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# Determinants of Farmers' Participation in Horticulture-based Extension Programs in Iran: Application of the Theory of Planned Behavior

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## Abstract

This paper aims to discover the determinants of farmers' participation in horticulture-based Education programs in the Western Azerbaijan province, Iran. Using the Theory of Planned Behavior (TPB), the study also tries to make a comparison between participants and non-participants, who have achieved in this program. A sample of 231 farmers (137 participants and 94 non-participants) was selected based on a stratified random sampling method. Data gathering instrument was a questionnaire that its validity was approved by a group of experts and its reliability was confirmed by calculating Cronbach's alpha ( $\alpha=0.71$ ). The results showed that, there were significant differences between participants and non-participants in agricultural education programs in terms of all the TPB contexts. Additionally, the results of the regression analysis showed that attitude to how thinking and decision and subjective norms were the best determinants of farmers' participation.

**Keywords:**  
*Theory of Planned Behavior, Behavioral Intention, Agricultural Education Programs, Participation*

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## INTRODUCTION

To improve participation in agricultural education and extension programs, a better understanding of target audiences is essential (Richardson, 2003). A fuller view of the factors determinants of farmers' decisions is likely to lead to more effective programs. That is why extension agents are interested in understanding the most effective factors that help increase the number of people at their programs. But sometimes, they fail to draw a comprehensive picture of what motivates a farmer actually to attend (Jacob and Ferrer, 2000). This probably leads to design incomplete programs which are less comprehensive in diagnosis and accountability. To avoid trial and error interventions which waste valuable time and resources, the factors associated with the success of programs need to be discovered. These factors closely related to the clients and hence should be scrutinized by extension agents deeply. The advantage of such an assessment is that the program planner will learn why farmers participate in programs and how success is governed. But this is not an easy task, because the factors involved in farmers' decisions are complex. The most farmers with whom extension agents must deal have a stereotyped, have a constant image of problem; their beliefs, intentions, and nonverbal behaviors reinforce each other, making any change difficult. Thus, programs that are to succeed must usually be powerful multifaceted ones in order to fulfill a wide range of expectations. Thus far, individual studies and reviews conducted in several domains have examined the determinants of farmers' intention to participate in extension programs. Although several studies have demonstrated the effects of personnel's factors on farmer's intention to perform a specific behavior, there is still a lack of research that can explore a set of variables in a theoretically framework to combine all kinds of potential influences. Only a small number of studies have tested theoretical models. One of these models in which many identified variables has been reflected is the Theory of Planned Behavior (TPB), a model that has demonstrated a good explanation for decision making contexts (Armitage and Conner, 2001; Godin and Kok, 1996; Hagger *et al.*, 2002). Accordingly, this

study tries to answer the following key question: which components determine participation of farmers in agricultural education programs?

This study will first explanation Theory of Planned Behavior theoretical basis, then show materials, afterwards results and finally conclusion.

### Theory of Planned Behavior (TPB)

The TPB is a framework for understanding the effect of attitude, subjective norms, and perceived behavioral control on intention to engage in behavior of interests (Pawlak and Malinauskas, 2008). The TPB is a revision of the Theory of Reasoned Action (TRA) (Ajzen and Fishbein, 1980; Fishbein and Ajzen, 1975), which is designed to explain almost any human behavior and has been successfully proven in predicting and explaining human behavior across various application contexts (Davis *et al.*, 1989). The TPB argues that the immediate precursor to behavior is the behavioral intention, which in turn is anteceded by (a) the extent to which individuals hold a favorable attitude toward the behavior, (b) individuals' perceptions of the norms and conventions regarding the behavior (i.e. subjective norms), and (c) the extent to which the individual perceives the behavior at hand to be under his or her personal control (perceived behavioral control). The TPB argues that the most proximal determinant of behavior is intention (Jimmieson *et al.*, 2008).

Intentions in turn are proposed to be a function of three independent determinants. The first determinant of intentions is the attitude. The second determinant of intentions is subjective norm. The third determinant of intentions is perceived behavioral control (Ajzen, 1991). Attitude refers to the degree to which a person has favorable or unfavorable evaluation or appraisal of the behavior in question (Ajzen and Fishbein, 1975). Ajzen (1991) further described that a favorable or unfavorable attitude has a direct proportion to the strength of the behavioral beliefs about likely consequences and can be formulated with an expectancy value model. Subjective norm refers to the perceived social pressure to perform or not to perform the behavior. Typical applications of TPB consider subjective norm to include only the normative influence (Liao *et al.*, 2007). Venkatesh and Davis (2000)

found that behavioral intention would positively influence the subjective norm in a mandatory usage context, whereas the effect was insignificant in voluntary contexts. Perceived behavioral control refers to people's perception of ease or difficulty in performing the behavior of interest (Ajzen, 2002a). Thus, control beliefs about resources and opportunities are associated with an underlying perceived behavioral control, which can be formed as the control beliefs are weighted by the perceived power of the control factor (Ajzen, 1991). More formally, perceived behavioral control refers to beliefs regarding the possession of requisite resources and opportunities for performing a given behavior (Madden *et al.*, 1992).

The TPB has been applied to a wide range of behavioral domains (Ajzen, 2002b) including those that are related to agricultural and human issues (Beedell and Rehman, 2000; Bergevoet *et al.*, 2003; Bernat and Roschewitz, 2005; Hattam, 2006; Karami and Mansoorabadi, 2007; Karppinen, 2005; Rehman *et al.*, 2006). Reviews have provided support for the TPB (Blue, 1995; Conner and Sparks, 1996; Godin, 1993; Manstead and Parker, 1995; Sparks, 1994) as have previous meta-analyses (Ajzen, 1991; Armitage and Conner, 2001; Godin and Kok, 1996; Hausenblas *et al.*, 1997; Van den Putte, 1991). Most empirical applications of the TPB try to explain or predict newly introduced behavior (Armitage and Connor, 2001; Davies *et al.*, 2002; Ouelette and Wood, 1998). However, despite general support for the TPB, a limitation in the model has been identified due to the weak support found for the role of subjective norm to predict intentions (Ajzen, 1991). Meta-analyses of TPB research revealed that average regression weights for attitude were consistently higher than for subjective norm in the prediction of intentions (Ajzen, 1991; Armitage and Conner, 2001). Terry and colleagues contended that lack of strong support for subjective norm in TPB studies may be attributable to the fact that the role of norms in this context has not been clearly theorized and that subjective norm is an inadequate construct to capture the impact of social influence on behavior (Terry and Hogg, 1996; Terry *et al.*, 1999; White *et al.*, 1994).

## MATERIALS AND METHODES

The main purpose of this study was to application of the TPB in order to understand a specific behavioral intention (participation in agricultural education programs) of gardener the Western Azerbaijan province. A sample of 231 farmers (137 participants and 94 non-participants, Participant farmers had certification letter in horticulture courses but non- Participant farmers hadn't it) was selected based on a stratified random sampling method. Questionnaire designed based on the literature, particularly from a previous study by Richardson in 2003. A panel of experts confirmed the validity of the questionnaire. And reliability measured by Cronbach's alpha coefficient (mean of  $\alpha$  in four parts of questionnaire = 0.71). SPSSwin15 was used to analysis the data. Using a stratified random sampling technique, a sample of 231 farmers was selected according Krejcie and Morgan (1970). Main description of the main variables used in this study is presented as follows:

Attitude was measured directly and indirectly based on the behavioral beliefs and outcome evaluations of the respondents (belief-based measures). Eleven behavioral belief questions and outcome evaluation questions were constructed. Subjective norms were also measured. The questions were used to determine the respondent's perception of social pressure regarding attendance at educational programs. Five questions elicited directly and indirectly used to create an index for measuring. Perceived behavioral control was also measured. Four questions were designed to create the index for perceived behavioral control, measuring the respondents' evaluation of how easy or difficult it would be to attend the education programs. Finally, behavioral intent was measured directly via four questions on the instrument. Ajzen (1988) states that behavioral intention of an individual is comprised of motivational factors involved in making the decision to engage in the behavior. The statements were measured on a five-point-Likert-type scale, that ranged from; 1="Strongly Disagree", 2="Disagree", 3="No opinion", 4="Agree" and 5="Strongly Agree".

## Description of the study area

This study was conducted in the Western



Figure 1: Location of the study area in Iran.

Azerbaijan province located in Northwest Iran. This province includes 12 counties/ township: Boukan, Khoy, Makoo, Mahabad, Meyandoab, Naghadeh, Pyranshahr, Salmas, Sardasht, Shahindej, Takab, and Oromeyeh (Figure 1).

Western Azerbaijan is one of the leading provinces in agricultural production. Crop diversity in this Province, particularly in Urumeh proved the important position to this region. Variety of Grapes and apples with different types is unique in its kind. The area under cultivation is the sixth in the country is allocated to the Province's production and value of these products is equal to 1,123,540 tones out to third be is allocated to (Ministry of Jihad-e- Agriculture, 2008).

## RESULTS

### Respondents' characteristics

On average, mean range of participants was 41.8 years old and a bout non-participant was 42.4 years old. 39 percent of participant in the educational programs, and 39 percent of not-participate just, hold elementary school. Participants owned an average of 3.8 ha of land and non-participants owned 6 ha of land. Also, participant's prioritized information and communication channels respectively as: extension experts, educational class, and TV. On the other hand, from non-participants' point of view, extension experts, other farmers and friends are of great importance among information and communication channels.

### Comparison between participants and non-participants

For testing is there a difference between participants and non-participants to all of the TPB variables below characteristics, an independent sample t-test was conducted by artificially make a sum up of the items. Results revealed a significant difference between participants and non-participants with regard to all of the TPB variables, i.e. attitude toward behavior, perceived behavioral control, subjective norms, behavioral intention, and perceived level of knowledge. There were significant mean differences in between participants and non-participants in terms of all of the variables (Table 1).

Means and standard deviations for 28 statements of the TPB are reported in Table 2. Three

Table 1: Comparison between participants and non-participants (TPB component).

Variable	Groups	t	Sig.	Mean	SD
Attitude toward behavior	Participants	4.652	.000	45.73	4.78
	Non participants			42.27	5.91
Subjective norms	Participants	2.925	.004	19.62	2.87
	Non participants			18.42	3.14
Perceived behavioral control	Participants	2.543	.012	15.41	2.4
	Non participants			14.60	2.29
Behavioral intention	Participants	4.397**	.000	21.36	3.05
	Non participants			19.31	3.70
Perceived level of knowledge	Participants	3.19*	.002	17.43	3.46
	Non participants			15.72	4.18

\* (P< 0.05) and \*\* (P< 0.01)

Table 2: Comparison between variables of participants and non-participants.

Attitude	Mean	SD	Group	Mean Rank	Mann-Whitney	Sig.
Extension and education programs offer up-to-date information on the horticulture	4.359	0.726	P	129.34	4612	0.000
			NP	96.56		
Extension and education programs offer an opportunity for people in the horticulture to increase their knowledge of new products in the market	4.372	0.780	P	129.26	4622.5	0.000
			NP	96.68		
Extension and education programs offer an opportunity for people in the horticulture to increase their knowledge of herbicides, pesticides, and fungicides	4.190	0.745	P	124.27	5306	0.012
			NP	103.95		
Extension and education programs offer an opportunity for people in the horticulture to increase their knowledge of agricultural management	3.991	0.875	P	123.83	5048	0.006
			NP	101.20		
Extension and education programs offer an opportunity for people in the horticulture to increase their knowledge of organic farming	4.026	0.901	P	124.83	5122.5	0.006
			NP	101.99		
Extension and education programs offer an opportunity for people in the horticulture to obtain continuing education units	4.114	0.876	P	126.72	4729.5	0.000
			NP	97.85		
Extension and education programs are not an effective way to spread information to the horticulture	2.278	1.215	P	108.24	5405	0.034
			NP	126.00		
Keeping up-to-date on the horticulture is important to me	4.557	0.601	P	130.74	4320	0.000
			NP	93.46		
Learning about pesticides, herbicides, and fungicides is important to me	4.278	0.815	P	128.15	4671.5	0.000
			NP	97.20		
Gathering new information about business management techniques is important to me	4.035	0.945	P	126.19	4834	0.001
			NP	98.93		
Obtaining continuing education units is important to me	4.174	0.839	P	126.08	4953	0.002
			NP	100.19		
<b>Subjective Norms</b>						
Generally speaking, I do what other important people think I should do regarding attendance in extension and education programs	3.239	1.187	P	115.65	5876.5	0.538
			NP	110.38		
Generally speaking, I do what other horticulture professionals in my work think I should do regarding attendance in extension and education programs	3.522	1.148	P	118.66	5498.5	0.139
			NP	106.12		
It is expected of me to attend as many extension programs as I can that are about horticultural issues	4.065	0.882	P	125.83	4986.5	0.002
			NP	100.55		
Generally speaking, I do what my coworkers think I should do regarding attendance at extension and education programs	4.288	0.876	P	118.33	5870.5	0.311
			NP	110.12		

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Attitude	Mean	SD	Group	Mean Rank	Mann-Whitney	Sig.
The opinions of horticulture professionals in my work are important to me	4.004	0.810	P	125.25	4793.5	0.001
			NP	98.60		
<b>Behavioral Intent</b>						
For me to attend one extension and education programs relating to the horticultural work in the next year would be	3.782	1.020	P	127.63	4742.5	0.000
			NP	97.95		
For me to attend more than one extension and education program relating to the horticultural work in the next year would be	3.969	0.934	P	127.21	4528	0.000
			NP	95.72		
I intend to attend extension and education programs relating to the horticultural work next year	3.416	1.142	P	129.28	4518.50	0.000
			NP	95.57		
I will try to attend extension and education programs relating to the horticultural work next year	3.939	0.939	P	128.45	4631	0.000
			NP	96.77		
I intend to become more aware of extension and education programs offered relating to my work	4.043	0.886	P	124.96	5105	0.000
			NP	101.81		
<b>Perceived Behavioral Control</b>						
It is mostly up to me whether or not I attend extension programs relating to the horticulture work	4.178	0.861	P	128.68	4498	0.000
			NP	95.35		
I feel in complete control over whether I attend an extension and education program relating to the horticultural work	4.148	0.823	P	120.98	5538	0.075
			NP	106.41		
If I wanted to, it would be easy for me to attend extension and education programs relating to the horticultural work within the next year	4.252	0.728	P	117.74	6200	0.620
			NP	113.46		
If I wanted to, I could attend an extension and education program relating to the horticultural work	5.251	1.735	P	118.02	5913	0.375
			NP	110.58		
<b>Perceived level of knowledge*</b>						
My knowledge of the horticulture management is	5.865	1.982	P	121.22	4759	0.000
			NP	98.38		
my knowledge of the horticultural extension and education service is	3.921	0.945	P	118.25	5049.5	0.053
			NP	101.61		
I have the potential to manage the horticulture	5.55	1.54	P	123.25	5231.5	0.019
			NP	103.15		

1="Strongly Disagree", 2= "Disagree", 3= "No opinion", 4= "Agree" and 5= "Strongly Agree".

\*1= "Very low", 2= "low", 3= "medium", 4= "high", and 5= "very high"

of the 28 statements have a mean value of over 5.00 indicating "agreement." The highest mean estimated for the statement knowledge of the horticulture management is high (M=5.86; SD=1.98). The other four statements had mean score closer to 4.00 indicating "agreement". Extension and education programs offer updated information on the horticulture work (M=4.35); Extension and education programs offer an opportunity for people in the horticultural issues to increase their knowledge about new products on the market (M=4.32); Extension and education programs offer an opportunity for people in the horticulture work to increase their knowledge of herbicides, pesticides and fungicides (M=4.19); Extension and education programs offer an opportunity for people in the horticulture work to increase their knowledge of organic farming (M=4.02); Extension and education programs offer an opportunity for people in the horticulture to obtain continuing education units (M=4.11); Keeping updated on the horticulture is important to me (M= 4.55); Learning about pesticides, herbicides and fungicides is important to me (M=4.27); Gathering new information about business management techniques is important to me (M=4.03); Obtaining continuing education units is important to me (M=4.17); It is expected of me to attend as many extension programs as I can that are about horticultural issues (M= 4.06); Generally speaking, I do what my coworkers think I should do regarding participation in extension and education programs (M=4.28); The opinions of horticulture professionals in my work are important to me (M=4.00); I intend to become more aware of the extension and education programs offered relating to my work (M=4.04); It is mostly up to me whether or not I attend extension and education programs relating to the horticultural activities (M=4.17); I feel in complete control over whether I attend an extension program relating

to the horticultural work (M=4.14), and if I wanted to, it would be easy for me to attend extension and education programs relating to the horticultural work within the next year (M=4.25). In addition, the Mann-Whitney U - test was used to determine the differences between participants in extension and education programs and those who did not participate in extension and education programs and the attitude, subjective norms, PBC, intention, and perceived level of knowledge of horticulture farmers. Overall, Mann-Whitney U- test results showed significant differences between the attitude, behavioral intention, and perceived level of knowledge of those farmers who had participated and those who did not participated in terms of all of the variables. Furthermore, there were significant differences in terms of subjective norm and PBC. There were differences in; it is expected of me to attend as many extension and education programs as I can that are about horticultural issues (sig=0.002); The opinions of horticulture professionals in my work are important to me (sig= 0.001), and it is mostly up to me whether or not I attend extension and education programs relating to the horticulture work (sig=0.000).

**Factors influencing the participants and Non-participants' attend Extension and Education Programs: Regression Analysis**

As shown in Table 3, variables were entered in the regression through the "stepwise" method include the standard TPB variable, i.e. attitude toward behavior, into Step 1 of the equation accounted for a significant amount of variance in intentions, R<sup>2</sup>= 0.519.

The information in Table 4 indicates that among independent variables that had significant correlation with the dependent variable (farmers' intention to participate in extension

Table 3: Regression analysis- non-participants.

Steps	Independent variable	B	SEB	Beta	t	p-value	R	R <sup>2</sup>
1	Attitude toward behavior	0.46	0.061	0.726	11.186	0.000	0.723	0.519
	Constant	0.33	1.003	_____	0.172	0.863		

Equation (1) Y= 0.33 + 0.46 Attitude



Table 4: Regression analysis-Participants.

Steps	Independent variable	B	SEB	Beta	t	p-value	R	R <sup>2</sup>
1	Attitude	0.433	0.50	0.689	8.59	0.000	0.474	0.468
	Constant	1.004	2.156	_____	0.465	0.672		
2	Attitude	0.309	0.068	0.492	4.56	0.000	0.516	0.504
	Subjective norms	0.349	0.132	0.283	2.63	0.010		
	Constant	-0.108	2.124	_____	-0.051	0.959		

and education programs), Considering the previous steps, entry of the two aforementioned variables in Step 2 of the equation explained an increment of variance in intentions,

$$R^2=0.504.$$

Here, attitude had the greatest influence on intention to participate in extension and education programs, followed by subjective norms. The following model is estimated to explain the variations in intention to participate in extension and education programs:

$$\text{Equation (2)} \quad Y = -0.108 - 0.309 + 0.349$$

### CONCLUSION

Extension agents are interested in understanding the most factors that help increase the number of people in their programs. The Theory of Planned Behavior (TPB) is a general, briefly model of cognitive determinants of behavior that has successfully been proven in predicting behavior in a variety of contexts. Therefore, the main purpose of this study was to explore the use of the Theory of Planned Behavior to assess intentional predictors of farmers' participation in agricultural extension and education programs. This research indicated that Ajzen's theory of planned behavior performs well across behavioral categories with respect to explaining intention. For the prediction of behavior, however its efficiency varies (Beedell and Rehman, 2000).

Results showed that, there were significant differences between participants and non-participants in agricultural extension and education programs in terms of all of the TPB variables. Additionally, the results of the regression analysis showed that attitude and subjective norms were the best predictors' behavior. Attitudes toward participating in agricultural extension and education programs were slightly more impor-

tant than subjective norms in predicting intention. In turn, intention was strongly related to farmers, and subjective norms were independently associated with farmer's participation. This result gives clear evidence that positive attitudes alone are not sufficient to encourage farmers for participation in agricultural education programs. They are driven by a perceived inability to convert successfully and social pressures from important referent groups. Psychological factors are therefore significant barriers to in agricultural education programs.

The results of nonparticipant regression indicated that attitude is the key factor for predicting participation. Attitudes drive participation levels, and the perceived image of extension is important for promoting future participation. Considering that attitudes are the main issue with non-participation, according analysis of attitudes as well as the beliefs to create particular attitudes among extension clientele are needed. Attitudes about horticulture-based extension and education programs are extremely important to this group of people and, therefore, should be closely monitored by the extension service. Several studies have shown that the higher the level of contact with the extension and education service and agents, the higher the satisfaction level of the farmers. Therefore, a need may be felt for the extension and education service to re determine audiences and re-evaluate the attitudes and beliefs of those audiences. Also the results of participants' regression indicated that attitude is the key factor for predicting participation. This suggests that the TPB model was appropriate for use in predicting the participation of farmers in extension and education programs; therefore, based on this research and the literature involved, the extension service has a

responsibility to its audience to provide educational programs that are timely and up-to date. It has the responsibility of understanding the knowledge, skills and, most importantly, attitudes of the clientele in order to maintain these programs. In addition, the extension service must do the research required for re-discovering existing audiences and exposing new ones. Then, the many valuable extension agents can ultimately help people help themselves.

Several months after attending courses the participants reported how often they had performed each behavior in the preceding several months. Behavioral beliefs were found to partition into beliefs about affective reactions and beliefs about costs and benefits. Participation in agricultural courses was influenced by these affective and instrumental beliefs, as well as by normative beliefs about the expectations of important others and by control beliefs about required resources and other factors that impede or facilitate education participation.

Researchers encouraged policy makers in agricultural education planning courses to promote farmers positive norms and attitude through creating participatory atmosphere in agricultural educations. Because it's to become more motivated to learn, take responsibility for their learning as suggested by Armitage and Conner (2001). Where learners are encouraged to work with group of peers and referent groups with whom they can share their experiences.

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