J. Agr. Sci. Tech. (2022) Vol. 24(2): 321-336

Factors Affecting Satisfaction and Loyalty of Farmers to the Agricultural Extension Programs

M. Dehghanpour[1], M. Yazdanpanah[1*], M. Forouzani[1], and G. Abdolahzadeh[2]

ABSTRACT

Extension and educational programs use various measures to advise farmers on adapting to climate change. Satisfaction with these programs is a tool to study their effectiveness. In this respect, studying the factors influencing satisfaction with extension and educational programs can help planners and policymakers of the agricultural sector in general, and agricultural extension in particular, to improve the quality of these programs. Therefore, the present paper explores the factors influencing satisfaction and loyalty in extension and educational programs. The statistical population was composed of all participants of these programs in Fars Province, Iran. A total of 150 participants was estimated as the sample size. Participants were selected through random sampling. Data collected from the participants were analyzed by structural equation modeling. The results showed that the research variables had optimal validity and reliability. The variables of appropriate extension packages and perceived value were among the most important factors dictating satisfaction with extension and educational programs. In addition to these two variables, other factors including image, emotions, perceived economic return, and tangibles of the educational programs had direct impacts on satisfaction and indirect impacts on loyalty to these programs. Research findings can help farmers to adapt to climate change.

Keywords: Adaptation to climate change, Appropriate extension packages, Educational programs, Perceived quality, Perceived value.

INTRODUCTION

Agricultural extension plays a critical role in training farmers as to how to adapt to and mitigate climate change, and makes them sensitive towards climate change (Hall *et al*., 2019; Onyeme and Iwuchukwu, 2012; Albore, 2018). On the one hand, extension systems can provide farmers with information about the causes and impacts of climate change to help them cope with this phenomenon (Agwu and Adeniran, 2009). On the other hand, extension services empowers farmers by training them about the best agricultural practices, thereby enhancing the level of technology adoption (Anang *et al*., 2020; Hall *et al*., 2019). Therefore, agricultural extension can help farmers cope with climate change by empowering and preparing them and improving their potential. These services include, among all, the adaptation and taking possible actions to prevent the negative impacts of climate change (Prokopy *et al*., 2015a, b; Azadi *et al*., 2019). The empowerment of farmers to deal with different impacts of climate change is of crucial significance and, in this respect, it is imperative to consider training to increase the flexibility and capacity of farmers (Singh and Grover, 2014; Hall *et al*., 2019; Albore,

[1] Department of Agricultural Extension and Education, Agricultural Sciences and Natural Resources University of Khuzestan, Ahvaz, Islamic Republic of Iran.
[2] Department of Agricultural Extension and Education, Gorgan University of Agricultural Sciences and Natural Resources, Gorgan, Islamic Republic of Iran.
*Corresponding author; e-mail: yazdanm@asnrukh.ac.ir

2018). Therefore, training and extension programs to adapt to climate change are an integral part of agricultural extension. Agriculture extension will play its role through sensitizing and educating farmers on how to mitigate and adapt to climate change (Onyeme and Iwuchukwu, 2012). In addition, agricultural extension services increase technology adoption by providing training on best farming practices. Agricultural extension can also help farmers cope with climate change through empowerment, preparation and capacity building. These services include adaptation and implementation of precautionary measures to prevent the negative effects of climate change (Singh and Grover, 2014). Empowering farmers to deal with various forms of climate change risk is very important and, to achieve this, special attention should be paid to teaching options to increase their flexibility and capacity building.

Providing extension services faces different challenges; for example, one of the agricultural extension challenges is inaccurate design of programs and messages in most developing countries. Even where agricultural extension services are available, many smallholders may not use them because these programs are not designed to meet the specific needs of farmers. As a result, many smallholder farmers do not seek extension services. Therefore, poor use of technologies and extension services is not only the result of farmers' reluctance to use them, but it is also rooted in poor methods of providing extension services, the recruitment of inappropriate staff, and/or the lack of proper equipment and materials (Anang *et al*., 2020; Mutimba, 2014). In addition, assessing the effectiveness or impact of extension services on technology adoption, productivity, or income of farmers is very challenging because access to information as one of the factors contributing to these results is difficult (Niu and Ragasa, 2018).

The level of customer satisfaction is one of the most important factors in assessing quality and service during the development of a certain product or service (Li *et al*., 2014). Furthermore, the level of customer satisfaction with services is an important factor in developing a service system that satisfies the needs of the target group in a fast and low-cost manner (Yazdanpanah *et al*., 2009). Satisfaction is defined as a person's feeling of pleasure or disappointment resulting from compared to his or her expectations in relation to a product's perceived performance or outcome (Wahyudi *et al*., 2019). When the client is not satisfied with the services provided, the organization is not efficient and effective. In particular, this is important for public and governmental organizations. In the context of full competition, if clients are able to choose among different options, their satisfaction will be determined by the demand level and the performance and efficiency of services will be assessed accordingly. However, when a service is provided by a particular public or private organization, clients' satisfaction is measured to assess the organization's efficiency and effectiveness (Yazdanpanah *et al*., 2013).

In agriculture, too, in attempts to assess performance, focus is placed on farmers' satisfaction in addition to investment return (Ao *et al*., 2017), so, farmers' satisfaction is a major indicator of sustainability, which is the main goal of scientific research and planning (Elias *et al*., 2016). There are other important reasons why it is crucial to measure farmers' satisfaction. First, farmers are the target users of the program, so, they should have the right to assess the performance of the program. Second, farmers are the end-users who have their own experiences with the program, but these experiences are not shared with the non-users. Third, the sustainability of the program depends on farmers' willingness to keep participating, which reflects their satisfaction (Elias *et al*., 2016). Thus, measurement of customer satisfaction has turned into a primary concern of managers of organizations (Sedghi *et al*., 2009). If the factors affecting satisfaction are recognized,

one can strengthen the positive constructs and mitigate the negative constructs. Then, demand will rise and this will move the agricultural sector towards a safer, more comfortable, and faster environment for development and prosperity (Yazdanpanah *et al*., 2009). Futuremore, farmers' loyalty to the extension services and their intention to re-participate in future programs is an index of success. Intention to participate in future programs means that past and current programs fit well with the farmers' needs and expectations and reveals that the extension organization is working well, with the right targets (Rahimi and Yazdanpanah, 2014; Yazdanpanah *et al*., 2013).

The review of the literature shows that various theories have been used to explore the factors underpinning customer satisfaction, including the SERVQUAL model (Parasuraman *et al*., 1985) and national satisfaction indicators such as those for Sweden (Fornell, 1992), the American (Fornell *et al*., 1996), Europe (Andreassen and Lindestad, 1998), and Norway (Andreassen and Lindestand, 1998). Also, some studies have focused on satisfaction with extension services (Elias *et al*., 2016; Ragasa and Mazunda, 2018; Ragasa and Niu, 2017), but they are limited and need to expand. Thus, the present study aimed to identify factors influencing farmers' satisfaction with the extension programs and their loyalty. The contributions of the research are the adaptation of customer satisfaction models to extension-educational programs and the use of broader variables in addition to the variables of satisfaction indicators. However, past studies have not paid enough attention to farmers' satisfaction with agricultural extension programs in Iran. Therefore, this study examined agricultural extension program users' overall satisfaction with the extension service and identified the relationship between level of satisfaction and loyalty, and other variables.

In addition, studies show that climate change and fluctuations have severely affected agriculture in Fars Province, and forecasts indicate an intensification of climate change in this province. In the form of ECHAM5 model and under C3M45 scenario, it is expected that the temperature of the central zone of Fars Province in the period 2011-2040 will increase by 0.55°C (1.5%). During the same period, the average rainfall will decrease by 44.18 mm (13%). The range of temperature and precipitation changes is not limited to the central part of the province and according to the IPCM4 model and under climate scenarios A1B, A2, and B1, the northern and southern regions of the province will experience an increase in average temperature and a decrease in precipitation. Therefore, the forecasts indicate that hot and dry conditions will prevail over Fars Province in the coming decades. Obviously, interventions related to the management of the agricultural system should be planned in such a way that not only reduce greenhouse gas emissions but also increase agricultural production, improve living standards and resilience of farming households against future climate change (Karimi *et al*., 2018). Therefore, this study investigated the factors affecting the satisfaction and loyalty of farmers in Fars Province.

MATERIALS AND METHODS

Conceptual Framework

The conceptual framework of this study consists of ten constructs that start with perceived product/service quality (Figure 1). A variable that is common among most satisfaction indicators is perceived product/service quality. Perceived quality is the difference between a customer's expectations or wishes (expected services) and his or her perception (perceived services). Furthermore, quality is what the customers say. In other words, product/service quality results from the customer's perception only after its consumption. As such, quality is the overall long-term assessment of products/services

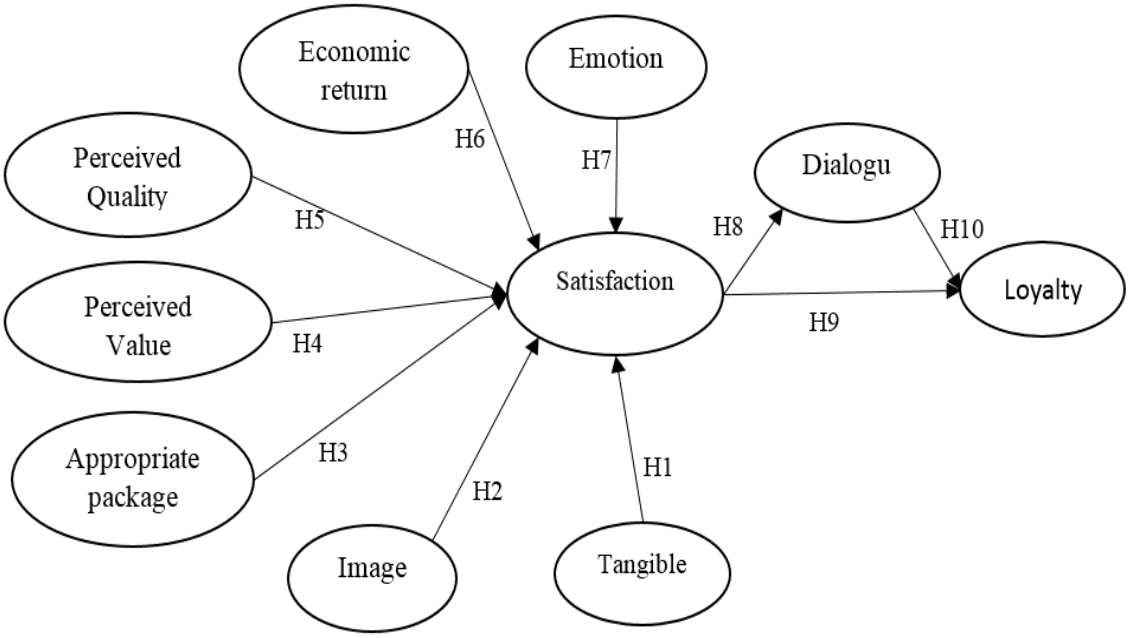

Figure 1. The conceptual model of the factors affecting satisfaction and loyalty.

provided to the customers and it can predict customer satisfaction (Wahyudi *et al*., 2019). Perceived value can be very informative about customer perception of product/service, because price is a significant component of perceived value and is an important cause of satisfaction (Ajami *et al*., 2018).

Rouzaneh *et al*. (2020) define perceived value as the overall assessment of how a product is classified by a customer based on his/her perceptions. In other words, according to Lam *et al* (2004), perceived value can be regarded as perceived benefits from all costs. These costs may include its price as well as psychological costs and customer endeavor costs.

In addition, Rouzaneh *et al*. (2020) point out that perceived value is related to quality, perceived quality of a product/service, and the price paid for the product/service. Value is thus defined as the relationship between price and quality. When increases are expected in both variables, an increase can be expected in customer satisfaction. Overall, perceived value reflects the perceived quality of a product versus its price. In other words, value is defined as the ratio of perceived quality to the price (Ciavolino and Dehlgaard, 2007).

In the Norwegian satisfaction index, the variable of image was introduced for the first time. Image refers to brand and customer relation type, which results from the brand and/or product (O'Loughlin and Coenders, 2002). Image pertains to the outward prestige of the product/service-provider organization to customers. In other words, the customer opinion as to the successful performance of an organization in the past forms its credibility among them (Zamani *et al*., 2009). According to Kuo and Ye (2009), corporate image is related to institution credibility. Also, Martensen *et al*. (2000) state that image is a critical factor in the customer satisfaction model, so, image is expected to have a positive effect on satisfaction and loyalty.

Satisfaction will be non-sense if there is no strong emotional connection. Seemingly, most people feel that affection (moods, feelings, and emotions) can influence their decisions and thinking manner at least in certain conditions (Chatzigeorgiou *et al*.,

2009). Emotions are divided into two groups: positive and negative (Rahimi Feyzabad and Yazdanpanah, 2014). The positive and negative emotions of learners about informal training courses are associated with the construct of feelings (Tu *et al*., 2011). According to Chatzigeorgiou *et al*. (2009), emotions are directly involved in the formation of satisfaction and influence the impact of perceived service quality on customer satisfaction.

The economic return of a service is the key determinant of satisfaction. Among these results, perceived economic return is a primary constituent. Advantages should be regarded as one of the most important investments of service providers, which optimize users' performance, provides them with opportunities for financial success, and acquiring a sustainable competitive advantage. Therefore, perceived economic return affects farmers' satisfaction positively after receiving extension services such as farmer's productivity, farmer's income, food self-sufficiency, capability to produce capital products, and capability to analyze costs (Elias *et al*., 2016). The appropriate extension packages is another factor that affects satisfaction with extension and educational programs. According to Elias *et al*. (2016), if the extension and educational programs are need-based, market-based, available, and economic, individuals will be more satisfied with them.

According to Lotfy and Adeeb (2016), the variable of tangibles, i.e. physical features, predicts satisfaction with commodities/services. Douglas *et al*. (2008) argue that tangibles are the physical characteristics of services, exemplifying it in the appearance of facilities and environment including the equipment used as an educational aid or in the appearance of staff and educators.

Loyalty is a dependent variable in the model and can be a measure of profitability (Ciavolino and Dahlgaard, 2007). Oliver (1999) defines loyalty as the deep commitment of a customer to repay for a product, brand, or service continuously in the future, even if situational and marketing impacts are potentially adequate to change his or her behavior. Customer loyalty can be measured by intention to re-purchase and customer sensitivity to price volatility in the future. Satisfaction is directly and positively related to customer loyalty. Finally, loyalty, as a result of satisfaction, is assessed from two different perspectives. The first is based on the assessment of the customer's re-purchase, and the second is to assess how price changes may influence decisions on purchasing a product/service (Ajami *et al*., 2018). Loyalty is also measured by the intention to re-pay and intention to recommend products/services to others (Ciavolino and Dahlgaard, 2007).

Based on the Switzerland National Index, a new variable – namely, customer dialogue – is influenced by satisfaction and can influence loyalty to services. In fact, customer dialogue is reflected in making verbal contact or relationship with the production organization (or service provider), ease of dialogue with the customer, and/or satisfaction with the dialogue (Sedghi *et al*., 2009).

Based on the review of the literature, the research hypotheses were developed as below. Figure 1 displays the conceptual framework of the factors underpinning satisfaction.

H1: Tangible influences satisfaction positively.

H2: Image influences satisfaction positively.

H3: appropriate extension packages influences satisfaction positively.

H4: Perceived value influences satisfaction positively.

H5: Perceived quality influences satisfaction positively.

H6: Economic return influences satisfaction positively.

H7: Emotions influence satisfaction positively.

H8: Satisfaction influences dialogue positively.

H9: Satisfaction influences loyalty positively.

H10: Dialogue influences loyalty positively.

The research was an applied research in terms of objective and a survey in terms of data collection methodology.

The study area was the city of Marvdasht, located in the Fars Province, 40 km to Shiraz, and its climate is mountainous. According to the 2016 census, the population of this county was 323434 Marvdasht is currently the second most populous city and the fourth largest city in Fars Province and is expanding rapidly. Marvdasht City by producing 2% of horticultural, livestock and agricultural products of the country??? has become one of the most important production poles in Fars Province, as well as Iran.

The statistical population was composed all of farmers (N= 250) in Marvdasht County who had attended climate change-related extension and educational programs in the last three years (2017-2019).

The sample size was determined to be 150 individuals by Krejcie and Morgan's (1970) table. They were taken by random sampling.

The data collection instrument was a self-designed questionnaire, which had two sections. The first section asked about the demographic and economic features of the farmers. It used some open-ended questions. In the second section, the variables of the satisfaction model were measured by items based on a 5-point Likert scale (very low, low, moderate, high, and very high). The dependent variable was farmers' satisfaction with extension and educational programs. The validity of the questionnaire was confirmed by a panel of agricultural experts including 3 faculty members of the Department of Agricultural Extension and Education at Agricultural Sciences and Natural Resources University of Khuzestan and officers of Jihad-e Agriculture Organization of Fars Province

In addition, in a pilot study, the questionnaire was administered to 30 individuals outside the research population to calculate Cronbach's Alpha. The coefficients of Cronbach's Alpha showed that the research variable had very good to excellent reliability. Table 1 presents Cronbach's Alpha and examples of the items included in the questionnaire.

The conceptual model of the research was examined by Structural Equation Modeling (SEM) in the AMOS20 software package.

Before assessing the relationships of the variables based on the structural models using the measurement model, the convergent and discriminant validities of the research instruments were checked by maximum likelihood estimation.

RESULTS

The descriptive results showed that the farmers had an average age of 44.48 years (SD= 12.53). The youngest was 16 and the oldest 70 years old.

Twenty-five participants (16 percent) were female and 125 (83 percent) were male. Among the participants, 69 (45.3 percent) had non-farming jobs and 81 (54 percent) did not have a second job or income. In addition, one individual did not answer this question. The participants had at least one year and at most 58 years of experience in farming with an average of 20.63 years. The average distance of the respondents' from the location of the educational classes or the closest Agricultural Service and Jihad Center was 15.16 km with a minimum of 1 km and a maximum of 150 km. About half of the respondents were members of farmers' cooperatives (Table 2).

Based on the results of descriptive statistics, the average scores of the research variables were in the range of 3.21-3.72 (of 5), so, all variables had an average score of higher than moderate. The satisfaction of participants with the extension and educational programs was, on average, 3.71, implying that the participants were partially satisfied with these programs. Also, the average scores for image, perceived value, perceived quality, tangibles, emotions, perceived return, appropriate extension

Table 1. Survey questions and reliability coefficients.

Items	Cronbach's Alpha
Image	0.86
I have a good perspective on Agricultural Jihad Organization and its educational programs.	
I have a good opinion on the educational courses held by Agricultural Jihad Organization.	
Other farmers have a good opinion about Agricultural Jihad Organization.	
My farmer friends have a good opinion about Agricultural Jihad Organization.	
Perceived value	0.69
Overall, I think that attending these courses is very valuable.	
I think that my attendance at these courses is very valuable and useful.	
From an economic perspective, attending training courses of climate change has increased profitability for me.	
Tangibles	0.88
The location of the training classes is big enough and has no problems with light, aeration, and noise.	
Chairs in the course location are appropriate and I feel comfortable on them.	
The physical facilities of the centers are attractive.	
The classrooms and course locations have attractive decorations.	
Emotions	0.86
Attending training courses improves my morale to work and tolerate more farming problems.	
Attending these training courses has made me feel better about my profession.	
Attending these training courses has made me feel delightful about my profession.	
Attending these training courses has calmed me down.	
Economic return	0.88
My farm income has increased after receiving extension services in the field of adaptation.	
My farming productivity has increased after receiving extension services in the field of adaptation.	
Self-sufficiency in crop production has increased after attending training courses.	
The productivity of marketable crops and their profitability have been improved since receiving extension services.	
Appropriate extension package	0.91
The training provided was based on my needs.	
The extension packages specifically designed for climate change are based on local agricultural features.	
The extension packages specifically designed for climate change are market-oriented.	
The extension packages specifically designed for climate change are affordable for farmers.	
Dialogue	0.93
I do like to be in contact with educators.	
It is easy for me to communicate with educators.	
It is easy for me to communicate with the extension agents.	
Engaging with educators and staff is satisfying and rewarding for me.	
Perceived quality	0.92
I believe that informing about when courses start is appropriate and timely.	
I believe the information provided in the courses is appropriate.	
In my opinion, the information provided in these courses is very scientific.	
I believe the information provided in this course is clear, useful, understandable, and applicable.	
Satisfaction	0.93
Overall, I find it helpful to attend these courses.	
Overall, I am satisfied with the attendance in these courses.	
My decision to attend these courses was useful and rewarding.	
I am pleased to have attended these courses.	
Loyalty	0.78
In the future, I intend to keep attending extension and educational courses to learn more.	
I intend to recommend these courses to others.	
I always use good words to describe these courses.	
If Agricultural Jihad Organization again invites me to participate in other courses, I will immediately accept it.	

Table 2. Descriptive analysis of socioeconomic variables.

		Frequency	Percent
Gender	Female	24	16
	Male	125	83.33
	No response	1	0.66
Second job (non-farming job)	Yes	68	45.33
	No	81	54
	No response	1	0.66
Cooperative member?	Yes	73	48.67
	No	73	48.67
	No response	4	2.66

packages, dialogue and loyalty were 3.52, 3.48, 3.50, 3.21, 3.61, 3.27, 3.34, 3.72, and 3.70, respectively (Table 3).

The relationship between the variables was checked by the Pearson correlation test. As is evident in Table 4, satisfaction had a positive and significant relationship with image (r= 0.66), perceived value (r= 0.69), tangibles (r= 0.53), emotions (r= 0.63), perceived economic return (r= 0.58), Appropriate extension packages (r= 0.54), Dialogue (r= 0.50), loyalty (r= 0.71), and perceived quality (r= 0.68). Also, loyalty and dialogue exhibited a significant correlation with all research variables.

Structural Equation Modeling

The conceptual model of the research was examined by Structural Equation Modeling (SEM) in the AMOS20 software package. Before assessing the relationships of the variables based on the structural models using the measurement model, the convergent and discriminant validities of the research instruments were checked by maximum likelihood estimation. Convergent validity was checked by calculating the Average Variance Extracted (AVE) and Composite Reliability (CR). The results of AVE showed that it was over 0.5 for all the constructs, except for perceived value for which it was very close to the threshold value 0.5 (Table 1). Also, the CR values were calculated to be greater than 0.7 for all the constructs (Table 1).

As to construct validity, three indicators need to be assessed: standardized factor loadings, AVE, and CR.

The AVE of constructs is commonly used to examine the convergent validity of the measurement scales. When AVEs are greater than 0.5, the convergent validity of the studied constructs is achieved (Hair *et*

Table 3. Descriptive analysis of variables.

Variables	Min	Max	Mean	Sd
Satisfaction	1	5	3.71	0.64
Loyalty	1	5	3.70	0.78
Image	1	5	3.52	0.80
Expectations	1	5	3.52	0.77
Perceived value	1	5	3.48	0.61
Perceived quality	1	5	3.50	0.65
Tangibles	1	5	3.21	0.74
Emotion	1	5	3.61	0.75
Economic return	1	5	3.27	0.69
Appropriate extension package	1	5	3.34	0.72
Dialogue	1	5	3.72	0.68

Table 4. Correlation and indicators of convergent validity. [a]

	Correlation coefficients between constructs									
	Image	Perceived value	tangibles	Emotion	Economic return	Appropriate package	Dialogue	Loyalty	Perceived Quality	Satisfaction
Image	**0.74**									
Perceived value	0.47**	0.**69**								
tangibles	0.31**	0.44**	**0.79**							
Emotion	0.39**	0.39**	0.55**	**0.74**						
Economic return	0.36**	0.48**	0.44**	0.56**	**0.77**					
Appropriate extension package	0.49**	0.54**	0.56**	0.54**	0.70**	0.74				
Dialogue	0.39**	0.38**	0.41**	0.46**	0.58**	0.55**	**0.74**			
Loyalty	0.55**	0.60**	0.51**	0.66**	0.48**	0.50**	0.57**	**.83**		
Perceived Quality	0.45**	0.41**	0.73**	0.67**	0.56**	0.55**	0.57**	0.62**	**.78**	
Satisfaction	0.66**	0.69**	0.53**	0.53**	0.63**	0.58**	0.54**	0.50**	0.68**	**.87**
AVE	0.554	0.481	0.636	0.569	0.608	0.569	0.550	0.697	0.614	0.763
CR	0.860	0.735	0.924	0.866	0.885	0.912	0.904	0.948	0.905	0.906

[a] Bolded elements indicate the square root of AVE; ** Significant values at the 0.01 level.

al., 2010; Fornell and Larcker, 1981). Table 3 reveals that all AVEs are greater than 0.5 (except for perceived value, for which it was very close to the threshold value 0.5). In addition, the other respective indicators (i.e. CR and factor loadings) are at acceptable levels, implying acceptable convergent validity.

Overall, the results showed that the research instrument had acceptable convergent validity.

With respect to the discriminant validity, it was revealed that the square of the correlation coefficient between the research constructs on a pairwise basis was smaller than the AVE for the individual latent variables, so, the research instrument had good discriminant validity. According to Table 4, the correlation coefficients were significant between all latent variables of the study in the context of the measurement models; consequently, the research instrument had logical validity. In addition, the results of the fit of the model by the goodness-of-fit indices showed that the conceptual model of the research was at an acceptable level of fit (Table 5).

After the measurement model was implemented, SEM was performed. The results for the fit of the conceptual model's structural equations showed that the ratio of χ^2 to degrees of freedom was 2.195 and the root mean square error of approximation (RMSEA) was 0.090. Therefore, it can be drawn that the model had acceptable fitness (Table 3). Table 4 presents the total standard impacts and standard direct and indirect impacts of the variables in the conceptual model of satisfaction. As is evident in Table 6 and Figure 2, satisfaction is positively, directly and significantly influenced by the variables of perceived value (Beta= 0.63, P< 0.001), image (Beta= 0.38, P< 0.001), perceived economic return (Beta= 0.36, P< 0.001), Appropriate extension packages (Beta= 0.65, P< 0.001), emotions (Beta= 0.28, P< 0.001), and Tangibles (Beta= 0.30, P< 0.001). Also, the variable of satisfaction has a direct, positive and significant effect on dialogue (Beta= 0.55, P< 0.001) and loyalty (Beta= 0.55, P< 0.001), and the

Table 5. Fitness Indicators of Measurement and structural model.

	Measurment model	Structural model	Recommended value
Goodness of Fit Index (GFI)	0.625	0.622	0.9≤
GFI Adjusted for degrees of freedom (AGFI)	0.574	0.576	0.9≤
Cmin/DF	2.168	2.195	≤ 3
RMSEA estimate	0.089	0.090	≤ 0.08
Comparative fit index	0.814	0.807	0.9≤
Incremental Fit Index (IFI)	0.817	0.810	0.9≤

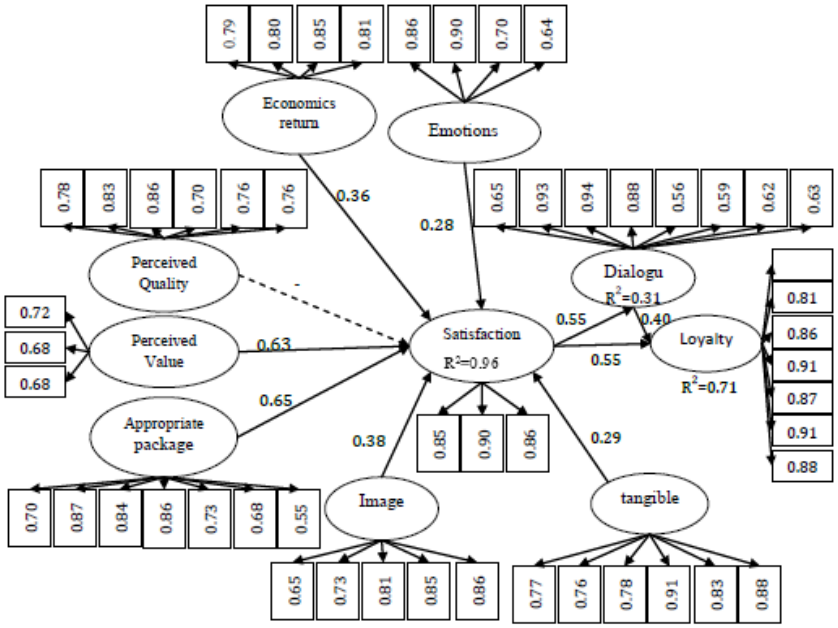

Figure 2. Results of structural equation modeling.

Table 6. The results of the hypotheses.

		β value	Conclusion
H1	tangibles → Satisfaction	0.29**	Supported
H2	Image→ Satisfaction	0.38**	Supported
H3	Appropriate package → Satisfaction	0.65**	Supported
H4	Perceived value→ Satisfaction	0.63**	Supported
H5	Perceived quality → Satisfaction	-0.19	Rejected
H6	Economic return → Satisfaction	0.36**	Supported
H7	Emotion → Satisfaction	0.28**	Supported
H8	Satisfaction → Dialogue	0.55**	Supported
H9	Satisfaction → Loyalty	0.55**	Supported
H10	Dialogue → Loyalty	0.40**	Supported

** Significant values at the 0.01 level.

variable of dialogue influences loyalty positively and significantly, so, dialogue has an indirect and significant effect on loyalty, too. Finally, the conceptual model of satisfaction predicted 96 percent of the variance in satisfaction. It also accounted for 31 percent of the variance in dialogue and 71 percent of the variance in loyalty. Table 7

Table 7. Total, direct and indirect Standardized impacts.

	Image	Perceived value	Tangibles	Emotion	Economic return	Appropriate package	Perceived quality	Satisfaction	Dialogue
Standardized direct effects									
Satisfaction	0.38	0.62	0.29	0.27	0.35	0.65	-0.19	-	-
Dialogue	-	-	-	-	-	-	-	0.55	
Loyalty	-	-	-	-	-	-	-	0.55	0.40
Standardized indirect effects									
Satisfaction	-	-	-	-	-	-	-	-	-
Dialogue	0.21	0.34	0.16	0.15	0.19	0.36	-0.10	-	-
Loyalty	0.29	0.48	0.22	0.21	0.27	0.50	-0.15	0.22	-
Standardized total effects									
Satisfaction	0.38	0.62	0.29	0.27	0.35	0.65	-0.19		-
Dialogue	0.21	0.34	0.16	0.15	0.19	0.36	-0.10	0.55	-
Loyalty	0.29	0.48	0.22	0.21	0.27	0.50	-0.15	0.77	0.40

briefly presents the results for the research hypotheses.

DISCUSSION

Satisfaction with extension and educational programs is an instrument to check the effectiveness of these programs. Evidence confirms that agricultural extension and education program's performance is low. This raises questions about its effectiveness. Farmers' satisfaction is considered to be an important indicator of effectiveness, which has become the leading target of scientific research and policy agenda. Client satisfaction evaluations can address the reliability and responsiveness of services or the willingness of providers to meet clients' needs. Evaluating the satisfaction rate of farmers is highly important for a number of reasons. First, the farmers are the intended beneficiaries of the program and thus they should have the right to judge its performance. Second, as end users, the farmers have personal experiences with the program that are not shared by nonusers. Third, the sustainability of the program ultimately depends on the willingness of the farmers to continue participating in it, which is a reflection of their satisfaction.

The contributions of thise research are the adaptation of customer satisfaction models to extension-educational programs and the use of broader variables in addition to the variables of satisfaction indicators. Past studies have not paid enough attention to farmers' satisfaction with agricultural extension programs in Iran. Therefore, this study examined agricultural extension program users' overall satisfaction with the extension service and identified the relationship between level of satisfaction and loyalty, and other variables. In this respect, exploring the factors influencing satisfaction with these programs can help planners and policymakers in the agriculture sector in general, and in agricultural extension in particular, to promote the quality of extension and educational programs.

The results confirmed hypothesis 1 (H1) as to the effect of tangibles on satisfaction. Therefore, the tangibles of extension and educational programs including educational equipment and facilities and educators' and staff's conduct and appearance influence satisfaction. This is in agreement with other studies (e.g. Yazdanpanah *et al*., 2013; Mamun-Ur-Rashid *et al*., 2018). Therefore, improving the quality of materials and equipment used in extension and educational programs and the attire of educators and

staff can be effective in increasing the audiences' satisfaction with these programs.

H2 was confirmed by the results. Accordingly, image of extension and educational programs affects satisfaction. In other words, the respondents who had a positive perspective on the extension and educational programs and perceived them to be useful and beneficial were more satisfied with them. Likewise, Hassan *et al*. (2019) and Kuo and Ye (2009) showed that corporate image affected satisfaction with educational courses significantly. Johnson *et al*. (2001) has supported this idea. To improve the image of organizations and agricultural service centers, it is recommended to announce their achievements in public media through news programs and documentaries.

It was found that H3 was correct. Appropriate extension and educational packages in extension and educational programs affect satisfaction. Similar results were reported by Elias *et al*. (2016). From a policy perspective, there is a need for the extension and educational packages to be in accordance with the supply and demand in the market. These services should aim to enhance farming profits by ensuring cooperation and satisfaction, which will foster loyalty for attendance in these programs. Extension services should include diverse technologies as to climate change, which matches the specific needs of farmers.

Also, evidence supported H4. In other words, it was found that perceived value of extension and educational programs was influential in satisfaction. This is consistent with the results of Hult *et al*. (2019) but inconsistent with the results of El-Adly (2019). Perceived value refers to the usefulness of educational programs with respect to the time and endeavor spent on them and their economic profitability. Thus, it is recommended to develop short-term and concise educational programs that are based on the most essential issues of adaptation and reduction of climate change impacts. They need to be held as close to farmers as possible too. In addition, when presenting adaptation options in these courses, it is recommended to explain the economic profitability of the options to the farmers.

The results refuted H5. Therefore, unlike what was expected, perceived quality has no significant impact on satisfaction. This is not in agreement with the results of Hassan *et al*. (2019) and Kuo and Ye (2009). It can be said that no matter how optimal the quality of a training course is, if it cannot satisfy farmers' needs, profitability, and the other factors influencing satisfaction, it cannot ensure farmers' satisfaction. Perceived quality is an intangible, overall feeling about extension programs. However, it usually will be based on underlying dimensions that include characteristics of the agricultural extension programs to which the programs are attached such as clear, useful, understandable, and applicable. Perceived quality cannot necessarily be objectively determined, in part because it is a perception and because judgments about what is important to customers are involved. It seems that tangible factors affect farmers' satisfaction more than intangible factors.

H6, hypothesizing the significant effect of perceived economic return of extension and educational programs on satisfaction, was supported. In other words, the more profitable an individual perceives a training course, the more satisfied he or she will be with the program. It seems that the prerequisite for the profitability of extension and educational programs is the feasibility of their fulfillment by farmers. Therefore, if the programs present materials on adaptation skills and modern agricultural practices, they will meet their satisfaction to a greater extent. These findings are consistent with the results of Elias *et al*. (2016).

H7 was confirmed. Emotion with the least impact in terms of importance is the last factor that affects people's satisfaction. In fact, positive feeling about extension and educational programs influences satisfaction. In this respect, creating a fresh and active atmosphere during training courses and classes fosters a positive feeling

and satisfaction with the attendance in the programs.

The findings supported H8, H9, and H10. Accordingly, people who are more satisfied with extension and educational programs are usually more willing to talk about them. They are also more loyal to these programs and are interested in taking part in them again. Also, satisfaction affects loyalty. This is consistent with the results of Hassan *et al*. (2019). Furthermore, dialogue affects loyalty directly. Therefore, satisfaction can affect loyalty to extension and educational programs both directly and indirectly.

Farmers' loyalty to the agricultural extension program, as an index of success (Rahimi and Yazdanpanah, 2014), is not only determined by a satisfaction with agricultural extension, but is also determined indirectly by the emotion, economic return, perceived value, appropriate package, images, and tangibles.

In rural areas, particularly in developing countries, local relationships and interactions between people are still very influential and, as a result, farmers' satisfaction and loyalty are very important for agricultural extension programs. One farmer's positive experience with an agricultural extension program, for instance, can be disseminated among many potential extension clients and other farmers, which may not be the case in other environments. Thus, understanding the factors that influence farmers' satisfaction is of great importance to extension organizations.

CONCLUSIONS

Research findings revealed that the proposed conceptual model of the research was very robust in predicting satisfaction and loyalty to extension and educational programs. Therefore, it predicted a great part of satisfaction and loyalty. Based on the findings, all independent variables, except perceived quality, influence satisfaction significantly.From a practical point of view, the present study provides a justification for using tangible characteristics, images, economic return, Agriculture appropriate package, and perceived value in policy and decisionmaking that seeks to encourage farmers to use agricultural extension programs.

REFERENCES

1. Agwu, A. E. and Adeniran, A. A. 2009. Sources of Agricultural Information Used by Arable Crop Farmers in Isale Osun Farm Settlement, Osogbo Local Government Area of Osun State. *J. Agric. Ext.,* **13(1).**
2. Ajami, M. P., Elola, L. N. and Pastor, J. 2018. Validation and Improvement of the European Customer Satisfaction Index for the Spanish Wine Sector. *Total Qual. Manage* , **30(2):** 133-152
3. Albore, A. 2018. Review on Role and Challenges of Agricultural Extension Service on Farm Productivity in Ethiopia. *Int. J. Agric. Edu. Ext*, **4(1):** 93-100.
4. Alini, M., Mirzaei, A. and Nahavand, S. 2012. Satisfaction of Farmers of the Farmers House from Extension-Education Courses Held. *Life Sci. J.*, **9(3):** 1209-1215.
5. Anang, B. T., Bäckman, S. and Sipiläinen, T. 2020. Adoption and Income Effects of Aagricultural Extension in Northern Ghana. *Sci. Afr.*, **7:** e00219.
6. Anderson, E. W., Fornell, C. and Lehmann, D. R. 1994. Customer Satisfaction, Market Share, and Profitability: Findings from Sweden. *J. of Mark.*, **58(3):** 53-66.
7. Andreassen, T. W. and Lindestad, B. 1998. The Effect of Corporate Image in the Formation of Customer Loyalty. *J. Serv. Res*, **1(1):** 82-92.
8. Ao, Y., Li, J., Wang, Y., Liu, C. and Xu, S. 2017. Farmers' Satisfaction of Rural Facilities and Its Influencing Indicators: A Case Study of Sichuan, China. *Math. Probl. Eng.*, **(11):** 1-12
9. Azadi, Y., Yazdanpanah, M., Forouzani, M. and Mahmoudi, H. 2019. Farmers' Adaptation Choices to Climate Change: A Case Study of Wheat Growers in Western Iran. *J. Water Clim. Change*, **10(1):** 102-116.
10. Chatzigeorgiou, C., Christou, E., Kassianidis, P. and Sigala, M. 2009. Examining the Relationship between

Emotions, Customer Satisfaction and Future Behavioral Intentions in Agrotourism. *Tourismos,* **4(4):** 145-161.
11. Ciavolino, E. and Dahlgaard, J. J. 2007. ECSI–Customer Satisfaction Modelling and Analysis: A Case Study. *Total Qual. Manage.*, **18(5):** 545-554.
12. Douglas, J., McClelland, R. and Davies, J. 2008. The Development of a Conceptual Model of Student Satisfaction with Their Experience in Higher Education. *Qual. Assur. Educ.*, **16(1):** 19-35.
13. El-Adly, M. I. 2019. Modelling the Relationship between Hotel Perceived Value, Customer Satisfaction, and Customer Loyalty. *J. Retail. Consum. Serv.*, **50:** 322-332.
14. Elias, A., Nohmi, M. and Yasunobu, K. 2016. Farmers' Satisfaction with Agricultural Extension Service and Its Influencing Factors: A Case Study in North West Ethiopia. *J. Agr. Sci. Tech.*, **18(1):** 39-53.
15. Elias, A., Nohmi, M., Yasunobu, K. and Ishida, A. 2015. Does Gender Division of Labour Matters for the Differences in Access to Agricultural Extension Services? A Case Study in North West Ethiopia. *J. Agric. Sci*., **7(1):** 138–147.
16. Fornell, C. 1992. A National Customer Satisfaction Barometer: The Swedish Experience. *J. Mark.*, **56(1):** 6-21.
17. Fornell, C., Johnson, M. D., Anderson, E. W., Cha, J. and Bryant, B. E. 1996. The American Customer Satisfaction Index: Nature, Purpose, and Findings. *J. Mark.*, **60(4):** 7-18.
18. Fornell, C., Larcker, D. F., Evaluating Structural Equations Models with Unobservable and Measurement Error, *J. Market. Res.*, **18:** 39–50.
19. Hair, J. F. J., Black, W. C., Babin, B. J., Anderson, R. E., Multivariate Data Analysis, Seventh Ed. Prentice Hall, Upper Saddle River, NJ, 2010
20. Hall, A., Turner, L., and Kilpatrick, S. 2019. Using the Theory of Planned Behaviour Framework to Understand Tasmanian Dairy Farmer Engagement with Extension Activities to Inform Future Delivery. *J. Agric. Edu. Ext.*, **25(3):** 195-210.
21. Hassan, S., Shamsudin, M. F., and Mustapha, I. 2019. The Effect of Service Quality and Corporate Image on Student Satisfaction and Loyalty in TVET Higher Learning Institutes (HLIs). *J. Tech. Edu. Train*, **11(4).**
22. Hult, G. T. M., Sharma, P. N., Morgeson III, F. V. and Zhang, Y. 2019. Antecedents and Consequences of Customer Satisfaction: Do They Differ across Online and Offline Purchases?. *J. Retail*, **95(1):** 10-23.
23. Johnson, M. D., Gustafsson, A., Andreassen, T. W., Lervik, L. and Cha, J. 2001. The Evolution and Future of National Customer Satisfaction Index Models. *J. Econ. Psy.*, **22(2):** 217-245.
24. Karimi, V., Karami, E., and Keshavarz, M. 2018. Climate Change and Agriculture: Impacts and Adaptive Responses in Iran. *J. Integ. Agric.*, **17(1):** 1-15.
25. Krejcie, R. V. and Morgan, D. W. 1970. Determining Sample Size for Research Activities. *Educ. Psych. Measur.*, **30(3):** 607-610.
26. Kuo, Y. K. and Ye, K. D. 2009. The Causal Relationship between Service Quality, Corporate Image and Adults' Learning Satisfaction and Loyalty: A Study of Professional Training Programmes in a Taiwanese Vocational Institute. *Total Qual. Manage*, **20(7):** 749-762.
27. Lam, S. Y., Shankar, V., Erramilli, M. K. and Murthy, B. 2004. Customer Value, Satisfaction, Loyalty, and Switching Costs: An Illustration from a Business-to-Business Service Context. *J. Acad. Mark. Sci*, *32*(3), 293-311.
28. Li, L., Liu, F. and Li, C. 2014. Customer Satisfaction Evaluation Method for Customized Product Development Using Entropy Weight and Analytic Hierarchy Process. *Comput. Ind. En,*. **77:** 80-87.
29. Lotfy, A, and Adeeb, N. 2016. Measuring Farmers' Satisfaction with the Services of Agricultural Service Providers in Minya and BeniSuef Governorates. *Rep. CARE Eva.*, **29:** 1-8.
30. Mamun-ur-Rashid, M., Gao, Q. and Alam, O. 2018. Service Quality of Public and Private Agricultural Extension Service Providers in Bangladesh. *J. Agric. Ext*., **22(2).**
31. Martensen, A., Gronholdt, L., and Kristensen, K. 2000. The Drivers of Customer Satisfaction and Loyalty: Cross-Industry Findings from Denmark. *Total Qual. Manage.*, **11(4-6):** 544-553.

32. Mutimba, J. K. 2014. Reflections on agricultural extension and extension policy in Africa. *S. Afr. J. Agric. Ext,* **42(1):** 15-26.
33. Niu, C. and Ragasa, C. 2018. Selective Attention and Information Loss in the Lab-to-Farm Knowledge Chain: The Case of Malawian Agricultural Extension Programs. *Agric. Syst.,* **165:** 147-163.
34. Oliver, R. L. 1999. Whence Consumer Loyalty? *J. Mark.,* **63:** 33-44.
35. O'Loughlin, C. and Coenders, G. 2002. Application of the European Customer Satisfaction Index to Postal Services. Structural Equation Models versus Partial Least Squares. Working Papers of the Department of Economics, University of Girona.
36. Onyeme, N. F. and Iwuchukwu, J. C. 2012. Responsiveness of Extension Workers to Climate Change in Anambra State, Nigeria. *J. Agric. Ext.*, **16(1):** 88-102.
37. Parasuraman, A., Zeithaml, V. A. and Berry, L. L. 1985. A Conceptual Model of Service Quality and Its Implications for Future Research. *J. Mark.*, **49(4):** 41-50.
38. Prokopy, L. S., Carlton, J. S., Arbuckle, J. G., Haigh, T., Lemos, M. C., Mase, A. S., Babin, N., Dunn. M., Andresen, J., Angel, J., M. Hart, C., and Power, R. 2015a. Extension′s Role in Disseminating Information about Climate Change to Agricultural Stakeholders in the United States. *Clim. Change*, **130(2):** 261-272.
39. Prokopy, L. S., Morton, L. W., Arbuckle Jr, J. G., Mase, A. S., and Wilke, A. K. 2015b. Agricultural Stakeholder Views on Climate Change: Implications for Conducting Research and Outreach. *Bull. Am. Meteorol. Soc.*, **96(2):** 181-190.
40. Raboca, H. M. 2006. Determinants of Customer Satisfaction and Service Quality-The Case of Romanian Public Services. *Transylv. Rev. Adm. Sci, **2**(16)*, 124-135.
41. Ragasa, C., Mazunda, J., 2018. The impact of agricultural extension services in the context of a heavily subsidized input system: The Case of Malawi. World Dev. **105:** 25–47.
42. Ragasa, C. and Niu, C., 2017. The State of Agricultural Extension and Advisory Services Provision in Malawi: Insights from Household and Community Surveys. International Food Policy Research Institute (IFPRI), Washington, DC.
43. Rahimi Feyzabad, F. and Yazdanpanah, M. 2014. Factors Affecting Continued Participation of Farmers in Agricultural Extension Training Classes in Aleshtar District, Iran. *J. Agri. Edu. Admin. Res.*, **33:** 56-72.
44. Rouzaneh, D., Yazdanpanah, M., and Jahromi, A. B. 2020. Evaluating Micro-Irrigation System Performance through Assessment of Farmers' Satisfaction: Implications for Adoption, Longevity, and Water Use Efficiency. *Agric. Water. Manag.,* **246:** 106655.
45. Sedghi, C., Javadin, S.r., Motalebi, D. Hosseini, J., and Yazdani, H.R 2009. Comparison Customer Satisfaction Indices and Finding a Model for Measurement Taxpayer Satisfaction. *Bus. Manag. J.,* **1(2):** 101-118.
46. Singh, I. and Grover, J. 2014. Role of Extension Agencies in Climate Change Related Adaptation Strategies. *Inter. J. Fa. Sci.*, **3(1)**: 143-155.
47. Tu, T., Lambert, C., Taylor, B. L., Lister, C. and Klein, A. 2011. *National Learner Satisfaction Survey: Adults in FE, Apprenticeship, Other LR and PCDL.* BIS Research Paper Number 17.
48. Wahyudi, D., Sulistiani, E., and Muhajat, M. H. 2019. The Impact of Farmer's Attitude and Perceived Quality to Farmer's Satisfaction and Its Effect on Brand Loyalty. *J. Res. Bus. Econ. Educ.*, **1(1):** 322907.
49. Yazdanpanah, M., and Feyzabad, F. R. 2017. Investigating Iranian Farmers' Satisfaction with Agricultural Extension Programs Using the American Customer Satisfaction Index. *J. Agric. Food. Inf.*, **18(2):** 123-135.
50. Yazdanpanah, M., Zamani, GH. and Rezaei Moghadam, K. 2009. Farmer's Satisfaction about Crop Insurance: Application of Path Analysis. Iran. *J. Agric. Econ. Devel. Res.*, **17:** 139–163.
51. Yazdanpanah, M., Zamani, G. H., Hochrainer-Stigler, S., Monfared, N. and Yaghoubi, J. 2013. Measuring Satisfaction of Crop Insurance, a Modified American Customer Satisfaction Model Approach Applied to Iranian Farmers. *Int. J. Disast. Risk Reduct.*, **5:** 19-27.
52. Zamani, Gh., Karami, E. and Yazdanpanah,M. 2009. Factors Effecting Farmers' Crop Insurance Satisfaction. *Iran. Agri. Ext. Edu. J.,* **4(2):** 53-66.

عوامل موثر بر رضامندی و وفاداری کشاورزان نسبت به برنامه های ترویجی آموزشی

م. دهقانپور، م. یزدان پناه، م. فروزانی، و غ. عبداله زاده

چکیده

برنامه های ترویجی و آموزشی از اقدامات و روشهای مختلفی برای مشاوره و راهنمایی کشاورزان در مورد سازگاری با تغییرات آب و هوا استفاده می کنند.. رضایت کشاورزان از این برنامه های ترویجی و آموزشی ابزاری مناسب برای بررسی اثربخشی این برنامه ها می باشد. از این منظر، مطالعه عوامل موثر بر رضایت از برنامه های ترویجی و آموزشی می تواند به برنامه ریزان و سیاست گذاران بخش کشاورزی به طور کلی و ترویج کشاورزی به طور خاص برای بهبود کیفیت این برنامه ها کمک کند. بنابراین، مقاله حاضر، عوامل موثر بر رضایت و وفاداری کشاورزان را از برنامه های ترویجی و آموزشی مرتبط با سازگاری و مقابله با تغییرات اقلیم بررسی می کند. جامعه آماری این تحقیق متشکل از کلیه کشاورزان شرکت کننده در این برنامه ها در استان فارس، شهرستان مرودشت است. طبق جدول نمونه گیری کرجسی و مورگان (1970) ، در مجموع 150 کشاورز شرکت کننده در این برنامه های ترویجی و آموزشی به عنوان نمونه آماریانتخاب شد. شرکت کنندگان از طریق نمونه گیری تصادفی انتخاب شدند .داده های جمع آوری شده از شرکت کنندگان با استفاده از مدل معادلات ساختاری مورد تجزیه و تحلیل قرار گرفت. نتایج نشان داد، متغیرهای تحقیق از روایی و پایایی مطلوبی برخوردارند. متغیرهای تناسب بسته های ترویجی و ارزش درک شده از مهمترین عوامل موثر بر رضایت از برنامه های ترویجی و آموزشی بودند .علاوه بر این دو متغیر، عوامل دیگری از جمله تصویر یا وجهه ظاهری، احساسات، بازده اقتصادی درک شده و عوامل ظاهری فیزیکی برنامه های آموزشی تاثیر مستقیم بر رضایت و تأثیرات غیرمستقیم بر وفاداری به این برنامه ها داشتند .