a questionnaire containing 15 items related to socioeconomic status, challenges and opportunities.

Results: The study revealed that the education of most of the farmers was below high school; 61% of the participants had their own land, with 10 to 15 years of farming experience. The majority were not into medicinal plant cultivation. The major challenges for medicinal plant cultivation were found to be marketing, finance, climate, lack of experience and training, government support and labour. Support from the government will encourage the medicinal plant cultivation.

Conclusion: Many of the farmers are not aware of the demands and support schemes by the government. Serious gaps were seen in availing government support schemes in medicinal plant cultivation by farmers, leading to limited success and productivity. There is a need to create awareness among the farmers regarding the benefits of medicinal plant cultivation and related training programmes to increase production and productivity of medicinal plants substantially. Support from the government will encourage medicinal plant cultivation.

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Introduction

Ayurveda is the indigenous, ancient system of medicine followed in India. Ayurvedic medicines are derived from plant sources. Like Ayurveda, other systems of medicine; such as naturopathies and Unani, also make use of medicinal plants. There are several medicines; such as quinine, artemisinin, digoxin and silymarin, used in the allopathic system has been derived from plants[1]. The Auyrvedic system of medicine became secondary with the arrival of the allopathic system of medicine owing to their quick and potent action[2]. With the evolution of science and technology, it has been realised that the isolation of phytoconstituents could bring dramatic changes in therapy[3]. The whole world realised that phytoconstituents are safe and effective. Now the research is dedicated to the isolation of new constituents and chemical modification of the available constituents to enhance their efficacy and safety[4].

The soil conditions of India are acidic, saline and basic. Some cultivable areas also suffer from water logging[5]. Sixty-five percent of the workforce depends upon agriculture for their employment[6]. The small and marginal farmers constitute about 83 percent of the farming community[7]. The agroclimatic condition of India is quite diverse (15 agroclimatic zones) on the basis of soil structure, humidity, elevation, topography, vegetation, rainfall and other agroclimatic factors[8].

Globally 72000-77000 (17-18%) of world flora is currently utilized for medicinal purposes[9]. More than 200 therapies employed by different cultures to treat physical and psychological ailments employ medicinal plants as curative medicines[10]. Global imports and exports (2000-2008) of medicinal plants have been worth US$ 1.59 and 1.14 billion/year, respectively, with >40%, growth rate per annum[11]. Out of the 3,000 medicinal plants traded internationally, only 900 are under cultivation, and the majority of the exported biomass is harvested from the wild[12]. The most commonly cultivated medicinal plants in India are: Ashoka, amla, ashwagandha, bael, brahmi, cheraita, gugul, gudmar, guluchi, satavari, sarpagandha, harida, bach and ghritkumari[13]. Agroclimatic, socioeconomic condition, support from the government, market availability and motivation are the factors contributing to medicinal plant cultivation[14].

The above facts revealed that the immense scope for the cultivation of medicinal plants has still not been utilised. India, being an agriculture-based country, should utilise this opportunity to move from traditional cultivation to medicinal plant cultivation. To promote medicinal plant cultivation, the government of India has set up a national medicinal plants board (NMPB), by Resolution No. Z.18020/19/97-M.P.Cell, notified on 24 November 2000; under the Chairpersonship of Union Health & Family Welfare Minister[15]. This board has announced various schemes to strengthen the knowledge and infrastructure for medicinal plant cultivation. However, no significant development has been seen in the contribution to the Indian/global herbal drug industry by Indian farmers[16].

This study was undertaken to find out the difficulties, challenges and opportunities in medicinal plant cultivation from the perspective of farmers in the state of Odisha, India, and to suggest possible supports that could promote medicinal plant cultivation.

Material and Methods

Development of the study instrument

A simple study instrument, containing 15 items, was prepared after an in-depth literature review and discussion with both experts and authorities from the related field. The instrument had three sections; the first section was socioeconomic status containing 3 items, the second section was challenges containing 6 items and the third section was opportunities containing 6 items. The questionnaire was pretested by circulating it among thirty participants, and its reliability was determined using Cronbach's alpha

value. Appropriate modifications were made; as per the suggestions given.

Determination of the sample size

As per the census of 2021, the total population of Odisha is 47,645,822[17]. Seventy percent of the population in Odisha are dependent on agriculture[18]. So, the sample size was found to be 650, as determined using Raosoft, keeping an error margin of 5%, a confidence level of 95% and a response distribution of 50%.

Inclusion and exclusion criteria

The details of the study, along with its objectives, were explained to the farmers. The farmers who are actively engaged in farming and willing to participate in the study were included. Those not willing were excluded from the study.

Collection of data

Data were collected from a prepared questionnaire, distributed among 700 farmers in the weekly vegetable markets of various villages across Odisha. The filled-in questionnaire was collected on the same day.

Processing of the data and statistical analysis

Appropriate coding of the responses was done and the data was stored in excel sheets. Statistical Package for the Social Science (SPSS) statistical software was used to carry out statistical analysis. Descriptive statistics & ANOVA was applied to compare the mean of the responses among groups, based upon education, experience and land ownership. The results of descriptive statistics and ANOVA were separately tabulated.

Results

Socioeconomic status

The percentage of response was found to be 95.71; however, 42 incomplete responses were not considered. The education for the majority of participants (61.3%) was below high school level. A majority of participants (49.7%) had 10 to 15 years of farming experience: 61% of participants owned land. The majority of the participants (87.9%) were not into medicinal plant cultivation, while the rest were into medicinal plant cultivation; but had been for only a few years (Table 1).

Challenges

The various reasons for stopping medicinal plant cultivation were; not profitable, finance, climate, no buyers, no government support, no training and labour problems. In total, 44.9 percent of the participants have faced all of the above reasons, while the rest of the participants had one or more of the above reasons. In total, 83.9 percent of the participants were not aware of government support schemes for medicinal plant cultivation. Similarly, 86.3 percent of participants were not aware of the NMPB. The majority of the participants (56.4%) were of the opinion that there are local buyers of medicinal plants. Most of the participants (43.9%) were not sure about the suitability of the agro-climatic condition for medicinal plant cultivation. The major challenges for medicinal plant cultivation were found to be: marketing, finance, climate, lack of experience and training, government support and labour; as per 45.9 percent of the participants (Table 1).

Opportunities

The majority of the participants (21%) were of the opinion that support from the government would help them to get into medicinal plant cultivation. In total, 50.6 percent of the participants were not sure as to the existing demand for medicinal plants; however, 13.9% of the participants had future plans for medicinal plant cultivation, if all the required supports were provided: 15% of the participants had a willingness to undertake medicinal plant cultivation. Alternatively, more than 50% of the participants were not sure as to making a move into medicinal plant cultivation in the future (Table 1).

Table 1 Socioeconomic status, challenges and opportunities

Questions	Response	Frequency(N)	Percentage(%)
Socio economic status			
Educational qualification	Below high school	385	61.3
	High school	23	3.7
	Graduate	102	16.2
	Post Graduate	118	18.8
Years of farming experiences	Below 5	19	3.0
	5–10	80	12.7
	10–15	312	49.7
	More than 15	217	34.6
Do you own land?	No	241	38.4
	Yes	387	61.6
Challenges			
Why did you stop medicinal plant cultivation?	No profit	92	14.6
	Financial problem	59	9.4
	Climatic condition	35	5.6
	No buyers	39	6.2
	No government support	83	13.2
	No training	27	4.3
	Labour problem	11	1.8
	All of the above	282	44.9
Are you aware of government support schemes for medicinal plantations?	No	527	83.9
	Yes	99	15.8
Are you aware of the National Medicinal Plants Board?	No	542	86.3
	Yes	86	13.7
Who are the buyers of medicinal plants?	Government	154	24.5
	Local buyer	354	56.4
	Industry	120	19.1
Is the agro climatic condition of Odisha suitable for medicinal plants?	No	211	33.6
	Yes	132	21.0
	Not sure	276	43.9
What are the challenges?	Marketing	46	7.3
	Finance	64	10.2
	Climate	26	4.1
	No previous experience	87	13.9
	Government support	69	11.0
	Access to training	30	4.8
	Labour	12	1.9
	All of the above	288	45.9
Opportunities			
What type of support will encourage you to undertake medicinal farming?	Marketing	21	3.3
	Finance	60	9.6
	Climate	24	3.8
	No previous experience	28	4.5
	Government support	132	21.0
	Access to training	30	4.8
	Labour	7	1.1
	All of the above	321	51.1

Table 1 Socioeconomic status, challenges and opportunities (continued)

Questions	Response	Frequency(N)	Percentage(%)
Are you cultivating medicinal plants?	No	552	87.9
	Yes	74	11.8
Years of cultivation of medicinal plants	Below 5	60	81.08
	5–10	14	18.9
	10–15	0	0
	More than 15	0	0
Are you planning for medicinal plant cultivation in the future?	No	191	30.4
	Yes	87	13.9
	May be	348	55.4
Is there a demand for medicinal plants?	No	229	36.5
	Yes	77	12.3
	Not sure	318	50.6
If the required supports and climate is favourable, will you switch to medicinal plant cultivation?	No	180	28.7
	Yes	94	15.0
	Not sure	352	56.1

Table 2 Statistical analysis of the result

ANOVA	Education		Experience		Land ownership	
	F	Significance	F	Significance	F	Significance
Are you cultivating medicinal plants?	3.068	0.027	11.875	0.000	9.870	0.002
If yes for how many years	7.027	0.000	17.369	0.000	13.645	0.000
If no, have you ever done medicinal farming before?	2.502	0.058	5.504	0.001	5.421	0.020
Why did you stop medicinal plant cultivation?	5.392	0.001	19.626	0.000	12.420	0.000
Are you planning for medicinal plant cultivation in the future?	4.727	0.003	9.182	0.000	1.526	0.217
Are you aware of government support schemes for medicinal plantations?	3.597	0.013	13.995	0.000	0.792	0.374
Are you aware of the National Medicinal Plants Board?	3.627	0.013	13.424	0.000	0.911	0.340
Is there a demand for medicinal plants?	10.280	0.000	16.227	0.000	3.488	0.062
Who are the buyers of medicinal plants?	3.331	0.019	2.604	0.051	11.539	0.001
Is the agro climatic condition of Odisha suitable for medicinal plants?	23.370	0.000	12.404	0.000	46.048	0.000
What are the challenges?	18.050	0.000	8.001	0.000	30.834	0.000
What type of support will encourage you to undertake medicinal farming?	8.952	0.000	2.969	0.031	2.311	0.129
If the required supports and climate is favourable will you switch to medicinal plant cultivation?	0.980	0.402	12.526	0.000	21.342	0.000

Statistical analysis

Significant impact of education, experience and land ownership was seen in most of the factors contributing to challenges and opportunities in medicinal plant cultivation (Table 2).

Discussion

There are various reports related to contributing factors for medicinal plant cultivation; however, no study from the perspective of farmers has been found. This study revealed that the major challenges in medicinal plant cultivation are: not profitable and financial issues, which is similar to the report of Goswami et al., 1990[19]. the climate is another factor that agrees with earlier reports by TIFAC 2001[20].

Marketing is another challenge, as there are reports of cases wherein the contracting party (buyer) backed out at the last moment; putting the supplier (farmer) in trouble; this too agrees with the findings of this study[21]. The formation of a co-operative society for the collection and selling of medicinal plant material from farmers and the promotion of the herbal industry by the government would be highly encouraging.

There are also earlier reports that a lack of knowledge and training in post-harvest handling of medicinal plants is one of the reasons for not cultivating medicinal plants, which is in agreement with this study's findings[21].

Good Agricultural practice is essential for sustainable agricultural development. It focuses on different curative and preventive measures, which are required for maintaining an agro-ecology and environment for quality food and nutrition. The Department of AYUSH, from the government of India has issued guidelines for the cultivation, collection and processing of medicinal plants[22]. Labor-intensive and low-input ecological organic agriculture having stringent on-farm resource management has been advocated for promising sustainable agricultural systems in India[23]. There have been suggestions for the implementation of modern crop production, post-harvest and processing technologies to improve the quality and to make agriculture both a sustainable and profitable business[24]. Indigenous technical knowledge and system for the management of natural ecology has helped in the survival of the people for a long time[25]. Although, several good agricultural practices are in place in India; such as controlling pests and diseases in organic farming preventive measures, these are widely used instead of curative measures[26]; for example, whiteflies are diminished from crops via the use of taller, non-host border crops; such as like maize, sorghum and pearl millet[27]. Also, mulch is used to cover soil surfaces around the plants to create congenial conditions for growth. Other practices may include temperature moderation, reduced salinity and weed control[28]. For centuries, agriculture in India relied upon local resources; such as local indigenous varieties and knowledge, which was achieved through sustained interaction with nature[29]. However, no reports about good agriculture practices; concerning medicinal plants, have been reported. India stands second in the export of medicinal plants, after China, which implies the demand for medicinal plants from India[30].

More recently governmental, nongovernmental and private sectors have started the process of developing and enacting a national policy on medicinal plants. These initiatives mainly focus on documentation relating to properties, natural distribution, ecological tolerances and use of valuable medicinal plants. Additionally, there is the ongoing identification of forest areas rich in medicinal plants and formulation of their management plan; however, a significant gap has been found in this study concerning the awareness of the farmers as to such policies[30].

A SWOT analysis of Indian medicinal plants has established that this sector has several strengths; such as enormous biodiversity, all types of soil and climate, a rich heritage of the Indian System of Medicine (ISM), a strong

base of Research and Development laboratories, skilled manpower, lower production and manpower costs and a well-developed pharmaceutical industry[20], which is not in alignment with the perspective of farmers.

There is a great demand for medicinal plants, as per the national survey conducted by NMPB (2001-02); however, in this study, it was found that the majority of the participants were not aware of this (Krusi Jagaran). Although there are several support schemes for medicinal plant cultivation from the NMPB, most of the participants were not aware of them[31].

Conclusion

As per the farmers' perspective, there are major challenges in medicinal plant cultivation; such as a lack of profit, no buyers, little government support, no training or labour, financial problems and unfavourable climatic conditions. There is also a serious gap in availing government supporting schemes in medicinal plant cultivation by farmers, leading to limited success in productivity. Therefore, there is a great scope of work to be performed in this field in enhancing farmers' awareness of such available schemes, and by conducting various training programmes, which can provide an opportunity for the State to increase the production and productivity of medicinal plants substantially. Also, there is a need for effective legislative measures to enforce the contracts between the farmer and the buyer.

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Conflict of interest

There are no conflicts of interest.

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