# Farmers' Attitude toward the Soil Conservation Practices in the Kushk-Abad Catchment Basins in the Province of Khorasan Razavi, Iran

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## Abstract

**Keywords**:
Attitude, People participation, Soil Conservation Practices ( SCP), Economical participation

The purpose of this study is to assess farmers' attitude toward the soil conservation practices in the Kushk-Abad Basin (KAB) in the province of Khorasan Razavi, Iran. The statistical population of this study consisted of all the heads of households of Kardeh villages (N=420). According to Kerjicie & Morgan Table, a sample of 200 person was selected using a method of simple random sampling. Data were collected from face-to-face interviews with respondents based on a structured questionnaire in 2014. A panel of experts established the validity of the questionnaire. A pilot study was conducted to establish reliability of the questionnaire. Cronbach's alpha coefficient was used for the main scale of questionnaire, which scored more than 0.71, confirming its appropriate reliability. Collected data were analyzed using the $SPSS_{18}$ software. The data were analyzed using descriptive and inferential statistics such as extent of mean, standard deviation, coefficient of variation, correlation analysis. In fact, this research was designed to assess relationship between attitude toward Soil Conservation Practics (SCP) and the level of participation in SCP in Iran. Data for this research collected through personal interviews from three villages in Kushk-Abad sub basin in Iran. Findings in the study indicated that a majority of the farmers have positive attitude toward adaption of SCP. The results revealed that the level of the participation of SCP is moderate and there is a significant correlation between attitude toward SCP and participation in SCP. However based on the findings, the level of economical participation of people are the more than social and environmental participation.

## 1. Introduction

Natural resource degradation especially soil erosion is one of the most important problems all over the world especially in Iran. Although, many projects in Iran have been conducted over several decades including watershed and range management projects. But, after more than 50 years, it seems that these projects could not reach to their objectives, because of increasing amount of the degradation and erosion processes (Ahmadi et al., 2004; Mohseni et al., 2008). In other hand people participation can be important in successes of watershed management. Therefore, it is necessary to assess these projects to recognize the reason of their failure.

The main purpose of this research was to assess people participation in watershed management. User's partnership in revisory and reviver of pasture and watershed management is a necessary matter caused an important part of project success.Today, people participation role in revision, revival and natural resources management is touchable, a new event of county watershed and Range management organization (Hematzadeh et al., 2006). One of the major communicative subjects in different implication and developmental activities is global participation, because the basis for development in a region depends not only on public pleasure but also on their participation and the objective of conducting any contractures and developmental project, are people and exploitants. (Raisian,2007; Sadeghi et al., 2009). The term people participation has gained a lot of popularity during the last few years, particularly in reference to sustainable natural resources and rural expansion projects. At the past time, emphasis was on people participation. In the past decade the promotion of people participation in development has been increased and the focus has extention to include other stakeholders as well (Karl, 2000).

In recent years, soil erosion, as one of the most important issue of the world environment, agriculture and food production, has been intensified due to the population growth and the change of human activities, so that annually round 75 billion tons of fertile agricultural soil and billions of the other soil layers is eroded (Ghodoosi et al., 2005; Mohseni, 2000; Baryan, 2000; Bayramin et al., 2003; Lafen and Roose, 1998).This phenomenon ruins the agricultural ecosystems through lowering soil fertility (Anbarani,1998). Each year approximately 22 million hectare of the arable lands is lost and only the worlds' 1.5 billion hectare is cultivated (Najafi, 2005; Mahdian, 2005).

Iran is ranked first in the region and second in the world regarding the volume of soil erosion. With an assumption of 2 to 2.5 billion tons annual country's soil lost, 20% of natural soil erosion and 8% of soil erosion in the world occurs in Iran (Mahdian, 2005; Najafi, 2005; Zare, 2008).

One of the main challenges in many catchments of the country is soil erosion and sedimentation. Soil erosion not only destroys the soil but also clogs up the channels and the reservoir of dams through sedimentations(Gvancheng, 2004). Kushk-Abad watershed area experiences also the same scenario and although no study has been done on its soil erosion status but there are proofs that this region is increasingly under severe erosion. Since this region of Khorasan province has high agricultural potential, therefore, attention to its soil erosion issues seems inevitable (Ahmadi et al., 2004).

Forms and intensity of soil erosion are considered through several factors such as climate, topography, geology, land exploitation, type of vegetation and surface runoff status (Mahdian, 2005; Faham, 2008). Mahdian (2005) divided the reasons of land destruction into two natural and non-natural factors of which human factor (non-natural) has demolished the natural ground cover through land exploitations for food, clothes and provision of other needs resulting in exposure of more soil to the erosion process (Sadeghi et al., 2009). Totally, anthropogenic disruptions in the nature system accelerate the soil erosion process (Kayongo, 1979). Therefore knowing different dimensions of human being would end up with success on the way of natural resources conservation planning.

Mohseni quoted from Kuletz that attitude is a kind of complex and regular ideological systems that prepares people for special behavioral reactions (Mohseni, 2008). Karimi(2006) revealed through their studies that there is a meaningful relationship between farmers' attitudes towards soil conservation practices. Moreover, most farmers showed a positive attitude to soil conservation adoption.

Sain and Barreto (1996) stated that most farmers have a positive attitude towards soil conservation as well as high awareness on the soil erosion issues; however, they refuse to accept soil conservation technologies because of being complex and costly with direct and short-term profit. Harrisson et al. (1999) concluded that adoption of the soil conservation technologies can be limited by benefits and personal resources, time constraints, labor and economic barriers.

Some experts believe that high implementation costs, the need for long-term investment, lack of direct and observable final result, lack of conservation ethics and sustainable culture among farmers and their poor attitude toward conservation and stability are the main causes of low adoption level of conservation technologies. Karami (1995) believe that soil erosion is a socio-technical issue; consequently, being successful at planning soil conservation, there is a need to assess the socio-economic dimensions of adoption of soil conservation technologies.

Soil as an important resource has a great role in meeting humans' needs and demands. Soil is regarded as a non-renewable resource because of its slow formation (Nikgohar, 1999). In today's changing world, increasing population along with the excessive pressure on natural resources including ground and soil have caused severe erosion of more than one third of the world's soil. As most arable lands are devoted to the cultivation, paying attention to the principles of sustainable agriculture in development of the management techniques is essential (Ahmadi et al., 2004).

As mentioned earlier, Iran has 2 to 2.5 billion tons the annual soil loss and being accused of 20% of natural soil erosion and 8% of global soil washouts (Karimi, 2006). This rate, considering Iran's share of 1.1 percentage of the world's land area, is highly significant. In addition, 15% of the arable lands of the country are affected with salinization, sodium and marching processes caused by over irrigation. Situation is so alarming that more than half of the Iran area (i.e. 88 million hectares) is announced critical in the country's draft law of the watershed and soil conservation regarding soil erosion rate in hectare (Sadeghi et al., 2009).

In a study by Kayongo (1979) in Kenya with the active people and groups in soil conservation, it was found that the first priority in soil erosion control is through soil terraces, obtaining favorable attitude of 44 percent of the participants. They mentioned the next priorities as proper use of tools and machinery (37%), people integration (14%), methods like leaders' training, pasture seed production and etc (5%), respectively. They also showed that positive attitude of the participants towards effects of terracing on soil erosion control have caused them to have more tendencies in its application on some part of their farms.

Nurick (1982) investigated the impacts of adopting soil conservation practices on wheat yield in Lesotho and indicated that farmers adopted long term (including terracing practices, silt traps, water ways and sand bags) and short term practices (including crop rotation, inter planting, fallowing, vegetation cover and contour ploughing) intervals with the most common measure adopted by the farmers as crop rotation. Other popular soil conservation measures were fallowing construction of waterways, vegetable cover, and contour farming, respectively. The least common method among the respondents were sandbag construction and inter-planting. However all respondents have adopted at least one of the soil conservation measures. In addition, Patel et al (2003) studies on adoption of the wheat production technologies demonstrated that most wheat cultivators had adopted the wheat production technology at medium level. Psychosocial characteristics had a significant relationship with adoption behavior.

Having said all these, the current study would like to examine the effective factors involving in soil conservation practice adoption by farmers at Kardeh and Kushk-Abad watershed areas as the farmers' attitude towards erosion is crucially an effective factor in its prevention. More specifically, the following objectives were drawn for more empirical investigation in current study:

1. Studying individual and socio-economical characteristics of farmers of Kushk-Abad Basin (KAB).

2. Investigating forms and amount of soil conservation practices application by farmers of KAB.

3. Analyzing the relationship between selected variables and the application rate of soil conservation by farmers of KAB.

4. Identifying Factors affecting the utilization rate of soil conservation by farmers of KAB.

## 2. Materials and methods

The population of this study included the heads of households living in the area of Kardeh participated in SCP plan. The total population which had participated in the program is 430 people that is comprised three villages (including Kushk-Abad, Goosh and Bahreh). Data for this research were collected from 200 respondents, through personal interview based on questioner in 3 rural village from Jun to August 2014. Data were collected from face-to-face interviews with respondents based on a structured questionnaire. A panel of experts established the validity of the questionnaire. A pilot study was conducted to establish reliability of the questionnaire. Cronbach's alpha coefficient was used for the main scale of questionnaire, which scored more than 0.71, confirming its approprite reliability (Gerrard, 2000). Collected data were analyzed using the $SPSS_{18}$ software. To determine the questionnaire's reliability, 30 farmers were required to fill up the questionnaire in a pilot study. The Cronbach alpha for attitude toward Soil Conservation Practices and participation in Soil Conservation Practices are in order 0.71 and 0.92 was obtained which considered, they proved high level of reliability for the questionnaire (Gregory, 2000).

Ten sets of instruments were conducted to collect data in this research. Respondents rated their agreement with items in a five part Likert scale ranging from strongly disagree (1) to strongly agree (5). This raring for questions which were designed to be positive and the value of negative questions was contrary to them. So, negative questions were recorded and their values changed to positive questions. Theses questions were combined by using factor analysis and finally their standard scores were derived. Then, by using the following formula, scores of attitude of prior SCP were distributed between 0 to 100 (Amidi, 2009; Mendenhall et al., 1999).

$$Attitude = \frac{(Zscore - Minimum) * 100}{Maximum - Minimum}$$

To retain or remove items, the coefficient of internal consistency (Cronbach's alpha) and the differentiation index (Mann- Whitney test) were used. The items were set in a set of regular expressions with a certain order and equal weights and the respondents expressed the extent of their application via a five part Likert scale (from never to every year in the range of 1 to 5) then the score of the soil conservation extent by farmers was estimated through summation of the responses given to the items.

The second instrument, which has 20 questions, is dedicated to data collection about measure of respondent's participation in the watershed management plan. To measure these questions, 5 point Likert scales are considered based on participant's previous experience, from very less 1 to very much 5 (Raiisian, 2007). Also, to measure the rate of communication channels and information sources use, 30 communication channels and sources including written (i.e. magazines, brochures and etc.), individuals (i.e.agants), media sources (i.e. radio, television and etc.), as well as institutional ones such as agriculture, public and etc., pertaining to soil conservation and erosion prevention were offered to the respondents in an orderly set with equal weights to express the rate of their usage of the sources in a five –item Likert scale (from large to nothing ranging by 0 to 5).

This variable has three dimensions which include:1. Social participation (8items) 2. Economical participation (6items) 3. Environmental participation (6 items) based on the model proposed by Dolisca et al. (2006). These questions have combined by using factor analysis and finally their standard scores were derived. Then, by using the following formula, scores of participation in SCP and its subscales were distributed between 0 to 100 (Amidi, 2009; Mendenhall et al., 1999).

$$Participation = \frac{(Zscore - Minimum) * 100}{Maximum - Minimum}$$

Independent variables included age, education level, the level of income from agriculture, specificity of cosmopolitan, usage extent of information resources and channels, which was assessed by questionnaire. Several statistical methods according to need and appropriateness such as descriptive statistics, factor analysis, Independent sample t-test, Analysis of Variance (ANOVA) and Pearson correlation were used to analysis of collected data (Hair et al., 1998; Gilles, 1995). Data analyze was done via descriptive statistics such as mean, frequency, percentages, inferential statistics like correlation and regression analysis.

Factor analysis was applied to measure the level of validity of participation in SCP as the main variable and identify latent dimensions underlying the variables which assessed the level of participation.

## 3. Results and discussion
### 3.1. Demographic Characteristics:
Recognition of socio demographic specifications of the farmers was the first objective of this study. This item is useful in understanding of the nature of the respondents that might influence their intention to participate in SCP. These characteristics included age, gender, marital status, education, occupation, land ownership, income, local group membership, and source of motivation to join SCP. Socio demographic characteristics of the respondents is useful to understand the nature of respondents which may have an influence on participation in SCP. These characteristics are discussed in the following sub-sections.

#### 3.1.1. Age and Marital Status:
Seventeen percent of the respondents were young adults of between 18 to 25 years of age. The minimum age considered as a respondent was 18 years. As shown in Table 1, a large proportion of the respondents were above 35 years old although they appear to be well-distributed in terms of the 10-year interval categories used in this study with those above 65 year being the least at 10.5 %.

In view of the need for family members to be involved with agriculture as the main economic activity, 79% of the respondents were married while the remaining unmarried individuals were younger people.

Table 1. Age and marital status

| Variables | Frequency | Percentage |
|---|---|---|
| Age(Year) | | |
| 18-25 | 34 | 17.0 |
| 25-35 | 35 | 17.5 |
| 35-45 | 37 | 18.5 |
| 45-55 | 40 | 20.0 |
| 55-65 | 33 | 16.5 |
| >65 | 21 | 10.5 |
| Marital Status | | |
| Married | 158 | 79 |
| Unmarried | 42 | 21 |
| Gender | | |
| Male | 164 | 82 |
| Female | 36 | 18 |
| Household Size | | |
| 1-4 Members | 34 | 17 |
| 4-6 Members | 118 | 59 |
| More than 6 Members | 48 | 24 |

#### 3.1.2. Gender:
From the data obtained, 82 % of the respondents were male and only 18 % were female.

Hence, the major work force of the study area is predominantly men. Moreover, men are usually the head of family households in the KAB (Table 1)

As described in this article, 200 respondents were used in the study after they were selected following the normal course of statistic protocols. The following sections describe the characteristics of the respondents used to evaluate their involvement in watershed management in KAB.

**3.1.3. Household Size:** A large proportion (59%) of the household in the study area have between four to six family members which is typical of rural Iran. More than six members are found in 25% of the households (Table 1). The main reason lies with the human resource which is much needed to carry out the various agricultural activities in the farms.

**3.1.4. Education**: In terms of education obtained, those who had no formal education constituted 32% (Table 2). About 47% had primary and secondary education while only six individuals or 3% of the 200 respondents had tertiary education. The main reason for the lack of education among the respondents is the limited number of schools in the rural area. Secondary schools in particular, are found largely in major towns.

Table 2. Distribution of education level

| Variables | Frequency | Percentage |
|---|---|---|
| No formal education | 64 | 32 |
| Primary School | 45 | 22.5 |
| Secondary School | 49 | 24.5 |
| High School | 36 | 18 |
| Diploma and Bachelor | 6 | 3 |

**3.1.5. Main Occupation**: From the occupation profile of the respondents, farmers and those involved in livestock comprised about 62.5% followed by government employees (24.5%) and businessmen (13%).While farmers grow chiefly wheat, corn, barley, rice and zaferan, those involved with livestock reared sheep, cattle and chicken. Government employees were chiefly lower clerics and security personnels. Businessmen varied between those involved in shopkeeping to marketing and transporting agricultural goods (Table 3).

Table 3. Main occupation

| Variables | Frequency | Percentage |
|---|---|---|
| Farmer | 96 | 48.0 |
| Livestock | 29 | 14.5 |
| Government employs | 49 | 24.5 |
| Businessman | 26 | 13.0 |
| Total | 200 | 100 |

**3.2. Descriptive Level of Independent and Dependent Variables:**

Descriptive level of the variables were determined for independent and dependent variables. In this study, the independent variables are satisfaction, attitude, knowledge and expectation. While dependent variables are social, economic and environmental. In this article we discussed about Farmers' attitude toward the Soil Conservation Practices and participation.

**3.2.1. Level of Attitude of** SCP**:**

Eighteen questions were used to measure the level of attitude toward SCP. A five point Likert scale, ranged from 1- strongly disagree to 5- strongly agree was applied and the results summarized in Table 4.

On the beneficiary of SCP, the findings indicated that 40.5% of the respondents agreed while 29% strongly agreed. suggesting that the respondents' attitude towards this item was relatively high. The second item tested the respondents' opinion on the needs of SCP and 33% agreed while 17.5% strongly agreed. The third question was about the comprehensiveness of the program. The responses to this item were 25%, 33% and 12% who agreed, neutral and strongly agreed respectively. The fourth question was related to termination of the program. The responses for this item were very surprising 61.5% of the respondents strongly disagreed with this item. They believed that this program must be continued in the KAB.

The fifth question was about villagers openness to program. In this case, responses were, 26.5%, 35.5% and 21.5% as agree, neutral and strongly agree respectively. Sixth question was on training courses. The responses for this item were 46% disagree. The result showed that people are not satisfied with the training program offered by SCP. The seventh question was related to the effectiveness of the program in helping to increase training course of program. In this case, 26% agree and 14.5% strongly agree with this item. Question eight was subsidize materials to helping agricultural. The responses for this item were 41.5% neutral and just 9.5% agree because the respondents felt they did not gain much subsidized materials in this program.

For question nine, the respondents were answered was not satisfied with the technical services. 29.5% of them were neutral and 23.5% agree. Question ten was about increasing their income after designing the program, and 42% of the responses were neutral which show that people income were not increased after the projects. Question eleven was related to involvement of people in the formulation of program. The responses were 21%, 30% and 8% as agree, neutral and strongly agree respectively. Question twelve show us the majority (38.5%) of the respondents have said that the program increased their water resources. In question thirteen, the respondents were asked about the facilities their answers, 27.5% and 25.5% agree and strongly agree. In question fourteen, the respondents were asked about agriculture

activity is important in KAB. They answered 52% and 31% strongly agree and agree, because the main occupation in this area in agriculture.

Question fifteen was about extension service, and based on the responses, 21%, 31.5% and 11% as agree, neutral and strongly agrees. Question sixteen was about credit facilities, and the responses were also more neutral because people did not gain much credit in this program. Question seventeen was about increasing agricultural land. The response (42.5%) show that people agreed with this item. Question eighteen was about the local leader development by the program. The majority (42%) of the respondent have said the program promoted the development of local lender is moderate. The 18 variables were combined together for factor analysis to obtain their Z-Scores which were then standardized in a range of 0-100, minimum value for overall attitude of SCP being zero and the maximum value, 100 (Table 4). The mean score was 54.1(standard deviation, 21.5). From the results, the level of respondents' attitude towards SCP was moderate.The majority of the respondents (53.8%) have moderate attitude while only 4% have very good attitude toward SCP. While 15.1% of the respondents have poor attitude and 6.5% of them have very poor attitude toward WMP.

### 3.2.2. Level of Participation of SCP:
The level of participation of WMP is composed of three sub-scores: 1) Social participation of SCP, 2)Economic participation, 3) Environmental participation of SCP components. The items and percentage of the subscales are represented in Table 5. An instrument consisting 18 questions was developed to measure the benefits of SCP. Eight questions were defined in the theme "Social participation of SCP" and four questions were defined in the theme "Economic participation of SCP" and six questions were "Environmental participation". This instrument utilized a five point scale: 1- None 2- Low 3- Moderate 4- Above Average 5-High. These 18 variables were combined together for factor analysis to obtain their Z-scores. which were standardized in a range 0-100. Hence, the minimum value for level of participation of SCP is zero and the maximum value is set at 100. The overall mean score is 51.8 and standard deviation is 20.8 (Table 6). The respondents believed that the level of participation of SCP is moderate. The majority of the respondents (48%) have moderate participation while only 2% of them have a very high participation of WMP. The 23.5% of the respondents have low participation and 7.5% of them have very low participation toward SCP.

Table 4.  Level of attitude towards SCP

| Level of attitude toward WMP | Frequency | Percent | Mean | SD |
|---|---|---|---|---|
| Very Poor (<20) | 13 | 6.5 | | |
| Poor (20-40) | 30 | 15.1 | | |
| Moderate (40-60) | 107 | 53.8 | | |
| Good (60-80) | 41 | 20.6 | | |
| Very Good (>80) | 8 | 4.0 | | |
| Total | 200 | 100 | 54.1 | 21.5 |

Table 5.  Summary of criteria of participation in  SCP

| No | Participation | Criteria | None | Low | Moderate | Above average | High |
|---|---|---|---|---|---|---|---|
| 1 | Social Participation | Attendance in the meetings | 38.5 | 8.0 | 16.5 | 27.5 | 9.5 |
| | | Influence the decision | 19.5 | 28.5 | 34.0 | 12.5 | 5.5 |
| | | Discussion | 13.0 | 27.5 | 28.5 | 23.0 | 8.0 |
| | | Make suggestion | 24.0 | 34.0 | 25.0 | 14.5 | 2.5 |
| | | Give new idea | 33.0 | 34.0 | 24.5 | 7.0 | 1.5 |
| | | Discuss with member | 47.5 | 27.0 | 18.0 | 3.0 | 4.5 |
| 2 | Economic Participation | Discuss with people | 39.5 | 30.0 | 19.0 | 7.0 | 4.5 |
| | | Discuss with family | 41.0 | 30.5 | 18.0 | 9.0 | 1.5 |
| | | Benefit from project Road | 4.5 | 5.5 | 14.0 | 47.0 | 29.0 |
| | | Benefit from the technical assistance | 5.5 | 8.5 | 25.5 | 44.0 | 16.5 |
| | | Benefit from personnel advices | 2.0 | 8.0 | 22.0 | 42.5 | 25.5 |
| | | Benefit from project Credit | 3.0 | 14.5 | 30.0 | 37.5 | 15.0 |
| 3 | Environmental Participation | Contribute to the tree planting | 30.5 | 19.5 | 20.0 | 18.0 | 12.0 |
| | | Contribute to the structured activities | 27.0 | 21.0 | 16.0 | 25.5 | 10.5 |
| | | Contribute to the Seeding activities | 23.0 | 23.5 | 24.5 | 20.5 | 8.5 |
| | | Contribute in Dike activities | 44.5 | 18.0 | 12.5 | 15.0 | 10.0 |
| | | Contribute to the Rangeland preservation | 18.5 | 19.5 | 19.0 | 30.0 | 13.0 |
| | | Contribute to the Seedling | 15.5 | 19.5 | 24.0 | 28.5 | 12.5 |

Table 6.  Level of participation in SCP

| Level | Frequency | Percent | Mean |
|---|---|---|---|
| Very Low (<20) | 15 | 7.5 | |
| Low (20-40) | 47 | 23.5 | |
| Moderate (40-70) | 96 | 48.0 | |
| High (70-90) | 38 | 19.0 | |
| Very High (>90) | 4 | 2.0 | |
| Total | 200 | 100 | 51.8 |

Table 7.  ANOVA for participation in SCP by education status

| S.O.V | SS | Df | MS | F | Sig |
|---|---|---|---|---|---|
| Between Groups | 8341.623 | 4 | 2085.406 | | |
| Within Groups | 77816.254 | 195 | 399.058 | | |
| Total | 86157.877 | 199 | | 5.226 | .001 |

Table 8.  LSD test between participation with education status

| (I)Education status | (J) Education status | Mean Difference (I-J) | Std. Error | Sig. |
|---|---|---|---|---|
| No formal education | Primary school | 6.36815 | 3.88629 | .103 |
| | Secondary school | 14.41258* | 3.79201 | .000 |
| | High school | 5.74853 | 4.16176 | .169 |
| | Diploma and bachelor | 27.18991* | 8.52906 | .002 |
| Primary school | No formal education | -6.36815 | 3.88629 | .103 |
| | Secondary school | 8.04444 | 4.12456 | .053 |
| | High school | -.61961 | 4.46687 | .890 |
| | Diploma and bachelor | 20.82176* | 8.68203 | .017 |
| Secondary school | No formal education | -14.41258* | 3.79201 | .000 |
| | Primary school | -8.04444 | 4.12456 | .053 |
| | High school | -8.66405* | 4.38509 | .050 |
| | Diploma and bachelor | 12.77732 | 8.64023 | .141 |
| High school | No formal education | -5.74853 | 4.16176 | .169 |
| | Primary school | .61961 | 4.46687 | .890 |
| | Secondary school | 8.66405* | 4.38509 | .050 |
| | Diploma and bachelor | 21.44138* | 8.80878 | .016 |
| Diploma and bachelor | No formal education | -27.18991* | 8.52906 | .002 |
| | Primary school | -20.82176* | 8.68203 | .017 |
| | Secondary school | -12.77732 | 8.64023 | .141 |
| | High school | -21.44138* | 8.80878 | .016 |
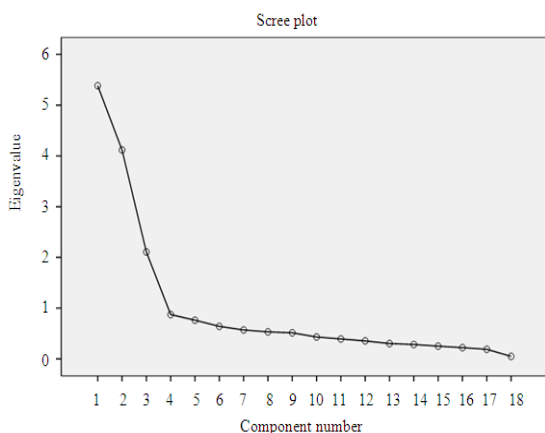


Figure 1. Scree plot of factors of participation variables

**3.3. Comparison of Participation with Socio-demographic Variables:**

Analysis of variance (ANOVA) was used to test whether there is a significant difference between the levels of participation in SCP based on the respondents' individual characteristics or not. This was conducted to determine the difference in the level of participation and socio-demographic variables.

This procedure enabled the researcher to answer the forth objective of study. To achieve this purpose, categorical individual variables were chosen and tested to determine differences in the level of participation in SCP based on these variables.

The first comparison was examining the differences in participation between educational groups (primary school, secondary school, high school and diploma and bachelor). To compare mean differences between educational groups, one way analysis of variance (ANOVA) was used. Prior to this analysis, the assumption of homogenetity of variance was tested.

The ANOVA analysis was run using the SPSS statistical package. Results indicated a significant difference in people participation between different groups of education status (F=5.226 and p<0.001) (Table 7).

### 3.3.1. Comparison of Participation based on Educational Groups

To test the difference between different education levels within each group, the Least Square Difference (LSD) test was utilized. The result indicated that there was a slight difference between levels of participation in SCP based on education status (Table 8). There were statistical differences between secondary school and no formal education groups (Sig=0.000), diploma and bachelor and no formal education groups (sig=0.002), primary school and diploma and bachelor (Sig=0.017) and high school and diploma and bachelor (Sig=0.016) in participation in SCP. According to Table 10, the maximum and minimum level of participation was related to the people with no formal education and academic education, respectively. So it can be claimed that there is a negative relationship between education status and participation level. It means people with lower level of education are more interested to participate in SCP.

### 3.4. Relationship between Socio Demographic and Participation

The correlation coefficint was used to test whether there is a significant relation between the levels of participation in SCP with some respondents' individual characteristics. Table 9 reveals correlation details between socio demographic characteristics and participation in SCP. As can be seen, there is a significant correlation between age and participation in SCP (r=0.365, p=0.000). In other words, relationship between age and participation in SCP is positive and low. It means that older people slightly are more interested to participate in SCP. There is also a significant correlation between household size and participation in SCP (r=0.318, p=0.000). It shows that people with extended family, slightly are more interested to participate in SCP.

Table 9, shows a significant correlation between number of sons above 15 years old and participation in SCP (r=.276, p=0.000). It confirms that people, who have more sons above 15 years old, slightly are more interested to participate in SCP. There is also a significant correlation between size of irrigated land and participation in SCP (r=.347, p=0.000). Therefore, it can be concluded that people who have more irrigated land, slightly are more interested to participate in SCP. There is a significant correlation between size of rain fed land and participation in SCP (r=0.262, p=0.000), as well. There is no statistical correlation between main income and participation in SCP and between alternative income and participation in SCP.

### 3.5.Relationship between Attitude toward SCP and Participation:

Based on the correlation test, there is a significant correlation between attitude toward SCP and participation in SCP (r=0.534, p=0.000) (Table 9). The results suggest that people who have good attitude toward WMP are more interested to participate in SCP.

### 3.6. Regression Model for Explaning Level of Participation

In this study, regression analysis was used to establish the relationship between the independent variables and dependent variable of several predictors. In linear regression analysis, participation in SCP was the dependent variable and knowledge of SCP, expectation of SCP, attitude toward SCP and satisfaction of previos projects are the independent variables. The independent variables were similarly used in the regression model. Table 10 presents the results of multiple regression analysis for the prediction of level of participation in SCP and the contribution of each of the predictor variables included in the model.

Table 9 .Correlation between socio-demographic and participation

| Variable | r | P-Value |
|---|---|---|
| Age | 0.365 | 0.000 |
| Household size | 0.318 | 0.000 |
| Number of son above 15 years old | 0.267 | 0.000 |
| Main income | 0.075 | 0.291 |
| Alternative income | 0.045 | 0.524 |
| Size of irrigated land | 0.347 | 0.000 |
| Size of rain fed land | 0.262 | 0.000 |
| Attitude toward WMP | 0.534 | 0.000 |

Table 10. Relative effects of knowledge, expectation, attitude and satisfaction of SCP

|  | B | SE B | Beta | T | Sig |
|---|---|---|---|---|---|
| Constant | -1.888 | .238 |  | -7.939 | .000 |
| Knowledge | .004 | .002 | .128 | 2.185 | .030 |
| Expectation | .009 | .003 | .217 | 3.662 | .000 |
| Attitude | .023 | .003 | .504 | 8.500 | .000 |
| Satisfaction | .000 | .002 | .011 | .180 | .857 |

As summarized Table 10, three independent variables have a significant effect on the prediction of participation in SCP. Attitude toward SCP has the greatest effect (Beta = 0.50, t =8.50, p=0.000), and is followed by the expectation of SCP which has a significant effect (Beta= 0.22, t=3.66, p=0.000). Knowledge of SCP has also significant effect on participation in SCP (Beta= 0.13, t=2.19, p=0.030). Satisfaction of prior projects has no significant effect on dependent variable (Beta= 0.011, t=0.18, p=0.85). Attitude toward SCP, expectation of SCP and Knowledge of SCP have positive effects on participation in SCP.

## 4. Conclusion and recommendations

Based on the results, most farmers applied soil conservation practices in a medium level however all farmers accepted multiple methods of soil conservation which is consistent with the findings of patel et al. (2003) and Dolisca et al. (2006). The reason is that their farm lands are small and application of a high level soil conservation practice will cost a lot of money. Therefore, as the villagers are poor they are not able to afford multiple practices of soil conservation. In conclusion, economic considerations for these farmers should be at the priority for the government. On social evaluation, results from the interviews showed that the villagers in the study area strongly believed that watershed management operations had a positive effect in reducing flood occurrence ($x2 = 68.34$, sig=0.00) and river sediment transport ($x2 = 86.84$, sig=0.00). Furthermore, the farmers believed that engineering structures and bio-engineering measures resulted in increasing agricultural yield ($x2 = 24.57$, sig=0.004) and orchard produce ($x2 = 76.58$, sig=0.00) in the area. These measures also increased the number of livestock ($x2 = 75.33$, sig=0.00) due to the improvement of rangeland resulting from bio-engineering (seedling, seeding, brush planting and enclosure) watershed operations.

In this study the relationship of five factors with level of participation were examined to determine the role of each factor in the level of participation. These factors were; 1)socio demographic characteristics of the respondents, 2)respondents knowledge of SCP,3) respondents attitude toward SCP,4) respondents expectations of

SCP, and 5) respondents satisfaction of prior programs as independent variables and level of participation as dependent variable.

The correlation analysis showed significant and positive relationships between some socio demographic factors such as age, household size and number of son above 15 yrs with level of participation. This study also found significant relationships between knowledge, attitude, expectation and satisfaction of previos programs with level of participation. The findings of study showed that the majority of the respondents were male and married. The data showed that the educational level is low. The findings of study also showed that the majority of the respondent's main occupation was farming and the average monthly income was low. The majority of the respondents were members in at least one community group and about half of them joined SCP due to self interest.

Evaluation of the respondent's attitude towards SCP was another subject that the respondents were tested for it in this study. The results showed that the level of respondent's attitude toward SCP was poor. On expectation of SCP the results indicated that the level of respondent's expectation was moderate. The respondent's satisfaction of previous programs, last independent variable, was moderate.

The respondent's level of participation in SCP was the main dependent variable that the respondents tested for in this study. The participation variables after employing factor analysis were categorized into three subscales: social, economic and environmental participation. In this study, the result indicated that the respondent's overall participation was low to moderate.

Comparison of participation among respondents showed that there were significant differences between their levels of participation in SCP based on the socio demographic variables. Significant difference was found between, main and alternative occupational groups, local group membership and source of motivation to join in SCP and level of participation; however, there was no significant difference between educational groups and their level of participation in SCP. Examining the relationship between respondent's, knowledge of SCP, attitude toward SCP, expectation of SCP, satisfaction of prior SCP and the level of participation

in SCP as the one of the specific objective of the study, the results showed that the levels of all independent and dependent variables including are distributed moderately. Consequently, it can be concluded that the level of success and participation of SCP design among the people is moderate.

The study showed a significant relationship between the farmers' access to IT infrastructures and adoption of soil conservation rates. This is because the access to these infrastructures raises the application rate of communication technologies and affects the use of information sources and communication channels by farmers for getting information on new soil conservation technologies, increasingly.

The findings of the study demonstrate that all farmers of the region had low level of communication channels and information sources application. It is suggested that as the gained score by all farmers regarding application rate of communication channels and information sources is low and on the other hand the relationship between application rate of communication channels and information sources is significant, the accessibility of communication channels and information sources' should be improved. Doing such, a tendency can be developed toward adoption of soil conservation practices and plan properly to boost the interrelations between farmers, promoters and developers and other information and communication sources so that to increment the knowledge, data and awareness on the new technologies of soil conservation based on the farmers' needs.

## 5. ACKNOWLEDGEMENT

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# نگرش کشاورزان به عملیات‌حفاظت خاک در حوزه آبریز کوشک آباد استان خراسان رضوی، ایران

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**چکیده**

هدف این پژوهش، بررسی نگرش کشاورزان نسبت به بکارگیری عملیات حفاظت خاک در حوزه آبخیز کوشک آباد واقع در استان خراسان رضوی بود. جامعه آماری این تحقیق را تمامی سرپرستان خانوار روستاهای حوزه آبخیز به تعداد ۴۲۰ نفر تشکیل می‌دادند. بر اساس جدول کرجسی و مورگان، تعداد ۲۰۰ نفر از آنان از طریق روش نمونه‌گیری تصادفی ساده برای انجام تحقیق انتخاب شدند. برای گردآوری داده‌ها از طریق مصاحبه چهره‌به‌چهره با پاسخگویان بر اساس پرسشنامه در سال ۲۰۱۴ استفاده گردیده است. روایی پرسشنامه با نظر پانلی از کارشناسان و پژوهشگران توسعه روستایی مورد تأیید قرار گرفت. برای تعیین پایایی ابزار تحقیق، پیش آزمون انجام گرفت که مقدار آلفای کرونباخ محاسبه شده برای هر یک از مقیاس‌های اصلی پرسشنامه در حد مناسب (بیش از ۰/۷۱) بود. به منظور تجزیه و تحلیل اطلاعات از نرم افزار $SPSS_{18}$ استفاده شد. داده‌ها با استفاده از آمار توصیفی و استنباطی مورد تجزیه و تحلیل همبستگی قرار گرفت. اطلاعات لازم برای این تحقیق از طریق مصاحبه‌های انجام شده از سه روستای حوزه آبخیز کوشک آباد، در ایران جمع آوری شده است. یافته‌های این تحقیق نشان داده است که اکثریت کشاورزان نگرش مثبتی نسبت به عملیات حفاظت خاک دارند. نتایج نشان داد که سطح مشارکت اهالی نسبت به SCP در حد متوسط بوده و رابطه مثبت ومعنی‌داری بین دیدگاه کشاورزان و مشارکت نسبت به استفاده از عملیات حفاظت خاک وجود دارد. با این حال بر اساس یافته‌های پژوهشی، مشخص گردیده است که سطح مشارکت اقتصادی مردم بیش از مشارکت اجتماعی و زیست محیطی می‌باشد.