Decision Making Styles of Farmers: A Case Study of Vegetable Producers in Turkey

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Abstract: It is important to determine the decision making styles of the farmers who play an important role in feeding societies. Defining farmers' decision making styles is also important to apply extension approaches and services in the field. In this study, decision making styles of vegetables farmers were examined based on social and economic variables in the village of Bafra district of Samsun province in Turkey. In the research, semi-structured interviews were conducted with 122 farmers selecting with simple random sampling method. The interviews were based on Decision Making Style Scale developed by Scott and Bruce (1995). Factor analysis was conducted to verify the decision style on the scale and the styles were theoretically verified. According to the findings, the decision making style of the farmers having the highest average score was determined as intuitive, while the lowest score average was found in the style of spontaneous decision. In addition, it was statistically determined that the farmers in the middle age group (40-49) were spontaneous decision makers. Rational decision makers were more formally educated than farmers with different decision making styles ($p<0,05$). It was observed that the intuitive decision score of farmers who had more agricultural experiences were higher. As a results, farmers in the field of research are intuitively relying on their instincts. Farmers see their production as routine job and therefore generally do not plan production for the future. This situation results in the farmers being unable to obtain the desired profits. The differences between the farmers should be revealed by conducting more in-depth research on farmers with different decision styles.

Key words: Decision making, decision making style, vegetable producers

Introduction

The most important sector related to feeding the world population is agriculture. Farmers working in the agriculture sector have thus the responsibility of decision-making in growing various crops to meet the nutrition needs of an increasing population. Thus, while planning the production, they have to make the best decisions about which crops they will grow in how much of an area and how many tons. The most important factor for this study is how farmers make their decisions by taking into consideration a great number of factors (dependence on natural conditions, price instability, irrigation problems, characteristics of the soil, etc) that exist in the agriculture sector. In order to find out how farmers behave while making a decision, there has to be a selection by farmers because making a decision is choosing the most suitable alternative among existing alternatives (Byrnes, 2002; Evans, Brown and Killian, 2002; Jacobs and Klaczynski, 2005; Saaty,2008). Farmers do not decide only for new Technologies or applications in agriculture sector. There is a continuing production in agriculture and consequently, various crops are grown. Farmers decide on choosing and growing the crop/crops most suitable for their farms among various crops. In vegetable growing, a great number of crops can be grown according to the characteristics of the season (summer/winter vegetables) and farmers decide about producing the ones they want. Each farmer has his own decision-making style and the reactions and perspectives of farmers while choosing among alternatives form their decision making styles. Decision-making styles are

expressed as individuals' approaches, reactions and actions (Philips, Pazienza and Ferrin 1984). Thus, finding out and presenting the reactions and perspectives, that is, decision-making styles, of farmers who have a very important role in the agriculture sector and finding out which social and economic characteristics these styles are related with will contribute to making better decisions in the future.

There are a great number of national and international studies on decision-making styles and it has been found that individuals use very different methods while making decisions (Taşdelen, 2001; Kuzgun, 2006; Kaşık, 2009; Pekdoğan, 2015). In terms of international literature, it can be seen that studies of decision-making have been conducted on different topics and these studies show an increase by years. Some of these are studies of developing scales for decision-making (Dinklage, 1698; Scott and Bruce, 1995) and finding out decision-making styles of consumers (Sprotles and Kendall, 1986; Hafstrom, Chae and Chung, 1992; Shim, 1996; Fan and Xiao, 1998; Mau, 2000). Decision-making studies in Turkey have been mostly conducted in the field of educational sciences and no studies on finding out the decision-making styles of farmers have been found in literature review.

Purpose of the study

The main purpose of this study is to find out the decision-making styles vegetable producing farmers use while making any decision about their business. After the decision-making styles of farmers are found, the secondary purpose of the study is to find out the association of socio-economic characteristics that affect their decision-making styles which explain how farmers behave while making decisions.

Methodology of the study

The method used in data collection

The main material of the study consists of primary data obtained through face-to-face interviews with farmers growing vegetables. "Questionnaire" method was used in the study as data collection method and the number of farmers to complete the questionnaire was found through simple sampling method by taking the area (da) they cultivated vegetable as a criterion (Yamane, 1967).

$$n = \frac{N(ZC)^2}{Nd^2 + (ZC)^2}$$

N= The number of farmers in the population (513)

Z= Standard normal value corresponding to the required confidence degree (1.65)

C= Variation coefficient (0.76)

d= Margin of error (0.10)

n= Number of farmers to conduct the questionnaire (120)

Thus, the number of individuals to conduct the questionnaire was calculated as 120 with a confidence degree of 95% and 10% margin of error. The questionnaires were completed between November 2015 and February 2016. Two backup questionnaires were conducted and the data of these were also included in the study. The completion of a questionnaire took about an hour.

Method used for data analysis

In the questionnaire conducted to find out the decision-making styles of farmers, the General Decision Making Style Inventory developed by Scott and Bruce (1995) was used. This inventory was developed to measure the individual differences in decision-making styles used by individuals with different characteristics while making decisions on important issues. The original 25-item form of the Decision Making Style Inventory used in the study is examined in five sub-dimensions. These dimensions are (1) rational style, defined as a logical evaluation of alternatives (2) intuitive style, defined as a reliance on feelings or instincts (3) dependent style defined as decision-making by the direction or advice of another person (4) spontaneous style, defined as making decisions as soon as possible and immediately (5) avoidant style, defined as postponing and avoiding decisions (Scott and Bruce, 1995). The items of the inventory are scored according to a 5 likert grading listed as "strongly disagree" (1), "disagree" (2), "neither agree nor disagree" (3), "agree" (4), "strongly agree" (5). Factor analysis was conducted to find out the structural validity of decision making styles inventory. The results of the factor analysis showed that some items (1, 4, 16, 24, 25) were not loaded in their own factor, but loaded in other factors. These results were taken as reference and the factor analysis was repeated for 20 items. It was found that the items were grouped in five factors with eigen values of higher than1 as listed in the original inventory form. Thus, it is thought that this result is also theoretically suitable.

Internal consistency coefficients (Cronbach alpha) were calculated for the reliability of Decision making styles inventory conducted on farmers. When the internal consistency of the sub-dimensions of the inventory were analyzed, internal consistency of the spontaneous decision making style was found as alpha: .75, internal consistency of the intuitive decision making style was found as alpha: .71, internal consistency of the dependent decision making style was found as alpha: .62, internal consistency of the avoidant decision making style was found as alpha: .62 and internal consistency of the rational decision making style was found as alpha: .62. These results show that the inventory is consistent. Before the comparisons between farmers' decision making styles and their socio-economic characteristics were conducted with suitable statistical analyses, the business groups of farmers (small, medium, large) were found by clustering analysis.

Results

Decision making styles of the farmers

Understanding what decision making is associated with can help individuals in making better decisions (Harris, 1998). Table 2 gives the descriptive statistical values of the total scores of farmers' decision making styles. According to Table 2, the intuitive decision making average scores of farmers ($\bar{X}$: 20.97) are higher than the other styles. Thus, it can be thought that the farmers decided on alternatives that they thought they would benefit from by depending on their instincts and feelings. The average score of dependent decision making style was 15.95. The farmers who had this style stated that they took the support of family members, friends or an expert while deciding on an agricultural activity about the business. The decision making style which had the lowest average score was found to be spontaneous decision-making style.

Table 1. Descriptive statistic values of farmers' decision making styles total scores

Sub-dimensions	n	$\bar{X}$	Std. Deviation	Minimum	Maximum
Rational	122	11.54	2.66	3	15
Intuitive	122	20.97	3.92	9	25
Dependent	122	15.95	4.16	5	25
Avoidant	122	10.15	4.25	4	20
Spontaneous	122	7.53	3.83	3	15

Comparisons about the decision-making styles of farmers

Decision making styles of farmers were analyzed in terms of their business groups and shown in Table 2. According to one-way Anova results, it was found that rational and intuitive decision making styles differed in terms of business groups ($p<0.05$), while dependent, avoidant and spontaneous decision making styles did not ($p>0.05$).

Table 2. Decision making styles of business groups

Decision making styles	Business Groups		
	Small	**Medium**	**Large**
Rational*	11.0 ± 2.5b	11.9 ± 2.8ab	13.5 ± 1.5a
Intuitive *	21.5 ± 3.2a	20.9 ± 4.1a	17.0 ± 6.5b
Dependent	15.9 ± 4.0	16.0 ± 4.5	16.8 ± 3.5
Avoidant	10.2 ± 4.6	10.0 ± 4.0	10.5 ± 3.2
Spontaneous	7.7 ± 4.2	7.4 ± 3.4	7.5 ± 4.5

*:$p<0.05$

Businesses with high rational decision making style scores take rational and realistic decisions and make plans for the business activities of the coming years. Thus, it is thought that farmers who make rational decisions will be more successful than farmers with other decision making styles while carrying out the activities of their businesses. According to the analysis results, it was found that farmers with large businesses were found to make more rational decisions when compared with small and medium businesses.

Businesses with high intuitive decision making style make their decisions based on their instincts, without thinking much about alternatives and without collecting enough information. The study showed that farmers with small businesses had higher intuitive decision making scores than the other businesses (large and medium).

The study showed no statistical difference between decision making styles of farmers in terms of business groups. It can be seen from Table 3 that large businesses had high dependent decision making style scores. While making their decision among alternative situations, farmers with dependent decision making style ask for help about their choice from family members, other farmer friends or experts (district directorate of agriculture staff, agriculture consultants, and agricultural engineers). This result is an indicator that farmers with large businesses take information while choosing the most suitable for themselves among alternatives. In addition, it was found in field studies that while deciding for which crop to grow, vegetable growing large businesses generally made a market research about things like which kinds of seeds were sold more, etc. This result shows that large businesses tend to make rational decisions by taking support from experts.

The use of decision making styles can differ according to individuals' ages, the situations they are in and the events they experience (Develioğlu 2006; Pekdoğan 2015). Thus, the decision making styles of farmers were compared in terms their age groups and the results were shown in Table 3. It was found that avoidant and spontaneous decision making styles differed in terms of farmers' age groups ($p<0.05$), while rational, intuitive and dependent decision making styles were not found to differ ($p>0.05$).

Table 3. Decision making styles of farmers in terms of their age groups

Decision making styles	Age groups				
	<30	**30-39**	**40-49**	**50-59**	**60≥**
Rational	11.6 ± 2.7	11.7 ± 2.2	11.6 ± 3.0	11.5 ± 2.6	11.0 ± 2.5
Intuitive	19.6 ± 3.9	21.9 ± 3.6	20.5 ± 4.7	21.3 ± 3.4	22.3 ± 2.7
Dependent	17.5 ± 4.0	16.2 ± 4.6	16.0 ± 4.3	15.6 ± 4.1	15.0 ± 3.4
Avoidant*	8.9 ± 4.5b	9.2 ± 4.7b	10.5 ± 4.0ab	10.0 ± 3.9ab	12.6 ± 5.4a
Spontaneous*	6.4 ± 2.5ab	6.4 ± 3.5ab	8.3 ± 4.1a	8.2 ± 3.9a	4.2 ± 2.3b

*:$p<0.05$

Avoidant decision making style scores of farmers older than 60 were found to be higher than other decision making styles. In other words, in the study, farmers older than 60 were found to

postpone and avoid making decisions about agricultural activities until the last minute. Old farmers in our study were found to be individuals who thought about quitting farming, who did not have any plan for the future and who left responsibilities about their farmers to their children.

According to analysis results, farmers between the ages of 40-49 were found to have high spontaneous decision making style scores. The farmers in this age group were found to have small and medium scaled businesses. Thus, it was found that small and medium scaled businesses made their decisions all of a sudden, without thinking. Rational decisions of farmers contribute to their developing and enlarging their businesses. When the decision making styles of farmers were analyzed in terms of their educational status, their rational decision styles were found to have statistically significant difference ($p<0.05$), while intuitive, dependent, avoidant and spontaneous decision styles were not found to have any difference ($p>0.05$)

Table 4. Decision making styles of farmers in terms of their educational status

Decision Styles	**Educational status**					
	Literate	**Primary School Graduate**	**Secondary School Graduate**	**High School Graduate**	**Associate degree**	**Undergraduate degree**
Rational*	8.5 ± 0.7b	11.4±2.5ab	10.6±3.5ab	12.2±2.3a	12.3±3.1a	13.9±1.5a
Intuitive	21.5 ± 4.9	21.4 ± 3.6	20.4 ± 3.8	21.0±4.9	19.3±6.0	19.1± 3.6
Dependent	14.5 ± 3.5	15.7 ± 4.3	17.1 ± 3.9	16.0±4.2	16.0±2.6	16.0 ±4.6
Avoidant	15.0 ± 7.1	10.2 ± 4.2	9.4 ± 3.4	10.0±4.9	10.7±7.0	9.9 ± 3.0
Spontaneous	6.5 ± 4.9	7.6 ± 4.0	9.3 ± 4.0	6.4 ± 3.3	6.3 ± 1.5	7.3 ± 2.6

*:$p<0.05$

As can be seen in Table 4, farmers' educational status has an important role in their decision styles. It was found that farmers who had an undergraduate degree had rational decision making styles. As the educational status of farmers decreased, their rational decision making scores were also found to decrease.

It was also examined whether there were significant differences in decision making styles of farmers in terms of their agricultural experience and the results were shown in Table 5. The experiences of the farmers in the study differed in terms of intuitive, dependent and avoidant decision making styles. Farmers who had longer agricultural experience were found to have high intuitive decision making scores. In addition, it was found that as farmers' experiences decreased, their dependent decision making style scores were found to increase. Farmers' avoidant decision making style scores were also found to increase as their agricultural experience increased. When the association between age and experience was considered, the differences found between age and decision making styles were also found in experience.

Table 5. Decision making styles in terms of agricultural experience

Decision making styles	**Agricultural experience**				
	1-10	**11-20**	**21-30**	**31-40**	**41≥**
Rational	12.5 ± 1.8	10.9 ± 3.1	11.3 ± 3.1	11.7 ± 2.4	11.4 ± 2.3
Intuitive*	19.2 ± 3.6b	21.3 ± 4.4ab	20.7 ± 4.3ab	21.4 ± 3.8ab	22.1 ± 2.8a
Dependent*	17.8 ± 4.3a	16.0 ± 3.4ab	16.4 ± 4.5ab	15.4 ± 3.8ab	14.5 ± 4.6b
Avoidant*	8.8 ± 3.9b	10.0 ± 4.3ab	10.3 ± 4.4ab	9.9 ± 3.9ab	12.0 ± 4.7a
Spontaneous	6.4 ± 2.9	6.8 ± 3.9	8.5 ± 4.2	8.1 ± 3.8	6.9 ± 4.0

*:$p<0.05$

Table 6 shows the analysis results of the comparison between decision making styles of farmers in terms of the size of land. According to analysis results, a significant difference was found between the size of land and rational decision style ($p<0.01$).

Table 6. Decision making styles in terms of size of land

Decision making styles	Size of land		
	1-49	**50-99**	**100≥**
Rational**	10.5 ± 2.8b	11.4 ± 2.6ab	12.3 ± 2.4a
Intuitive	20.6 ± 4.0	22.0 ± 3.0	20.6 ± 4.3
Dependent	16.0 ± 4.2	15.2 ± 3.9	16.4 ± 4.3
Avoidant	11.0 ± 4.2	9.8 ± 4.8	9.9 ± 3.9
Spontaneous	8.0 ± 4.1	7.5 ± 4.0	7.2 ± 3.6

**:$p<0.01$

Rational decision style scores of farmers who had larger than 100 ha land were found to be higher than the others. Our previous results showed that large scale businesses had high rational decision scores; thus, it can be said that farmers whose lands were large made their decisions more rationally than farmers who had smaller land.

Table 7 shows the comparison between farmers' incomes and their decision styles. When the Table is examined, a significant difference can be found between income and decision style. Farmers who had high income and large businesses were found to make rational decisions, while those with a low income were found to make intuitive decisions.

Table 7. Decision making styles farmers in terms of their income

Decision making styles	Income		
	<100000	**100001 - 200000**	**200001>**
Rational*	11.3 ± 2.5b	11.4 ± 3.0b	13.1 ± 2.1a
Intuitive*	21.1 ± 3.6a	21.7 ± 3.2a	18.9 ± 5.7b
Dependent	16.2 ± 4.2	15.8 ± 4.1	15.1 ± 4.3
Avoidant	10.1 ± 4.5	10.1 ± 4.4	10.5 ± 2.9
Spontaneous	7.5 ± 4.0	7.6 ± 3.9	7.3 ± 3.2

*:$p<0.05$

Decision making styles were examined in terms of keeping record about agricultural issues and the results were given in Table 8. The results of the study showed that farmers who did not keep records of anything were found to have higher intuitive decision scores than those who did. Rational decision scores of the farmers who kept record were found to be higher. Thus, it was found that while farmers who did not follow the activities of the business made their decisions based on their instincts, it was found that the farmers who recorded the planting, sowing dates, yields and previous year's prices and determined and planned the next year's production based on these were found to make rational decisions. The fact that farmers make rational decision by planning and thinking about alternatives helps them to expand their business. A great number of comparisons above confirm this result. Thus, Professional or not, farmers should be encouraged to keep a record of their activities and the importance of this should be explained to farmers.

Table 8. Decision styles of farmers in terms of keeping record on agricultural issues

Keeping record	Decision styles				
	Rational*	**Intuitive***	**Dependent**	**Avoidant**	**Spontaneous**
No	10.6 ± 2.6	21.9 ± 3.4	15.5 ± 4.1	9.8 ± 4.6	7.2 ± 3.9
Yes	12.5 ± 2.3	20.0 ± 4.2	16.4 ± 4.3	10.5 ± 3.8	7.9 ± 3.7

*:$p<0.05$

In this study, it was examined whether there was association between the kinds of crops farmers grew and their decision making styles and the results were given in Table 9. When the results were examined, a significant difference was found between the decision styles of farmers in terms of the crops they grew. Avoidant style scores of farmers who grew between 1 to 3 crops were found to be higher than the farmers who grew more crops. Thus, it can be said that the farmers who have less kinds of crops make their decisions by avoiding. Farmers with avoidant decision style were found to be farmers who did not have the courage to grow a crops they did not know how to grow although they thought the crops were good in terms of yield and price, those who postponed their decision while choosing among alternatives, in other words, they were found to be farmers who could not take risks.

Table 9. Decision styles of farmers in terms of the variety of crops they grew

Decision styles		**Number of crops**		
	1-3	**4-6**	**7-9**	**10-12**
Rational	11.9 ± 3.2	11.5 ± 2.2	11.2 ± 3.2	12.5 ± 2.5
Intuitive	20.6 ± 4.1	21.3 ± 3.4	20.7 ± 4.6	20.6 ± 5.0
Dependent	16.1 ± 4.4	15.7 ± 4.0	16.1 ± 4.6	16.6 ± 3.9
Avoidant*	11.8 ± 4.7a	10.4 ± 4.4ab	9.6 ± 3.9ab	8.4 ± 3.1b
Spontaneous*	9.8 ± 4.5a	7.5 ± 3.7ab	6.9 ± 3.5b	6.8 ± 3.9b

*:$p<0.05$

The results of the analysis showed that farmers who grew less crops made their decisions spontaneously. The farmer who avoids deciding for the next year's crop until the last minute probably won't change his idea about the crop, in other words, will decide to grow the crop that he has experiences with.

Farmers' decision styles in terms of being the member of a farming organization are shown in Table 10. A significant difference can be found between farmers' state of being the member of an organization and avoidant decision making style ($p<0.05$). The results of the study showed that farmers who were not members of any farming organization had higher avoidant style scores than farmers who were.

Table 10. Decision making styles in terms of being the member of a farming organization

Being member of an organization	**Decision styles**				
	Rational	**Intuitive**	**Dependent**	**Avoidant***	**Spontaneous**
No	11.4 ± 2.9	20.7 ± 4.6	16.0 ± 4.7	11.5 ± 4.4a	7.6 ± 4.7
Yes	11.6 ± 2.6	21.1 ± 3.7	15.9 ± 4.0	9.8 ± 4.1b	7.5 ± 3.6

*:$p<0.05$

Conclusion

This study examined how farmers decide while making a choice. Since a questionnaire was used, it was not possible to determine the one-to-one decision styles of farmers. Sub-dimensions of the decision styles in the inventory were found and interpretations were made based on the total score averages. Intuitive decision making style scores of farmers in the sample group were found to be high and thus, it was generalized that the farmers in our study made their decisions intuitively. Later, comparisons were made between the decision makings styles of farmers and the variables determined in the first and second part of results by using one way anova and t-test. According to the analysis results;

Farmers with rational decision making style:

- ✓ Had high educational status
- ✓ Had larger land
- ✓ Kept records about agricultural issues

- ✓ Had too much income from the business activities
- ✓ Had large scaled businesses

Farmers with intuitive decision making style:

- ✓ Had low educational status
- ✓ Had less experience
- ✓ Had low income
- ✓ Were small scaled business

Farmers with spontaneous decision making style:

- ✓ Grew less various crops
- ✓ Were between 40-49 years of age
- ✓ Were small and medium scaled business

Farmers with avoidant decision making style:

- ✓ Were older
- ✓ Did not have too much agricultural experience
- ✓ Had less number of crops
- ✓ Were not a member of any farming organization.

Farmers with dependent decision making style:

- ✓ Had little experience on agricultural issues.

It is not easy to make a decision about an issue. How we will behave when faced with making a decision is associated with the satisfaction that we get or cannot get as a result of the decision. As can be seen from the results, social and economic conditions of farmers can differ in terms of the different decision making behavior they show. Thus, it is very important to find out the decision making behaviors of farmers who are managers of the agriculture sector, which is an important sector in feeding the population. It is obvious that farmers who make rational decisions are in better conditions than farmers who show other decision making behaviors. At the same time, as in all fields, it can be seen that for farmers who see farming as an occupation and who aim to develop and expand their farm, success comes in time.

Although no statistical difference was found, when total score averages are examined, it can be seen that farmers with large scale businesses, who are young and educated, in other words, farmers who make rational decisions, who have high internal values and farm-focused targets also give dependent decisions at the time of choice. This result leads to the conclusion that farmers have sources of information, are in continuous communication with these sources and thus can make suitable decisions about their businesses. From another perspective, biological variables such as age and educational status are also considered as important in decision making behaviors. Young and educated farmers love their jobs and so attach importance to their decisions about the activities of the business and they gain ground. Old farmers with low educational status see their business activities as a work that has been continuing for years and they make their decisions according to their behaviors and thus they present different perspectives. This way, they earn less and remain as small scaled businesses. Based on the fact that there are more small scaled farmers in Turkey, farmers in this study have small scaled businesses and generally choose according to their habits and prices, and do not care much about their decisions. It is thought that in farms, there should be young and educated farmers with experience in dedication. Farmers therefore need not only formal education, but also informal education. Thus, the extension and advisory services that may be needed by the farmers in rural areas should be increased.

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