

Socio-Economic Factors for Adoption of Medicinal Plants Cultivation in North of Iran

N.N. Seyyed Ali, A.L. Dariush, S.A. Mohammad and D.M. Pedram
Members of Young Researchers' Club, Islamic Azad University, Rasht Branch, Rasht, Iran

Abstract: There has not taken any major step for mass cultivation of medicinal plants. In this context, review of factors affecting adoption of agricultural cultivation of medicinal plants is very important. This study has also been accomplished for the purpose of identification of socio-economic factors effective on the adoption of medicinal plants cultivation in the Eshkevarat region of Iran. A survey was conducted using a stratified random sampling to collect data from farmers of selected rural in Eshkevarat region, north of Iran. The questionnaire validity and reliability were also determined to enhance the dependability of the result. The subjects under study were then divided into two groups of adopters and non-adopters. A total of 50 adopters and 40 non-adopters were studied for effective factors. Results showed that the most important socio-economical factors that influence on the adoption of medicinal plants cultivation in Eshkevarat region of Guilan province are marriage status, number of farm patches, yearly income from agricultural activities and utilization system.

Key words: Adoption, medicinal plants, farmers, Eshkevarat region, agricultural activities, Iran

INTRODUCTION

In recent years, it has been paid more attention to herbaceous medicines and their origin namely medicinal plants mainly due to the proof of these side effects of chemical and the human tendency to use more natural products to maintain their health. The problems of modern medicinal systems such as pharmacologic high costs, the use of non-renewable resources such as fossil resources and environmental pollution by pharmaceutical industry for making human inability of some drugs that normally exists in plants have also caused much more attention to medicinal plants (Lakeh *et al.*, 2008; Ghandali and Hosseini, 2008; Badi *et al.*, 2006; Akhoundzadeh and Hampa, 2004; Kessler *et al.*, 2001). Medicinal preparations derived from natural sources, especially from plants have been in widespread use since time immemorial.

In fact, plants remain the main source of medicines for a large proportion of the world's population, particularly in the developing world, despite the advent of the pharmaceutical chemistry during the early 20th century which brought with it the ability to synthesize an enormous variety of medicinal drug molecules and allowed the treatment of previously incurable and/or life-threatening diseases (Ahmad *et al.*, 2006). The strategies that herbal practitioners adopt to prevent illness or restore health in their patients are different in the many and varied herbal traditions across the planet

but the effects that herbal medicines have within the body to improve health do not vary. There are many thousands of medicinal plants in use throughout the world with a tremendous range of actions and degrees of potency. Most have a specific action on particular body systems and are known to be suitable for treating certain types of ailments (Chevallier, 1996).

World trade volume of medicinal plants is >43 billion dollars and has been predicted to reach to 5 trillion dollars in 2050. The financial circulation of this trade has raised up to 100 billion dollars and about 25% of the world pharmaceutical market in 1996, worth approximately 250 billion dollars is allocated to drugs derived from plants. Iran's share of this market is about 60 million dollars (Ebrahimi, 2008). Existence of 11 climates from 13 known climates of the world having 300 sunny days a year and temperature difference between 40-50°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 (Akbarinia *et al.*, 2007; Niroumanesh *et al.*, 2008). During the accurate study of all Iran's plants that list in the book glossary of Iran's plants names, it has been identified that nearly 569 genera of all Iran's plants are medicinal that include approximately 2300 species. Some of them introduced to Iran or have been imported that are not among common



Fig. 1: Medicinal plant of echium amoenum in eshkevarat region (picture by: dariush ashoori latmahalleh)

and traditional medicinal plants. About 80 genres of these plants are among the plants that imported to Iran and have been planted in different parts of the country. About 116 genres among these plants are aromatic and smelly that includes 836 species often belonging to the families compositae, mint and apiaceae. Altogether, these plants can publicly fit into 130 families that 19 families of them are through implanted herbs. Among the current medicinal plants of Iran, 136 genres include trees and shrubs that their secondary products are definitely consumed or their products placed among everyday foods and fruits consumption of families, these plants are used regardless of their pharmaceutical functions (Mozaffarian, 2008).

Medicinal plants are the valuable resources of every community. Identification, cultivation and domestication of important species is memorable in order to reduce the pressure incurs to natural resources and to preserve the genetic resources (Akbarinia *et al.*, 2006). As respects, the vast land of Iran has tendency to culture and produce many species of medicinal plants due to having different climates (Akbarinia *et al.*, 2007) but there has not taken any major step for identification, domestication and mass cultivation of these plants (Bagheri *et al.*, 2008). In this context, review of factors affecting adoption of agricultural cultivation of medicinal plants and domestication of wild medicinal plants in different regions of Iran is very important. This study has also been accomplished for the purpose of identification of socio-economic factors effective on the adoption of medicinal plants cultivation in the Eshkevarat region of Iran (Fig. 1).

MATERIALS AND METHODS

The data reported here were collected to identify socio-economic factors critical to adoption of medicinal plants cultivation. This study was carried out by survey



Fig. 2: Location of studied region in North of Iran

Table 1: Total sample size used in the study area

Sample size	Frequency	Percent
Adopters sample size	50	55.6
Non-adopters sample size	40	44.4
Total	90	100.0

Survey results, 2009

during May and June 2009 in selected villages of Eshkevarat Region in Guilan province near to Caspian Sea, North of Iran (Fig. 2). The sampled population in each village was stratified into two categories, adopters-those who adopted and continue to practice medicinal plants cultivation and non-adopters-those who have never adopted medicinal plants cultivation.

From each village list, a random sampling approach was used to select the respondents. This sampling technique was used to avoid conscious or unconscious bias in the selection of sampled households and ensured that the selected sample was representative of the population. According to Table 1 and with keeping 5% error due to classified questions selected 90 farmers as sample size.

In total 90 farmers were selected of which 50 (55.6%) were medicinal plants cultivation and 40 (44.4%) non-adopters (Table 1). The instruments used for data collection was questionnaire with open and close questions. The questionnaire was pre-tested by interviewing three farmers. After some modifications, it was tested again with 5 other respondents. The dependent variable was the adoption of medicinal plants cultivation among farmers of Eshkevarat region of Guilan province.

The dependent variable was dichotomized with a value 1 if a farmer was an adopter of medicinal plants cultivation and 0 if non-adopter. Data analysis was conducted with software of Statistical Package for Social Sciences, 16 version (SPSS 16). Frequency, percent and standard deviation were used for the descriptive analysis of data. Chi-square test, t-test and Mann-Whitney test were used for inferential analysis data.

RESULTS AND DISCUSSION

Descriptive analysis of data: In this study, results of data descriptive analysis in Table 2 showed that mean of responders age was about 46 year. More of responders farmers were male (about 80%). More of responders were of married (96.7%). Responders were 36.7% illiterate, 23.3% primary-school level, 18.9% guidance level, 7.8% have a secondary education and school diploma and 13.3% collegiate. Mean of family size was about person 5. Prime occupation of responder farmers more was agriculture and animal husbandry (about 70%).

Number of owned farm patches of more responders was lesser of patch 4 (76.7%). More of responder farmers were padrone of owned farm (92.2%). Uttermost of species six collected medicinal plant by farmers in region that more of responders collected lesser of medicinal

species 4 (93.4%), mean about species 2. Lesser of 3 ha were mean of amount of farm ownership of responder more (80%, mean about 2.25). Mean of yearly income from agricultural activities was about 14 million Rials while yearly income of non-agricultural activities was about 18 million Rials. Responders did not owned 51.1% animal.

More of animal padrone responders owned lesser of animals 20 (35.6%). Alone 38.9% of responder farmers go visit refer to agricultural services during a year. More responders were member of in social institutions (76.7%). Mean of numbers go to city was about 8 time during a year. Obtain information on agricultural activities by other farmers was method of responders more (78.9%). Method of diseases treatment between responders was 41.4% herbal medicines, 46.7% chemical medicines and 12.2 year herbal medicines and chemical medicines.

Table 2: Frequency, percent, mean and standard deviation of socio-economic characteristics of farmers

Characteristics	Groups	Frequency	Percent	Mean	S.D
Age	20-30	20	22.2	46.60	15.50
	31-40	17	18.9		
	41-50	18	20.0		
	51-60	18	20.0		
	61 thru highest	17	18.9		
	Total	90	100.0		
Sex	Male	73	81.1	-	-
	Female	17	18.9		
	Total	90	100.0		
Marriage status	Married	87	96.7	-	-
	Bachelor	3	3.3		
	Total	90	100.0		
Education level	Illiterate	33	36.7	-	-
	Primary school	21	23.3		
	Guidance school	17	18.9		
	High school	7	7.8		
	Collegiate	12	13.3		
	Total	90	100.0		
Family size	1-3	19	21.1	5.10	2.09
	4-6	48	53.3		
	7 thru highest	23	25.6		
	Total	90	100.0		
Prime occupation	Agriculture	57	63.3	-	-
	Animal husbandry	7	7.8		
	Other occupations	26	28.9		
	Total	90	100.0		
Number of owned farm patches	Lowest thru 2	36	40.0	3.34	2.17
	2-4	33	36.7		
	4-6	10	11.1		
	6 thru highest	11	12.2		
	Total	90	100.0		
Utilization system	Ownership	83	92.2	-	-
	Rental	1	1.1		
	Without farm	6	6.7		
	Total	90	100.0		
Numbers of medicinal species collected	Lowest thru 2	51	56.7	2.23	1.39
	2-4	33	36.7		
	4-6	6	6.7		
	Total	90	100.0		
Amount of farm ownership (per hectare)	Lowest thru 1	38	42.2	2.25	2.04
	1-3	34	37.8		
	3-5	10	11.1		

Tabel 2: Continue

Characteristics	Groups	Frequency	Percent	Mean	S.D
Yearly income from agricultural activities	5 thru highest	8.0	8.9	14072000	16721400
	Total	90.0	100.0		
	Lowest thru 5000000	32.0	35.6		
	5000000-15000000	34.0	37.8		
	15000000-25000000	9.0	10.0		
	25000000-35000000	7.0	7.8		
Yearly income from non-agricultural activities	Total	90.0	100.0	18344000	57564300
	Lowest thru 5000000	50.0	55.6		
	5000000-20000000	23.0	25.6		
	20000000-35000000	7.0	7.8		
	35000000-50000000	7.0	7.8		
	50000000 thru highest	3.0	3.3		
Number of domestic animals	Total	90.0	100.0	13.98	48.38
	0	46.0	51.1		
	1-20	32.0	35.6		
	21-40	4.0	4.4		
	41 thru highest	8.0	8.9		
	Total	90.0	100.0		
Number of Visit refer to agricultural services during a year	0	55.0	61.1	0.88	1.50
	1-3	28.0	31.1		
	4 thru highest	7.0	7.8		
	Total	90.0	100.0		
	Yes	69.0	76.7		
	No	21.0	23.3		
Membership in social institutions	Total	90.0	100.0	-	-
	Yes	69.0	76.7		
	No	21.0	23.3		
	Total	90.0	100.0		
	1-5	55.0	61.1		
	6-10	8.0	8.9		
Numbers go to city during a year	11-15	16.0	17.8	8.77	9.14
	16 thru highest	11.0	12.2		
	Total	90.0	100.0		
	Promotion bureau	4.0	4.4		
	Other farmers	71.0	78.9		
	Agricultural input supply stores	2.0	2.2		
Method obtain information on agricultural activities	Radio and TV	5.0	5.6	-	-
	Several from options	8.0	8.9		
	Total	90.0	100.0		
	Chemical medicines	42.0	46.7		
	Herbal medicines	37.0	41.1		
	Chemical and Herbal	11.0	12.2		
Method of treatment of diseases	Total	90.0	100.0	-	-
	Amount of land for cultivation of medicinal plants (ha)	50.0	-		
	Species numbers of medicinal plants for cultivation	50.0	-		
	Survey results (2009)				

Mean of medicinal plant farms between adopters was 1500 m². More adopters of medicinal plant cultivation implanted alone one species of medicinal plant.

Inferential analysis of data: In this study, results of Chi-square test in Table 3 showed that there was a significant relation between adoption of medicinal plants cultivation and variables of marriage status ($p < 0.05$ and $\chi^2 = 3.879$), number of owned farm patches ($p < 0.05$ and $\chi^2 = 8.319$) and utilization system ($p < 0.05$ and $\chi^2 = 8.707$).

But there was no significant relation between adoption of medicinal plants cultivation and variables of age ($p > 0.05$ and $\chi^2 = 5.285$), sex ($p > 0.05$ and $\chi^2 = 0.613$), education level ($p > 0.05$ and $\chi^2 = 2.650$), family size ($p > 0.05$ and $\chi^2 = 4.255$), prime occupation ($p > 0.05$ and $\chi^2 = 0.960$), numbers of species collected ($p > 0.05$ and $\chi^2 = 2.102$), amount of farm ownership ($p > 0.05$ and $\chi^2 = 4.525$), yearly

Table 3: The effect of socio-economic characteristics on adoption of medicinal plants cultivation using Chi-square test

Characteristics	χ^2	P
Age	5.285 ^{Ns}	0.259
Sex	0.613 ^{Ns}	0.434
Marriage status	3.879*	0.049
Education level	2.650 ^{Ns}	0.618
Family size	4.255 ^{Ns}	0.119
Prime occupation	0.960 ^{Ns}	0.619
Number of owned farm patches	8.319*	0.040
Utilization system	8.707*	0.013
Numbers of medicinal species collected	2.102 ^{Ns}	0.350
Amount of farm ownership	4.525 ^{Ns}	0.210
Yearly income from agricultural activities	8.527 ^{Ns}	0.074
Yearly income from non-agricultural activities	7.646 ^{Ns}	0.105
Number of domestic animals	5.742 ^{Ns}	0.125
Number of Visit refer to agricultural services	4.392 ^{Ns}	0.111
Membership in social institutions	3.382 ^{Ns}	0.066
Numbers go to city	5.364 ^{Ns}	0.147
Method obtain information on agricultural activities	8.420 ^{Ns}	0.077
Method of treatment of diseases	0.484 ^{Ns}	0.785

Ns: Non significant, *significant at $p < 0.05$ and **significant at $p < 0.01$

income from agricultural activities ($p>0.05$ and $\chi^2 = 8.527$), yearly income from non-agricultural activities ($p>0.05$ and $\chi^2 = 7.646$), number of domestic animals ($p>0.05$ and $\chi^2 = 5.742$), number of visit refer to agricultural services ($p>0.05$ and $\chi^2 = 4.392$), membership in social institutions ($p>0.05$ and $\chi^2 = 3.382$), numbers go to city ($p>0.05$ and $\chi^2 = 5.364$), method obtain information on agricultural activities ($p>0.05$ and $\chi^2 = 8.420$) and method of treatment of diseases ($p>0.05$ and $\chi^2 = 0.484$).

In this study, results of t-test in Table 4 showed that there was a significant difference between the two groups of adopters and non-adopters of medicinal plants cultivation regarding variables of number of owned farm patches ($p<0.01$ and $t = 3.382$) and yearly income from agricultural activities ($p<0.05$ and $t = 2.558$). But, there was no significant difference between the two groups of adopters and non-adopters regarding variables age ($p>0.05$ and $t = 1.193$), family size ($p>0.05$ and $t = 1.950$), family size ($p>0.05$ and $t = 1.950$), numbers of species collected ($p>0.05$ and $t = 0.584$),

of amount of farm ownership ($p>0.05$ and $t = 1.299$), yearly income from non-agricultural activities ($p>0.05$ and $t = 0.817$), number of domestic animals ($p>0.05$ and $t = 0.958$), number of visit refer to agricultural services ($p>0.05$ and $t = 1.068$) and numbers go to city ($p>0.05$ and $t = 1.564$).

In this study, results of Mann-Whitney test in Table 5 demonstrated that there was a significant difference between the two groups of adopters and non-adopters of medicinal plants cultivation regarding variables of Marriage status ($p<0.05$ and $z = 1.959$) and Utilization system ($p<0.01$ and $z = 2.922$). But there was no significant difference between the two groups of adopters and non-adopters regarding variables of sex ($p>0.05$ and $z = 0.778$).

Education b level ($p>0.05$ and $z = 0.228$), prime occupation ($p>0.05$ and $z = 0.597$), membership in social institutions ($p>0.05$ and $z = 1.829$), method obtain information on agricultural activities ($p>0.05$ and $z = 1.948$), method of treatment of diseases ($p>0.05$ and

Table 4: Comparison of some socio-economic characteristics of adopter and non adopter of medicinal plants cultivation using t-test

Characteristics	Groups	N	Mean	Std. deviation	t	Sig.
Age	Adopters	50	48.34	15.68	1.193 ^{ns}	0.236
	Non-adopters	40	44.42	15.17	-	-
Family size	Adopters	50	5.48	2.215	1.950 ^{ns}	0.054
	Non-adopters	40	4.62	1.86	-	-
Number of owned farm patches	Adopters	50	4.00	2.18	3.382**	0.001
	Non-adopters	40	2.52	1.88	-	-
Numbers of medicinal species collected	Adopters	50	2.16	1.62	0.584 ^{ns}	0.561
	Non-adopters	40	2.32	1.04	-	-
Amount of farm ownership	Adopters	50	2.50	1.99	1.299 ^{ns}	0.197
	Non-adopters	40	1.94	2.08	-	-
Yearly income from agricultural activities	Adopters	50	17730000	20148200	2.558*	0.013
	Non-adopters	40	9500000	9457060	-	-
Yearly income from non-agricultural activities	Adopters	50	13900000	19543000	0.817 ^{ns}	0.416
	Non-adopters	40	23900000	83815700	-	-
Number of domestic animals	Adopters	50	9.18	19.31	0.958 ^{ns}	0.343
	Non-adopters	40	20.00	69.32	-	-
Number of Visit refer to agricultural services	Adopters	50	1.04	1.59	1.068 ^{ns}	0.289
	Non-adopters	40	0.70	1.38	-	-
Numbers go to city	Adopters	50	7.44	9.06	1.564 ^{ns}	0.121
	Non-adopters	40	10.45	9.07	-	-

Ns: Non significant, * significant at $p<0.05$ and **significant at $p<0.01$ results (2009)

Table 5: Comparison of some cultural characteristics of adopter and non adopter of medicinal plants cultivation using Mann-Whitney test

Characteristics	Groups	N	Mean rank	Sum of ranks	Z	Sig.
Sex	Adopters	50	46.80	2340.00	0.778 ^{ns}	0.436
	Non-adopters	40	43.88	1755.00	-	-
Marriage status	Adopters	50	47.00	2350.00	1.959*	0.050
	Non-adopters	40	43.62	1745.00	-	-
Education level	Adopters	50	44.96	2248.00	0.228 ^{ns}	0.820
	Non-adopters	40	46.18	1847.00	-	-
Prime occupation	Adopters	50	46.75	2337.50	0.597 ^{ns}	0.550
	Non-adopters	40	43.94	1757.50	-	-
Utilization system	Adopters	50	48.84	2442.00	2.922**	0.003
	Non-adopters	40	41.32	1653.00	-	-
Membership in social institutions	Adopters	50	42.20	2110.00	1.829 ^{ns}	0.067
	Non-adopters	40	49.62	1985.00	-	-
Method obtain information on agricultural activities	Adopters	50	48.92	2446.00	1.948 ^{ns}	0.051
	Non-adopters	40	41.22	1649.00	-	-
Method of treatment of diseases	Adopters	50	46.98	2349.00	0.661 ^{ns}	0.509
	Non-adopters	40	43.65	1746.00	-	-

Ns: Non significant, * significant at $p<0.05$ and **significant at $p<0.01$ Survey results (2009)

$z = 0.661$). Referring to the results of this study, effect of the variables number of farm patches, yearly income from agricultural activities and utilization system on adoption almost have the same direction toward the results of many other researchers wherein the adoption of innovations and different technologies in agriculture namely some researchers outcome like Darvish *et al.* (2009), Saka *et al.* (2005), Tabaraee and Hassannejad (2009) and Rostami *et al.* (2008).

It is inferred that such traits could be among limitative factors on adoption of medicinal plants culture across the non-adopters. Besides the results of current study unto the variables age, sex, education level, family size, amount of farm ownership (per hectare), number of domestic animals, number of visit refer to agricultural services during a year, membership in social institutions were commonly unlike some researchers outcomes Astaneh and Iravani (2007), Tabaraee and Hassannejad (2009), Faraji and Mirdamadi (2006), Kapanda *et al.* (2005), Iravani *et al.* (2006), Rostami *et al.* (2008), Joshi and Pandey (2005), Darvish *et al.* (2009), Pezeshkiran *et al.* (2006), Lashgarara and Asadi (2008), Kohansal *et al.* (2009), Mahboubi *et al.* (2005), Pezeshkiran and Arayesh (2001), Adeogun *et al.* (2008), Saka *et al.* (2005), Boahene *et al.* (1999) and Rezvanfar and Mandape (2000).

As regards in multiple researches, the most of these traits are reported effectively on the adoption of technologies and various innovations but lack of meaning of these traits in this study signifies that there is no major difference among the groups of adopters and non-adopters in studied region. For this reason, there won't be major restriction in order to adopt medicinal plants culture among the non-adopters of this technology in comparison with the adopters.

CONCLUSION

In general, the results of survey indicate that the most important socio-economical factors that influence on the adoption of medicinal plants culture in Eshkevarat region of Guilan province are marriage status, number of farm patches, yearly income from agricultural activities and utilization system. First of all, as respects of non-adopters difference in comparison with the adopters of medicinal plants culture in Eshkevarat region of Roudsar depends on such these traits and generally is trifling.

RECOMMENDATIONS

It is suggested to promote more effective medicinal plants culture. as regards, three meaningful variables of four show the economical difference between two

groups of the adopters and non-adopters of medicinal plants culture in studied region. It should provide financial resources, facilities and necessary materials so as to develop medicinal plants and make it more valuable. Finally, as respects plenty of medicinal plants of the studied region are grown wildly, it is suggested to study more on domestication of these plants and determining the profitable cultural features in order to specify the requirements of planting, maintenance and harvesting of these plants. There is hope that the strength of mentioned region farmers' economy will be improved by utilization of medicinal plants cultivated in specific farms.

ACKNOWLEDGEMENTS

The researchers would like to acknowledge the farmers for their patience in answering the questions.

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