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FACTORS AFFECTING FARMERS' DESIRE TO CHANGE THE CULTIVATION PATTERN (MEDICINAL PLANTS CULTIVATION)

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Abstract

Achieving sustainable development is one of the most important agricultural resources. Therefore, the overall purpose of this study is to investigate the factors affecting farmers' desire to change the cultivation pattern to cultivation of medicinal plants. The research method is allowed as a field-library. After determining the variables through questionnaires and software SPSS. The statistical population of this study is rural producers in Targabah district in Khorasan Razavi Province in Iran. The statistical sample for this study was 204 rural households. The sample was calculated using random sampling based on Cochran formula. The results show that the farmers' desire to change the cultivation pattern to cultivation of medicinal plants has a significant positive correlation with its level of economic, social, technical and environmental awareness. Also, it has a significant and positive relationship with his understanding of the production of medicinal plants which can enhance the protection of the environment. The results of the diagnostic analysis showed that the level of economic awareness and awareness of processing plants and product packaging can affect the farmers' desire to change the cultivation pattern to cultivation of medicinal plants.

***Key words*:** *medicinal plants, change the cultivation pattern, farmers' desire*

INTRODUCTION

Today, the cultivation and use of medicinal and aromatic plants due to human re-orientation to nature and natural products, side effects of synthetic materials and the discovery of new drugs from natural compounds that have complex chemical structures and cannot be synthesized, has grown greatly. Attention to natural products has led to the development of the use of various medicinal and aromatic plants and other natural compounds in their products in various food, pharmaceutical and cosmetic industries, which has ultimately led to the creation of a large market for these plants [37].

The increasing trend of increasing the consumption of medicinal plants without the development of proper methods of cultivation and proper management and planning, will have a worrying consequence, ie the destruction of nature. In this regard, the study of agricultural operations such as the time and manner of sowing, the method of propagation, the method of harvesting, feeding and managing it will t will play an important role in increasing the product and its quality [10].

Existence of 11 climates from 13 known climates of the world, having 300 sunny days a year and temperature difference between 40 to 50°C between the coldest and warmest zone in Iran has provided favorable conditions for the country in terms of having an exclusive ecology. These conditions predispose the growth and development of wild and medicinal plants [1,7]. The flora of Iran contains more than 8,000 species, of which 1,100 are used in traditional Iranian medicine [19, 25].

WTO reports from 2004 to 2013 show that China is the world's largest exporter and the United States the largest importer of medicinal plants. In general, the United States, Germany, China (Hong Kong) and India are the main centers of trade in medicinal plants in the world. China, the world's largest supplier and exporter of medicinal plants, exports its products to 103 countries, and China's exports have grown by 15% over this ten-year period [18].

The development of exploitation and production of medicinal plants and the creation of employment in this field is effective in order to diversify the strategic rural economy. The more diverse the rural economy is, the more opportunities and opportunities will be provided for the rural poor to have access to living standards. In the approach of sustainable livelihood, in order to solve the problem of poverty and increase the wealth of local people, much emphasis is placed on diversifying the economic activities of the villages. So that a more diverse rural economy leads to increased access and strengthening of rural capital as a result of their empowerment [12, 20].

Every strategy must have a long-term perspective. In many countries, medicinal plants seem to be a bridge between sustainable economic development, cost-effective health care and the preservation of vital biodiversity [33].

The definition of a medicinal plant is: Plants and plant raw materials include leaves, flowers, fruits, stems, bark, wood, roots, rhizomes, and other parts of plants that may be whole, powdered, or partial. Consume the component [2].

Protection of traditional knowledge based on medicinal plants, which is supposedly disappearing fast, is another major conservation issue. Traditional and indigenous knowledge and practices about the medicinal plants are weakening and, in many cases, vanishing altogether. [8, 9] noted that every year, the sum total of human knowledge about the types, distribution, ecology, methods of management and methods of extracting the useful properties of medicinal plants is declining rapidly. It is a continuation of a process of loss of local cultural diversity that has been underway for hundreds of years. Thus the conversion of socio-cultural traditions and indigenous knowledge into livelihood means and economic opportunities also has the advantage of preserving the rapidly eroding cultural knowledge and practices which are increasingly threatened due to globalization and the homogenization of people and communities [13, 14, 15].

Plants that have medicinal properties with an optimum active ingredient in some form or another are regarded as medicinal plants. These are invaluable natural resources; they are exhaustible if overused and sustainable if the juxtaposition of present and future needs takes place within the behavioral pattern of various kinds of users. Sustained and coordinated efforts are needed to transform unsustainable practices of medicinal plant collection from wild sources to more ecologically sustainable, socially acceptable and economically equitable production and utilization systems [23, 24, 26].

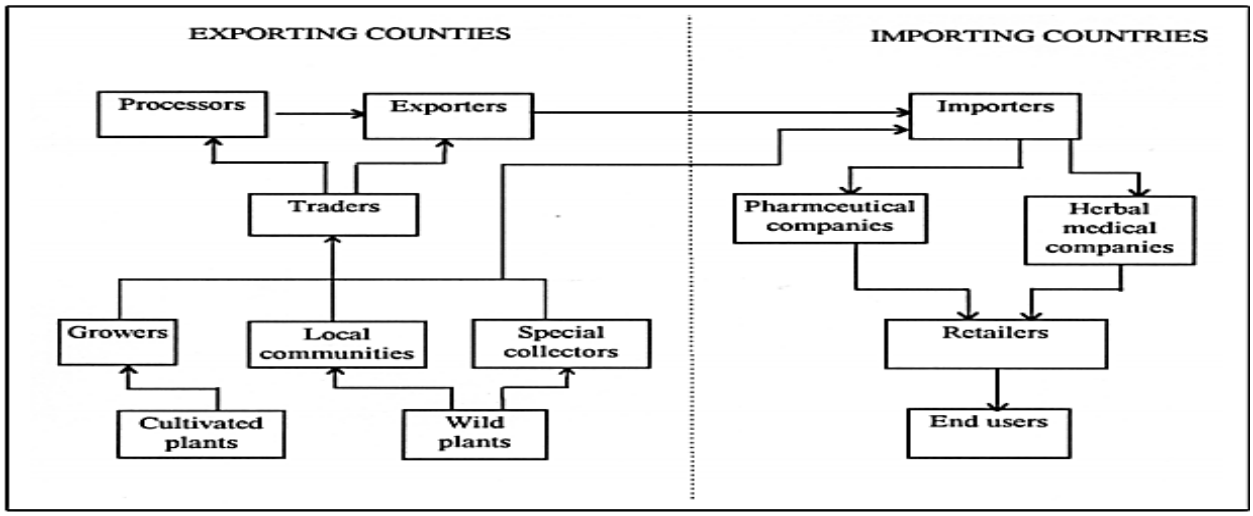

Fig. 1. Movements of plant materials traded internationally
Source: WWF, 2000 [36].

In the face of threats caused by both anthropogenic and natural reasons, the question of the production and sustainability of medicinal plants has emerged very strongly in recent times. These plant resources, therefore, have become important domains of intervention and are increasingly attracting the attentions of public and private sector policy researchers, policy makers and development program implementer. In recognition of such importance this research is undertaken to specifically focus on two key aspects of medicinal plants in Bangladesh: i) their local status and ii) the market scenario. First, the focus was on their status; the causes of threats were examined and conversely the measures and initiatives to conserve these medicinal plants and the associated livelihood and economic implications of such initiatives were evaluated. Second, the research critically examined the medicinal plant-based herbal market system, especially to map the industry value chain in function or place.

The studies on the topic offered by the literature in the field are summarized and presented in Table 1.

Table 1. Summarize the literature review

Researcher	Year	Summary of results
Silori and Badola [32]	2000	Economic and social knowledge of medicinal plant cultivation and evaluation of the future perspective of action for sustainable development among the local community and encouraging and promoting medicinal plant cultivation to improve the standard of living of poor communities as well as preserving these plants in nature and preserving indigenous and cultural knowledge in Help among the locals.
Saddiqui et al [28]	2004	The present century can be described as the century of return to medicinal plants.
Canter et al [5]	2005	Traditional and unreasonable harvesting of medicinal plants from nature, as well as misidentification by non-specialists who traditionally collect medicinal plants from the natural environment, causes environmental degradation, causes the loss of genetic diversity, so the production of medicinal plants It is a good alternative and an opportunity to overcome these problems.
Kala et al [11]	2006	Proper performance of medicinal plants can be very effective for sustainable development and improving the living standards of poor communities.
Schippmann et al [30]	2006	Many species of medicinal plants are traditionally collected and cultivated, which is why a number of organizations recommend that medicinal plants be cultivated sustainably, as sustainable cultivation is one of the most important Conservation strategies for most species of medicinal plants are due to their contribution to the local economy and more added value to the crop in the long run.
Kazemi et al [17]	2007	Before recommending to change the cultivation pattern, the agronomic conditions of the plant must first be adapted to the climatic conditions of the region.
Moradi et al [22]	2008	Work experience, level of education and participation in training courses are related to the level of knowledge of people about medicinal plants.
Doherty [6]	2009	In order to export more and more medicinal plants and improve the position of this product in the world, the selection of potential foreign markets is very important.
Kashfi [16]	2010	The emphasis of the World Health Organization on the gradual replacement of natural materials instead of chemicals has led various countries around the world to invest, plan cultivation and mass production of medicinal plants at the industrial level and use it in the pharmaceutical, health and food industries.
Sher et al [31]	2010	Lack of awareness of local people about the economic importance of medicinal plants has caused damage to vegetation and improper production of herbal medicines, as well as insufficient knowledge of the market and lack of government support for this industry has caused great damage to the trade of these plants. It has reduced the harvest and production of these plants.
Tatian et al [34]	2014	the farmers don't tend to the medicinal plants cultivation because of unfamiliarity of medicinal plants kinds for cultivate and production, lack of confidence and satisfaction of good income from production and sale of these plants.
Mojaverian et al [21]	2015	Iran has an advantage in the production and development of medicinal plants.
Sadatpour [27]	2017	Due to the limitation of internal resources, the development of employment projects based on the cultivation and development of medicinal plants compatible with the ecological conditions of the region, can be a good way to conserve existing resources
Khodaverdizadeh and Mohammadi [18]	2017	Iran can improve its comparative advantage and export price of medicinal plants by connecting with new markets, accessing reliable foreign markets, and pursuing a policy of diversifying its target export markets and reducing its focus on a limited number of markets.
Noorhosseini et al [25]	2017	Factor analysis revealed that the main deterrents could be grouped into four factors related to i) limited support of MDPs, ii) poor access to processed MDPs, iii) lack of alternatives and spatial limitations, and iv) uncertainty and lack of confidence.
Bahl et al [4]	2018	Medicinal plants are now considered as important commercial items for the sustainable economic development of countries.
Astutik et al [3]	2019	we advance the need for empirical investigations on the performance of medicinal plants production systems and their contribution to livelihoods in diverse institutional contexts.
Trisilawati et al [35]	2020	Along with the increase in public awareness and the global demand of efficacious but safe herbal products, the organic cultivation of medicinal plants is a necessity. In organic farming, crop cultivation relies on the use of organic (natural) ingredients and avoids the use of synthetic chemical inputs (pesticides, herbicides, fertilizers), and genetically modified organism seeds.

Source: Authors' synthesis.

MATERIALS AND METHODS

The present study is an applied research in terms of purpose and descriptive-survey research in terms of data collection [29]. This research is also a type of field research in which the researcher is present to collect data in the desired areas. Part of this research has also examined related articles and books, which can be called non-field studies or library studies.

Photo 1. Pastures with medicinal plants
Source: Survey data.

Photo 2. Medicinal plants in the research area
Source: Survey data.

In this study, multi-stage sampling with proportional assignment was used. Cochran's formula was also used to determine the sample size (Equation 1). The statistical population of the study was the producers of medicinal plants in Torqabeh village located in Binalod Township in Iran. Due to its favorable climate, this area is a great advantage for the growth and cultivation of various species of medicinal plants. According to the census, there were 1,900 rural households living in the area, with more than 50% of the Panans engaged in the cultivation and harvesting of medicinal plants from the rangelands.

Equation 1: $$n = \frac{\frac{z^2 pq}{d^2}}{1+\frac{1}{N}\left(\frac{z^2 pq}{d^2}-1\right)}$$

where:
n = Number of research samples (204)
z^2 = 1.96
p = 0.5
q = 0.5
d^2 = Sampling accuracy (0.05 to 0.1) (0.06)
N = Number of research statistical population (1,900)

The data gathering tool in this research is a structured questionnaire that was prepared according to the goals and hypotheses of the research and according to the indicators and was conducted through an interview.
The 5-point Likert scale (1. Strongly Disagree, 2. Disagree, 3. Undecided, 4. Agree, 5. Strongly Agree) was used in structured questionnaire.
The Cronbach's alpha for the whole questionnaire was 0.80 (Equation 1 was used to calculate Cronbach's alpha).

Equation 2: $$a = \frac{k}{k-1}\left[1 - \frac{\sum_{=1}^{k} s_i^2}{\sigma^2}\right]$$

where:
a = Cronbach's alpha coefficient
k = Number of questions per component
s^i = The variance of each component
δ^2 = The total variance of the test

Table 1. Cronbach's alpha coefficient for questionnaire elements

Component	Number of variables	Cronbach's alpha coefficient
Awareness	10	0.805
Attitude	12	0.745
Economical factor	9	0.710
Social factor	7	0.817

Source: Survey data.

According to the results of previous researches, Asteraceae family with 2 species, Lamiaceae without 3 species, Euphorbiaceae, Malvaceae and Rosaceae each with 2 species are the most abundant species in the region (Table 2).

Table 2. The most abundant species in the research region

Family	Species
Apiaceae	Bunium persicum (Boiss.) B. fedtsch.
Asteraceae	Achillea arabica Kotschy.
Asteraceae	Sonchus oleraceus L.
Asteraceae	Tanacetum parthenium Sch.Bip.
Asteraceae	Tripleurospermum disciforme (C.A.Mey.) Sch.Bip.
Brassicaceae	Alyssum szovitsianum Fisch. & C.A.Mey
Brassicaceae	Descurainia sophia (L.) Webb & Berth
Euphorbiaceae	Euphorbia microsciadia Boiss.
Euphorbiaceae	Euphorbia spinidens Prokh.
Fabaceae	Astragalus sieversianus Pall.
Fumariaceae	Fumaria vaillantii Loisel.
Hypericaceae	Hypericum perforatum L
Lamiaceae (Labiatae)	Clinopodium graveolens Kuntze (Syn.: Acinos graveolens)
Lamiaceae (Labiatae)	Hymenocrater calycinus Benth.
Lamiaceae (Labiatae)	Mentha longifolia (L.) Hudson.
Malvaceae	Alcea angulata Freyn & Sint
Malvaceae	Malva sylvestris L.
Plantaginaceae	Plantago major L
Rosaceae	Crataegus turkestanica Pojark.
Rosaceae	Sanguisorba minor Scop.
Scrophulariaceae	Scrophularia variegata M.Bieb
Solanaceae	Solanum nigrum L.
Urticaceae	Urtica dioica L. subsp. Dioica.

Source: Research data.

RESULTS AND DISCUSSIONS

The result of research showed that the average age of respondents was 52 years and 87% of respondents were male. Also, about 78% of the respondents have illiterate or primary education and only 1% have university education.

Table 3. Description of the characteristics of farmers growing medicinal plants

Variables	Frequency	Percent	Cumulative percent
Gender			
Man	177	86.8	86.8
Female	27	13.2	100
Plural	204	100	
Age (years)			
<40	54	26.5	26.5
40-55	66	32.4	58.8
55-70	58	28.4	87.3
<70	26	12.7	100
Plural	204	100	-
Educational level			
Illiterate	40	19.6	19.6
Primary school	120	58.8	78.4
Secondary school	27	13.2	91.7
High school	15	7.4	99
Post high school	2	1	100
Plural	204	100	-
Main job			
Employee	3	1.5	1.5
Manual worker	3	1.5	3
Farmer	185	85.7	88.7
Other	13	11.3	100
Plural	204	100	-

Source: Survey data.

One of the things that helps to develop the cultivation of medicinal plants is the way the product is sold. Based on the research results (Table 4), it can be said that the main method of selling the product of medicinal plants produced by the farmer is selling to intermediaries (brokers).

Table 4. Type of sale of medicinal plants by Farmers

Type of sale	Frequency	Percent	Cumulative percent
Direct supply to the consumer	46	22.5	22.5
Direct supply to local distributor (Attari)	50	24.6	47.1
Sales through intermediaries(brokers)	80	39.2	86.3
sell of product to factories	28	13.7	100
Plural	204	100	-

Source: Survey data.

The level of farmers awareness about the production of medicinal plants was also evaluated by 5- Likert scale (VL=very low, L=low, M=medium H=high and VH=very high). The results showed that the highest level of farmer awareness is related to technical-production awareness in cultivation and harvesting of medicinal plants. Also, the lowest level of farmer awareness is related to social awareness in the cultivation and harvesting of medicinal plants (Table 5).

Table 5. The level of farmers awareness

Rank	Item	5-point Likert scale				
		VL%	L%	M%	H%	VH%
4	Social awareness	0.0	12.7	38.2	41.3	7.8
3	Economic awareness	0.0	17.6	36.3	34.3	11.8
1	Technical-production awareness	0.0	1.5	7.4	42.1	49.0
2	Environmental awareness	0.0	1.0	45.6	52.0	1.4

Source: Research data.

The relationship between individual characteristics and the farmer's awareness about the production and harvest of medicinal plants was also examined. the results showed that Variables such as income level, use of social networks, work experience and indigenous knowledge are related to the farmer's awareness (Table 6).

Table 6. Correlation test to investigate the relationships between variables

Dependent variable	Independent Variables	r	sig
The level of farmers awareness	Income frome sale of medicinal plants	0.360**	0.000
	Age (years)	0.019	0.785
	Educational level	0.066	0.351
	Use of social networks	0.357**	0.000
	Work experience in the production and harvesting of medicinal plants	0.408**	0.000
	Farmer indigenous knowledge	0.215**	0.002
	Belief in environmental protection	0.142*	0.043

Source: Research data.

The results showed that the type of sale of the farmer also affects his level of awareness. To test this hypothesis, Kruskal-Wallis test was used and the results showed that if a producer of medicinal plants sells his product to factories, it will have a positive effect on his level of awareness (Table 7).

Table 7. The Kruskal Wallis test of the average farmers awareness

The farmers awareness	**Ranking Mean**	df	Kruskal Wallis	sig
		3	71.062	0.000
Direct supply to the consumer	59.21			
Direct supply to local distributor (Attari)	57.36			
Sales through intermediaries(brokers)	123.03			
Sell of product to factories	129.59			

Source: Research data.

Also, the result of cluster analysis in farmers awareness showed that the variables such as: selling type and economic awareness in separating into two strong and weak the farmers awareness (Table 8).

Table 8. Analytical diagnostic function in the distinguishing variables of classes of farmers awareness groups (Enter)

Variables	Wilk's Lambda	F	df1	df2	sig
Selling Type	0.759	63.889	1	201	0.000
Economic awareness	0.688	45.417	1	200	0.000

Source: Research data.

In the general model, the focal correlation coefficient is equal to 0.559. Therefore, it can be said that 56% of the changes in the farmers awareness variable of the individuals under study are explained by these variables (Table 9).

Table 9. Canonical correlation and Wilkes lambda for the model

Eigenvalue	**0.454**
Percentage of variance	100
Cumulative percentage	100
Canonical correlation	0.559
Wilks' Lambda	0.688
Chi-square	74.888
Df	2
P-value	0.000

Source: Research data.

The variables of selling type and economic awareness had the highest standard coefficient and this shows the importance of these variables in predicting the farmers awareness (Table 10).

Table 10. Standard and non-standard coefficients of Canonical detection function

Variables	**Standard coefficients**	**Non-standard coefficients**
Constant	-	- 3.644
Selling Type	0.671	0.653
Economic awareness	0.572	0.036

Source: Research data.

$Z = \text{Constant} + W_1X_1 + W_2X_2 + W_3X_3 + \ldots + W_nX_n$

$Z = -3.644 + 0.116533\ (\text{Selling Type}) + 0.036\ (\text{Economic awareness})$

Also, the research findings show that this model correctly classifies 94.10 % of farmers with high awareness and 75.70% of farmers with low awareness (Table 11).

Table 11. Classification results to determine the accuracy of segregation

Classification	**G_1**	**G_2**	**Total**	**Accuracy of segregation**
	Frequency			
high awareness	6	99	105	
low awareness	78	24	99	
	Percent			
high awareness	5.90	94.10		
low awareness	75.70	24.30		80.30

Source: Research data.

The results showed that the average age of the respondents was 52 years and this indicates the high age of the farmers. The results showed that the lack of awareness of local people about the economic importance and insufficient knowledge of the product market has created many problems for the production and trade of medicinal plants. Based on the type of product sales, the highest frequency from the respondents' point of view is related to the option of selling to intermediaries. Factory sales are reported at only about 13 percent. This reported rate is not due to the reluctance of people to sell their products to factories, but because of the lack of factories.
Findings show that based on the level of technical-productive awareness of farmers, 81% is in good condition. Also, based on the level of social awareness of medicinal plant producers, it is 59% and weak.

CONCLUSIONS

According to the results obtained in the research area, the number of women producing medicinal plants is more than men, but their production is lower. This is rooted in traditional rural culture, where women are less involved in the economic sphere than men. Women own less land than men.
According to the results, the higher the level of economic awareness, the greater the general awareness of farmers producing medicinal plants. In the study area, farmers

have a moderate level of economic awareness. In addition, most of the population of these villages are elementary literate and have not received specialized training in the field of rural development and rural capacity.

The results showed that the level of awareness of medicinal plant producers in the community of producers who sell their products in different ways is different, the level of awareness in the three communities of supply to consumers and perfumers and intermediaries with the fourth community, ie supply The processing plant has created a very significant difference in the level of awareness of manufacturers.

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