



Research Paper

The Effect of Farm Counseling on Farmers' Beliefs and Motivation in Sustainable Environmental Protection (Case Study: Wheat Farmers in Behbahan city, Iran)

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ABSTRACT

The purpose of this study was to investigate the effect of field consultation on the beliefs and motivation of farmers in sustainable environmental protection (Case study: wheat farmers of Behbahan city). From the perspective of the purpose, the present study is an applied research conducted among farmers in Behbahan. From the perspective of data collection method, it is also a survey research. The statistical population of the study consisted of farmers in Behbahan city. Cochran's formula was used to determine the sample size and based on this sample size it was estimated 350 people. Simple random sampling method was used for sampling. The main research data collection tool is a researcher-made questionnaire with 35 items. Expert questions are set with a 5-point Likert range. The validity of the questionnaire was used by a panel of experts including the supervisor and other professors of agricultural management department. The Cronbach's alpha method was used to determine the reliability of the questionnaire. SPSS software was used for data analysis and Cronbach's alpha for the questionnaire was 0.935, so the reliability of the questionnaire was evaluated. Data were analyzed using SPSS 20 and LISREL 8.85 software in two parts: descriptive statistics and inferential statistics. The results of the study have shown that on-farm counseling should enhance farmers' beliefs and beliefs in environmental protection.

KEYWORDS: Farm counseling, Motivation, Belief, Conservation, Environment

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I. INTRODUCTION

Agricultural activities are known as one of the most basic pollutants and as a result have wide-ranging effects in terms of quality and to some extent on the environment (Newman, 1997). Major agricultural activities that have caused land degradation include planting changes without considering the appropriate time between two plantings, planting in weak lands, unbalanced fertilizer application, poor irrigation planning and management. Failure to meet soil conservation standards, including soil erosion due to overgrazing and intensive cultivation, as well as soil degradation due to overuse of agricultural chemicals on a large scale, deforestation to agricultural land, over-exploitation of timber for fuel and timber harvesting, and drilling activities have also raised concerns. Deforestation in sloping areas has caused land degradation and severely eroded soils. Irregular cutting of plants for wood, fuel and other products is also common in areas of semi-arid ecosystems (Sarkar and Chakrabati, 2007).

Public concerns about the environmental impacts of agriculture in the United States first emerged in the 1960s with concerns about the effects of pesticides on the environment and human health. During the 1970s, it was recognized that in both the United States and Europe, specialized agricultural activities, intensified by current economic incentives in agricultural policy, had adverse effects on the environment. Increasing the level of pollution from concentrated cereals and livestock systems and increasing the use of fertilizers had no acceptable effects compared to other industries. It has been proven that the interactions between agriculture and the environment are very complex. Still, we know that agriculture and the environment are interdependent. However, it is also accepted that there are many problems in combining modern farming practices with the environment (Warren et al., 2008).

The world's biodiversity is one of the major environmental threats posed by humans (Rockstrom et al., 2009). Farmers can play a key role in achieving biodiversity conservation goals. Knowing the way of thinking of farmers, how they perceive natural resources and their willingness to take all necessary measures to protect

the environment, is essential to solve environmental problems and crises to achieve change (Chevillat et al, 2017). Behavior such as involving them in the protection of water resources and other aspects related to the environment, initially requires a change in people's attitudes towards it, because scientific activities have shown that people who have a more favorable attitude to the environment, probably have better behaviors that are in line with the preservation of the environment and natural resources. Therefore, understanding the value attitudes of the environment is the main goal of many researchers in gaining new insights to help behavioral research in environmental sociology. Ghazani and Bijani, (2015).

Many farmers want to increase their knowledge and improve their environmental education, and it is very likely that they will face ethical and doctrinal questions in their profession and work. For example, the farmer may be asked if chemical fertilizers and pesticides can be used as the crop grows. Is it right to use groundwater to increase agricultural production so that there is nothing left for future generations? Is it possible to cultivate forest pastures and lands while endangering the animal species living in it or reducing the biological species? These questions are inherently ethical and doctrinal, and agricultural promoters can help farmers identify and differentiate them from management or technology issues and provide them with the best advice in the event of an ethical dilemma (Vanessa et al., 2018).

Agricultural activities, as an important economic sub-sector, have environmental, aesthetic and social functions (Howley et al., 2014; Abbasian et al., 2017). Due to growing concerns about environmental degradation due to agricultural activities, the concept of sustainability has also been introduced in the agricultural sector and the paradigm of "sustainable agriculture" has been adopted (Sulemana & James, 2014).

Soil erosion, deforestation, destruction of soil micronutrients, soil salinity, pollution of agricultural waters, increase in nitrate and phosphate from fertilization, burning of crop residues, lack of biodiversity, excessive use of pesticides, ammonia pollution from animal fertilizers, are among the most important environmental challenges in agriculture (Zhang et al. 2014)

"Sustainability of the environment is strongly related to the quality of human life, and given that sustainability problems arise to a large extent from human-environmental interaction, social and behavioral research should be considered as a necessary complement to "natural sciences" and "technological research". (Steg & Vlek, 2007). Moreover, today, the increase in the destruction of natural resources in recent decades, has made the protection of these resources inevitable (Karami and Keshavarz, 2015).

In the new paradigms, more emphasis has been placed on the aspects of human and natural environment impact (Corral-Verdugo et al., 2008). New paradigms acknowledge that environmentally destructive behaviors essentially have many negative consequences that arise in the process of pursuing personal interests by individuals and groups (Carling et al., 2002).

Environmental beliefs are a set of attitudes that determine a person's behavior in relation to the environment and are the reference framework for interaction with the environment. Over the years, the General Environmental Beliefs (GEB) have used the New Environmental Paradigm and the NEP HEP Exception Paradigm, extensively. According to Stern et al., the NEP HEP "paradigm or worldview" is a set of generalized beliefs about human-environmental relations. NEP paradigm consists of two variables, Natural Balance (NB), meaning "human harmony and other components of nature, and "Limits to Growth (LG "means the imposition of restrictions on human activities. It is noteworthy that in contrast to "general environmental beliefs", there are specific environmental beliefs in which beliefs and assumptions are studied in relation to the state of a natural resource (such as water, climate) (Kral et al., 2003).

A new chapter in the field of attitude and behavior research began with the introduction of Ajzen and Fishbin theory in 1975 and the design of the "Reasonable Action" model. This theory was widely used to predict various behaviors. In this model, behavior is determined by intention and intention by mental norms and attitudes. Despite the research findings, the research showed that this model is only applicable to relatively non-complex and simple behaviors and did not show much application in complex areas that require high levels of processing. Ajzen and Fishbin 1977 stated that if the tools for measuring behavior and attitude are consistent in terms of the degree of specificity of that tool for a particular behavior, and that tool well measures a person's attitude about that behavior, thus the degree of correlation between behavior and attitude will increase. Due to the weaknesses of the "reasonable design" model, Ajzen and Maden presented a new model in 1986 in which, in addition to mental norms and attitudes, the factor of "perceived behavioral control" was added to the previous model and this model was called the theory of planning behavior. This theory has been used as one of the most effective general conceptual frameworks in the study of human behavior (Ajzen, 2002). Researchers who believe that individual desire is the most influential factor in behavior often refer to rational models of behavior such as the theory of Ajzen behavior (Kloschner and Bluoba, 2010). Armitage and Connor (2001) performed extensive meta-analysis to show that the theory of planned behavior can explain 20% of the variance of actual behavior. They also emphasized that working on other normative variables can predict the power of the model.

Stern (2000), in a comprehensive and detailed study, has divided the factors affecting the underlying individual relationships and the living organism of the environment into four main categories, which are: a.

Attitude factors including norms, beliefs and values; b. Underlying or external factors including costs, material resources, rewards, rules and regulations, available technology, social norms and expectations, advocacy policies and publicity; c. Individual competencies such as literacy, social status, financial resources, special behavioral knowledge and skills; d. Conventional habits and practices. Various theories have been proposed to evaluate and measure motivation, including: Maslow's Hierarchy of Needs Theory, Herzberg Health Motivation Theory, McClelland Theory of Progress, Worm Wait Theory, Adams Equality Theory, Skinner Strengthening Theory, and McMillon's theory to mention a few.

Togbe et al. (2012), in their study stated the most important incentives for farmers were to use new guidelines for cotton pest management to reduce costs, increase cotton quality, increase yield compared to traditional methods, effective pest management, environmental protection, and improved knowledge.

Goh et al. (2016), in a study entitled Non-conformity of the planned model among environmentalists in national parks showed that social norms had the greatest impact on predicting the amount of investment of people in creating green space and then this variable, perceived attitudes and behavioral controls, had the greatest impact on people's perceptions of environmental values and investment in improving green space. Tang et al. (2017) state that environmental protection behaviors are conscious actions taken by individuals with the aim of minimizing the negative impact of human activities and preserving the environment.

Salehi et al. (2017) conducted a study titled, "The effect of environmental beliefs on the sustainable behavior of farmers in Fars province in the exploitation of groundwater resources". Their results showed that special belief in groundwater is a strong determinant of groundwater sustainability behavior, which is itself influenced by the general environmental beliefs of the human exclusion paradigm and the new environmental paradigm. The results also showed that among the general environmental beliefs, the new paradigm of human interdependence had the most direct causal effect and the paradigm of human exclusion had the most indirect causal effect on farmers' behavior.

Bijani et al. (2017) examined the analysis of the application of environmental value attitudes in the analysis of environmental behavior in order to protect the soil among paddy farmers in the central part of Sari, Iran. The results showed that paddy farmers with a selfish environmental value perspective had a lower level of environmental behavior than the two ecological and altruistic environmental value perspectives.

The environmental promotion approach emphasizes the use of participatory and activity-oriented methods of farmers to gather information and perform decision-making and more interactive communication between researchers, extension experts and information users. Increasing user participation (farmers) makes the research departments more relevant and transmits information related to environmental learning (Valentine et al., 2007).

The results of research by (Farahmand et al. 2014,; Jamshidi et al. 2014,; Fazeli and Jafar Salehi 2013,; Ziapour et al. 2012,; Salehi and Imam Gholi, 2012) showed that the variables of age, gender, marital status, land ownership rate, household income percentage, environmental awareness, individualism, life satisfaction, renewed spirit, understanding of environmental benefits, cultural perception, cultural motivation, cultural capital and environmental behaviors have a significant relationship. There is also a significant difference between men and women in environmental behaviors.

The results of research by (Takahashi et al. 2014,; Kiel et al. 2014,; Werf et al. 2015,; showed environmental attitudes and spatial affiliation, perceptions, norms, and personal responsibilities for using local knowledge, household labor constraints, land ownership, and high initial expectations about market opportunities for products, legal tools, economic rewards, Procurement communications and voluntary collective action, cultural worldview, environmental identity, social concerns (environmental commitment) and moral concerns (guilt about environmental degradation) affect individuals' environmental behavior.

According to the results of the presented research and the importance of environmental protection in human life, the main purpose of this study is to investigate the effect of field counseling on the beliefs and motivation of wheat farmers in Behbahan in sustainable environmental protection. Based on the results of the research background, the conceptual model of the research is shown in Fig. 1.

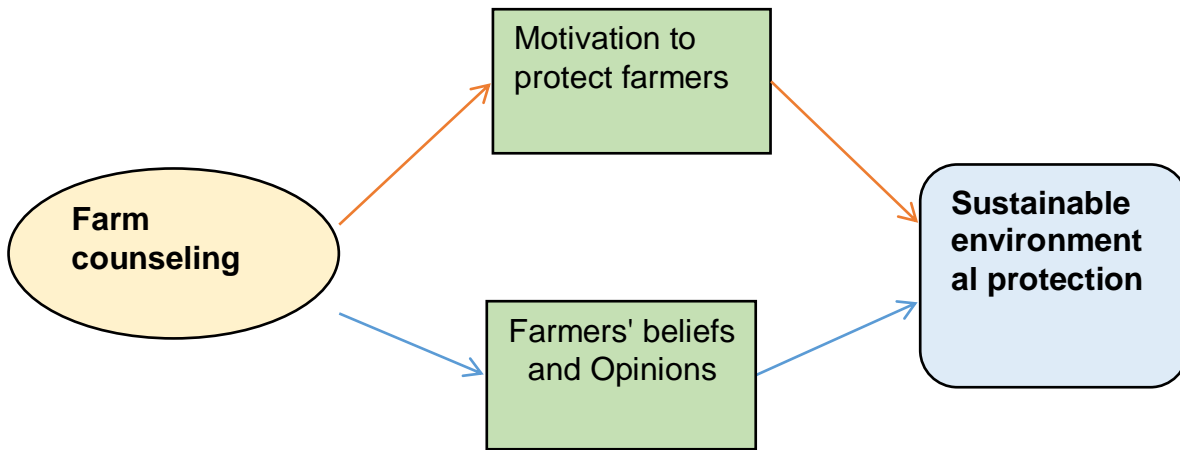


Figure 1: conceptual model of the research

II. METHODOLOGY

The aim of this study is to investigate the effect of field counseling on the beliefs and motivation of wheat farmers in Behbahan in sustainable environmental protection. Therefore, in terms of purpose, it is an applied research and in terms of nature, it is a descriptive survey and cross-sectional description. The statistical population of this study includes farmers who are engaged in agriculture as the main profession in Behbahan city and in the crop year 2018 have planted wheat as their main crop, which is 4000 wheat farmers. Krejcie and Morgan table was used to determine the sample size and based on this table, the sample size of 350 people was estimated. Random sampling method was used to select the sample. The data collection tool was a questionnaire that includes 5 main dimensions which are: Farmers' beliefs, Farmers' Motivation, environmental protection, Biodiversity, Farm counseling and one section included the demographic characteristics of the study population. To evaluate the validity of the questionnaire, a panel of experts was used. Cronbach's alpha coefficient was used to calculate the reliability of the questionnaire, the results of which are shown in Table 1

Table 1: SPSS software output for reliability

Dimensions	Number of items	Cronbach's alpha
Farmers' beliefs	5	0.76
Farmers' Motivation	5	0.78
Farm Consoling	12	0.73
environmental protection	6	0.87
Biodiversity	7	0.72

Source: Findings of Research

Statistical methods used for data analysis include descriptive statistical methods (frequency distribution tables and mean and view) and inferential statistical methods (normality test, randomness test, confirmatory factor analysis and structural equation modeling). The analysis of this research will be done using SPSS 20 and LISREL 8.85 software in two sections of descriptive statistics and inferential statistics.

III. FINDING OF THE STUDY

3.1 Investigation of demographic characteristics

According to Table 2, 267 (76%) of the farmers are male and 83 (24%) are female. Thirty-six (15%) farmers under the age of 35, 98 (28%) respondents between the ages of 35 and 45, 171 (49%) between the ages of 45 and 55, and Forty-five of the subjects were over 55 years old. Forty-two (12%) have less than 5 years of experience, 80 (23%) of farmers between 5 and 10 years, 195 (56%) between 10 and 20 years and 33 (9%) more than 20 years' experience working in agriculture. Thirty-five (10%) were literate, 179 (51%) had less than a diploma, 92 (26%) farmers had a diploma and 44 (13%) had a university degree.

Table 2. Frequency distribution of individual characteristics of farmers

	Frequency	Percentage	Cumulative Percentage
Gender			
Female	83	32.71	32.71
Male	267	76.29	100
Total	350	100	
Age			
<35	36	10.28	10.28
35 - 45	98	28	38.28
45-55	171	48.86	87.15
>55	45	12.85	100
Total	350	100	
Job Experience			
<5	42	12	12
5-10	80	22.85	34.85
10-20	195	55.71	90.57
>20	33	9.43	100
Total	350	100	
Education			
Reading and writing	35	10	10
Less than diploma	179	51.14	61.14
diploma	92	26.29	87.43
University	44	12.57	100
Total	350	100	

Source: Findings of Research

3.2 Internal model of research (testing of hypotheses)

The relationship between the studied variables in each of the research hypotheses is tested based on a causal structure with the PLS partial least squares technique. The general model of the research is shown in Fig. 2. In this model, which is the output of Smart PLS software, a summary of the results related to the standard operating load of the variables is presented. The t-statistic and the amount of bootstrapping to measure the significance of the relationships were also shown in Fig. 3. In order to facilitate the drawing of the model for the variables, an abbreviation has been given in Table 3, respectively.

Table 3 shows the research variables and symbols used in LISREL software

Main components	Sub-components	symbol	Number	Number of questions	Cronbach's Alpha
Farmers' beliefs		M1	5	1-5	0.844
Motivation to protect farmers		M2	5	6-10	0.756
Intention		Y1	3	23-25	0.713
Attitude		Y2	3	26-28	0.722
Farm counseling	Development of agricultural activities	X1	4	11-14	0.736
	Development of promotional educational activities	X2	4	15-18	0.755
	Development of sustainable agricultural methods	X3	4	19-22	0.749
Sustainable environmental protection	social norms	Y3	3	29-32	0.731
	Perceived behavioral control	Y4	3	33-35	0.729

Source: Findings of Research

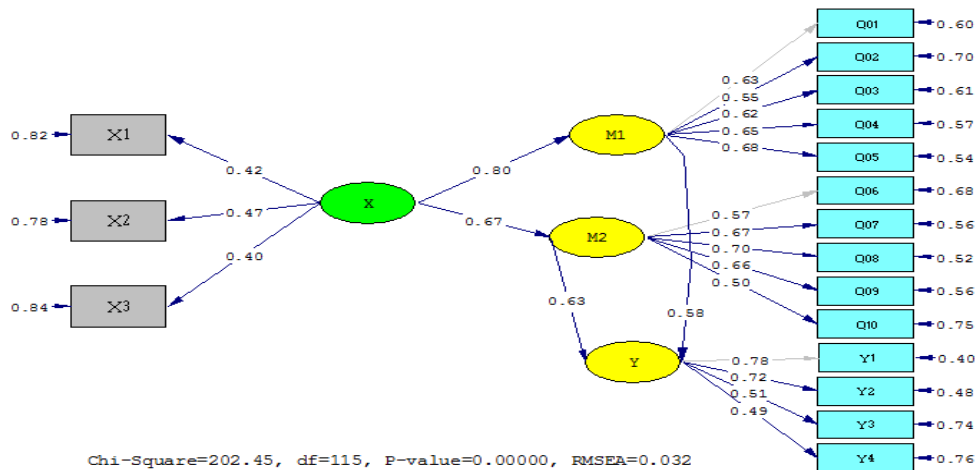


Figure 2. Test of research hypotheses (standard estimation)

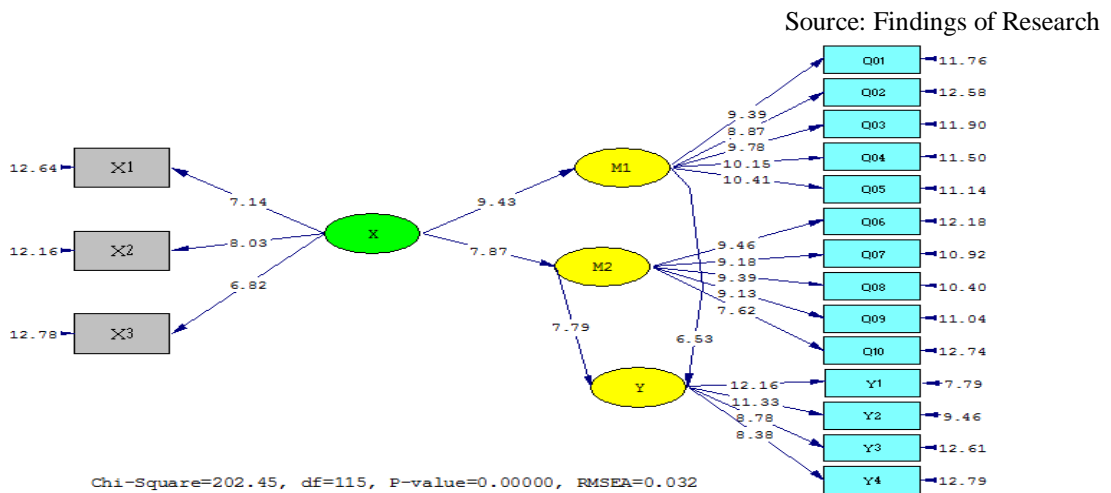


Figure 3. Test of research hypotheses (t value statistic)

Source: Findings of Research

After ensuring the accuracy of the measurement of research structures, the relationships of these structures can be used are possible to test the research hypotheses. As shown in Table 5, according to the factor load and the value of t-statistic, on-farm counseling has a positive and significant effect on farmers' beliefs and motivation for protection. Also, beliefs and motivation of conservation as a mediating variable have a positive and significant effect on sustainable environmental protection. A summary of the results of examining the relationship between research variables is given in Table 4.

Table 4. Summary of test results of the research hypotheses

independent variable	dependent variable	Factor load	t-statistic	Result
On –Farm Consoling	Farmers' beliefs	0.80	9.43	Confirmation
On –Farm Consoling	Motivation to protect farmers	0.67	7.87	Confirmation
Farmers' beliefs	Sustainable environmental protection	0.58	6.53	Confirmation
Motivation to protect farmers	Sustainable environmental protection	0.63	7.79	Confirmation

3.3 Investigating the mediating role of variables

Since "farm counseling" affects "farmers 'motivation" and "farmers' beliefs" and on the other hand, these two variables affect "sustainable environmental protection", therefore, these two variables p lay a mediating role in "farm counseling" and "sustainable environmental protection". To calculate the mediating effect of two variables, the method proposed by Edwards (2007) and the calculation of Sobel statistics have been used.

- The direct effect of the independent variable on the dependent variable
- Indirect effect of the independent variable on the dependent one through the mediating variable
- Total effect, Direct effect, Indirect effect

Sobel statistic is used to test the significance of indirect effects caused by a mediating variable.

$$Z = \frac{a \times b}{\sqrt{b^2 s_a^2 + a^2 s_b^2}} \quad (1)$$

a: Path coefficient between independent and mediator variables

b: Path coefficient between mediator and dependent variables

sa: Standard error of independent and mediator variable path

sb: Standard error of intermediate and dependent variable path

"Farmers' motivation" plays a mediating role in "farm counseling" and "sustainable environmental protection".

The mediating effect of farmers' motivation = the effect of counseling on motivation × the effect of motivation on conservation $0.63 \times 0.67 = 0.42$

$$Z_1 = \frac{0.67 \times 0.63}{\sqrt{0.63^2 \cdot 0.106^2 + 0.67^2 \cdot 0.129^2}} = 3.865 \quad (2)$$

The mediating effect of farmers' motivation was 0.42. The value of test statistics was obtained using the Sobel test of 2.87, which is greater than the value of 1.96. Therefore, it can be said that the hypothesis of the mediating role of farmers' variable motivation is accepted.

"Farmers' beliefs" mediate "farm counseling" and "sustainable environmental protection".

The mediating effect of belief motivation = the effect of counseling on beliefs × the effect of beliefs on protection. $0.80 \times 0.58 = 0.46$

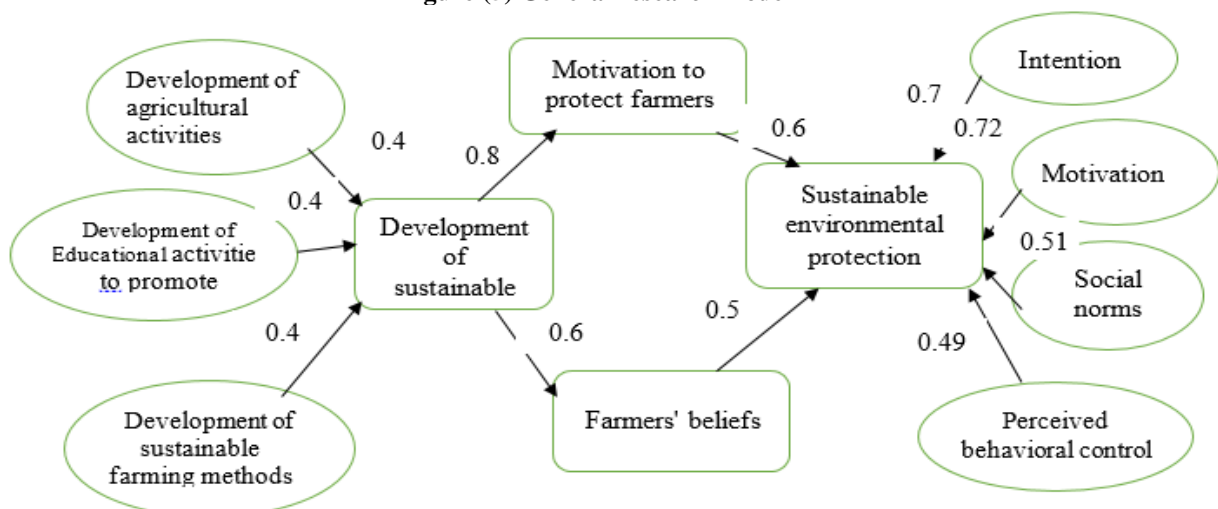
$$Z_1 = \frac{0.80 \times 0.58}{\sqrt{0.58^2 \cdot 0.098^2 + 0.80^2 \cdot 0.123^2}} = 4.083 \quad (3)$$

The mediating effect of farmers' beliefs was 0.42. The value of test statistics was obtained using Sobel test, 4.083, which is greater than the value of 1.96. Therefore, it can be said that the hypothesis of the mediating role of farmers' variable beliefs is accepted.

3.4 Investigation of research sub-hypotheses

In this study, the role of different dimensions affecting farm consulting and factors affecting sustainable environmental protection has also been investigated. The final research model is presented in Fig. 5 and summarizes the test results of the research sub-hypotheses that are shown in Table 5.

Figure (5) General research model



Source: Findings of Research

Table 5: Summary of test results of the research sub-hypotheses

Research Hypotheses	independent variable	dependent variable	Factor load	t-statistic	Result
sub-hypothesess1	Development of agricultural activities	On-farm counseling	0.42	7.14	Confirmation
sub-hypothesess2	Development of educational activities to promote	On-farm counseling	0.47	8.03	Confirmation
sub-hypothesess3	Development of sustainable farming methods	On-farm counseling	0.40	6.82	Confirmation
sub-hypothesess4	Intention of farmers	Sustainable environmental protection	0.78	2.16	Confirmation
sub-hypothesess5	Farmers' attitudes	Sustainable environmental protection	0.72	11.33	Confirmation
sub-hypothesess6	social norms	Sustainable environmental protection	0.51	8.78	Confirmation
sub-hypothesess7	Perceived behavioral control	Sustainable environmental protection	0.49	8.38	Confirmation

Source: Findings of Research

According to the findings of Table 5 and the data of Fig. 4, which shows the general model of the research, all factor loads related to the sub-hypotheses of the research are greater than 0.3 and also the values of t-statistics calculated are greater than the critical value of 1.96. Therefore, with 95% confidence, all sub-hypotheses of the research were confirmed.

3.5 Good model fit

Fitness indices were used to determine the validity of the research model. Among the indices used are χ^2/df index, RMSEA index, SRMR and GFI index. The values of goodness fit the conceptual model of the research as follows:

$$x^2/df = \frac{202.45}{115} = 1.76; RMSEA = 0.032; SRMR = 0.035; GFI = 0.96$$

(4)

In this research, chi-square norm of 1.76 has been obtained. The RMSEA index is 0.032, the SRMR is 0.035 and the GFI index is 0.96, which indicates that the model fits.

IV. DISCUSSION, CONCLUSION AND RECOMMENDATION

On-farm consulting affects farmers' motivations for sustainable environmental protection. The results of hypothesis analysis showed that the value of standard factor load was 0.67 and the value of t-statistic was 7.87. Therefore, with 95% confidence, on-farm counseling has an effect on farmers' protection motivation. This result is consistent with the findings of Tang et al, (2013), Stern, (2000) and Salehi et al, (2017).

Farm counseling has an impact on the beliefs of wheat farmers in Behbahan city in protecting a sustainable environment. The results of hypothesis analysis showed that the value of standard factor load was 0.80 and the value of t-statistic was 9.43. Therefore, with 95% confidence, field counseling affects farmers' beliefs. This result is consistent with the findings of Stern. (2000), Goh et al. (2016) and Togbe et al, (2012).

Farmers' beliefs have an impact on sustainable environmental protection. The results of hypothesis analysis showed that the value of standard factor load was 0.58 and the value of t-statistic was 6.53. Therefore, with 95% confidence, farmers' beliefs have an impact on sustainable environmental protection. This result is consistent with the findings of Stern, (2000). Togbe et al, (2012). Farahmand et al. (2014). Ghazani & Bijani. (2015), Takahashi & Selfa (2014).

Farmers' motivation has an impact on sustainable environmental protection. The results of hypothesis analysis showed that the value of standard factor load was 0.63 and the value of t-statistic was 7.79. Therefore, with 95% confidence, farmers' protection incentive has an impact on sustainable environmental protection. This result is consistent with the findings of Ziapour et al. (2012), J. Kil et al (2014). Werff & Steg (2015).

- The results showed that on-farm counseling has an effect on farmers' motivations to protect the sustainable environment. Therefore, it is suggested that local methods and local experiences be identified and strengthened for environmental sustainability. Manpower training is desirable with an environmental perspective and is consistent with sustainability. This means that trained manpower is considered as the intellectual and cultural leaders of any society that can have long-term effects on environmental protection.

- The results showed that on-farm counseling has an impact on farmers' beliefs in sustainable environmental protection. It is suggested that governmental and non-governmental environmental organizations be established and these organizations be run by local people, and local people should be encouraged to join these organizations. Because these organizations are very effective in shaping the environmental attitudes of local

people. Also, necessary measures should be taken to hold training classes on the devastating environmental consequences and to educate farmers.

- Findings showed that farmers' beliefs have an effect on sustainable environmental protection. Therefore, it is suggested that the necessary action be taken to implement environmental projects in accordance with the beliefs of local farmers by identifying local capacities and managing these projects by experts in various sciences and local people. Also, identifying the opinions and beliefs that exist in relation to environmental protection in the region and taking the necessary action to strengthen these moral teachings.

-Findings showed that farmers' motivation has an effect on sustainable environmental protection. It is suggested that necessary measures be taken to create and strengthen farmers' motivation for farmers' full participation in all stages of planning environmental projects. This partnership requires their awareness of the importance of the environment in economic and social life, and to motivate participation, more than anything else, cultural activities seem necessary.

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