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The Effect of Individual, Social and Economic Factors on Villagers Participation in Watershed Projects in MianKouh Watershed, Yazd

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Abstract

This paper is accounted as a descriptive field survey with respect to the control degree, data collection and finding generalization. Research population consists of all the residents of MianKouh in Yazd province. The data collection tool is a questionnaire which involves seven sections such as occupational and personal specifications of respondents, cultural and social elements, participation levels, economic factors, social relationships, information and promotion sources and individual participation rate in Watershed Projects (considered as the dependent variable). Questionnaire validity has been confirmed by a group of agricultural extension and Cronbach alpha coefficient. Results have shown that participation rate of respondents is low and moderate in all the evaluated aspects involving cultural and social elements, participation levels, economic factors, social relationships and information sources. Undoubtedly, if such circumstances continue, sustainable management of watershed projects is more likely to encounter some difficulties and impose high costs on the government in order to implement and expand the plans and projects while in recent years, there have been such conditions in the desired region. Considering the results of regression analysis, it is found that the highest variable value can be related to the variable of attendance in watershed courses and promotion workshops, which was entered in the analysis in the first step. Also, the operation has been stopped after the input of second variable that is meeting with farmers who implemented the watershed projects in the village. In total, these two variables could explain almost 35% variations of individual participation in watershed projects considered as a dependent variable.

Keywords: economic, villager participation, rural development, social, watershed projects,

Introduction

Natural resources are accounted as one of integral contributors in human life (Krywkow and Hare, 2008). Such factors as poverty of rural areas and low levels of knowledge and awareness concerning natural resources protection and finally, their unsuitable exploitation have led to the intense resources destruction, poverty exacerbation and underdevelopment of rural areas (Mojtahed and Hassanzadeh, 2001). Nowadays, development experts believe that only villagers can specify the appropriate local development and its stages and select the suitable procedures in order to achieve the desired development; however, lack of significant participation in relation to natural resources management and supervision causes the failure of rural groups in making decisions, the inability of individuals in reflecting the needs and the separation of groups from society (Adhikari, 2012). Given these problems, global tendencies and natural resources' development views have been altered because of environmental crises, climate variations and frequent droughts and several approaches concerning suitable and sustainable exploitation of natural resources have been discussed worldwide (Omani & Chizari, 2007; Reed, 2008; Richards, 2000; Wilson & Droste et al., 2004). Watershed management has been chosen as a comprehensive and appropriate method with regard to sustainable management of natural and human resources (Baghaee, 2006). It should be stated that many

watershed projects have to be implemented through participation processes considering their long-term nature (Azami & Sadi, 2008).

Ebadi & Tabatabaee (2006) have defined the watershed management as the planning to prevent from the watershed disorders and stabilize the situation by implementing different plans; in this regard, Plaster (2002) scientifically defined watershed management concerning economic and social issues in order to use the lands in a correct and planned manner for avoiding the erosion, regulating floodwater and sedimentation and improving the vegetation in the studied area. Watershed management needs a comprehensive viewpoint and planning as a natural approach and fundamental technique. Though, there are many objections to this approach. Some believe that field-based planning is preferred as compared to the watershed-based one (Daglas, 2001). Results indicate that watershed projects along with public participation have been more successful than redesigning ones (Sharifi et al., 2010; Azami & Sadi, 2008; Adhikari, 2012). In this respect, Duram & Brown (1990) reported that the success of watershed projects is of no particular structure based on a supportive system of government but it depends on public participation. Furthermore, Hernandez (2000) stated that in order to manage the watersheds effectively, a suitable combination of public participation, financial credits, human force, data and organizational resources is required. Regarding participation definition, lots of definitions have been presented (Patricia & Perkins, 2010).

Reed (2008) defined the participation as a process by which the individuals, groups and organizations play active roles in making and utilizing decisions which affect them directly. In another definition, participation has been defined as a process of involvement in order to affect the consequences, achievements and plans (CIS, 2003). Public participation in the integrated and coordinated management of watersheds is more likely to be guaranteed by creating an effective and stable structure. It should be pointed out that the establishment of such structures and organizations has to be asked by the people; in other words, the organizations must be created on the basis of public thoughts and viewpoints.

Baghaee (1999) conducted a descriptive-correlative study of individual and social factors affecting the villagers' participation in Zar watershed, Hojan spring. Results demonstrated that there are meaningful relationships between such variables as age, social class, public participation, participation tendency, modernization, trust and collective activities' tendency and villagers' participation in watershed projects.

Salehi (2007) investigated the effective factors in the residents' participation with the help of a sample of 100 people using a simple random sampling method in five villages in Tonekabon city. Correlation analysis results showed a positive, meaningful relationship between participation level and some variables like literacy, ownership of lands, communication channel usage and relative advantages. Also, a negative meaningful relationship has been observed between participation level and some variables, including age, agricultural experience and number of livestock.

Soleimanpour (2007) concluded that the development of a comprehensive management plan should be based on the principles, holistic approaches, flexible processes and collective decision making and planning processes. Therefore, for the success of sustainable development and public participation programs, some people should be selected in order to train, collect local information regularly, change the structure and views of administrative systems, approve and implement national development plans and conduct studies and researches.

Mazlom Khorasani et al. (2008) observed a meaningful relationship between such variables as age, gender, education, occupation, income, urbanization, political power, political alienation, satisfaction from authorities' measures, citizenship rights and media and public participation. Finally, they concluded that between the independent variables, income has the most effects of

participation changes. Alipour and Malekian (2012) studied the roles of public participation in watershed projects in Ivar watershed and reported that person's participation in watershed and natural resource plans is necessary and inevitable.

Prokopy (2005) presented that public participation levels lead to the success or failure of watershed projects. Bagdi (2005) concluded that in general, public participation levels in watershed projects are low. In addition, such variables as age, social class and number of family members can be regarded as the most important elements influencing the improvement of public participation levels.

Brahmi (2011) studied some political-economic factors affecting the public participation in natural resources projects and reported the lack of awareness, illiteracy, poor economic conditions, lack of trust in public programs, subsidy, rural policies, loss of meetings and loss of transparency. Adhikari (2012) mentioned the roles of rewards in increasing the public participation in natural resources projects.

Given the literature and related resources, this paper intends to investigate the individual, social and economic elements which affect the villagers' participation in watershed projects in MianKouh watershed in order to improve and stabilize their participation levels in a variety of watershed project management stages through recognizing the individual participation levels.

This study aims to a) investigate the effective individual, cultural, economic and social elements in the residents' participation in watershed projects, b) review the viewpoints and awareness level of villagers on watershed projects, c) prioritize the fundamental obstacles of villagers' participation and d) conduct the regression analysis of effective factors in participating in watershed projects in MianKouh watershed.

Study area

MianKouh watershed is located in Ardakan-Yazd plain at 54° 05′ to 54° 25′ eastern longitude and 31° 25′ to 31° 43′ northern latitude at the hillside of Shirkooh Mountain in the western south of Yazd province. It is accounted as a part of the central plateau in Iran (fig. 1). It covers 635 km2 that is 8% of Yazd province from the heights of Shirkooh Mountain to the exit of Mehriz watercourse. Generally, the existing villages including Deh Bala, Tazrjan, Manshad, Bandak and Sadat are attached to Taft and Mehriz cities.

According to statistics, 48 and 25% of individuals live in Taft and Mehriz cities, respectively. Also, the gender ratio is 97%; in other words, there are 100 women for 97 men. Variation trend of population demonstrated that the reduction of the population is resulted from the emigration of villagers to the urban areas due to the difference of rural and urban incomes, limitations of agriculture, low income of agricultural activities, inconstancy of agriculture and livestock earnings, lack of industries and crafts in the region. Basic occupations are agriculture and ranching. Agriculture activities, especially orchards with the irrigated cultivation have been decreased because of climatic conditions and low precipitation rate in Taft and Mehriz cities. Various crops and fruits involve wheat, barley, alfalfa, almonds, nuts and berries. Considering topographic conditions, agricultural procedures and ways are traditional and water resources are consisted of springs and aqueducts. Traditionally, irrigation way is the waterlogging of furrows.

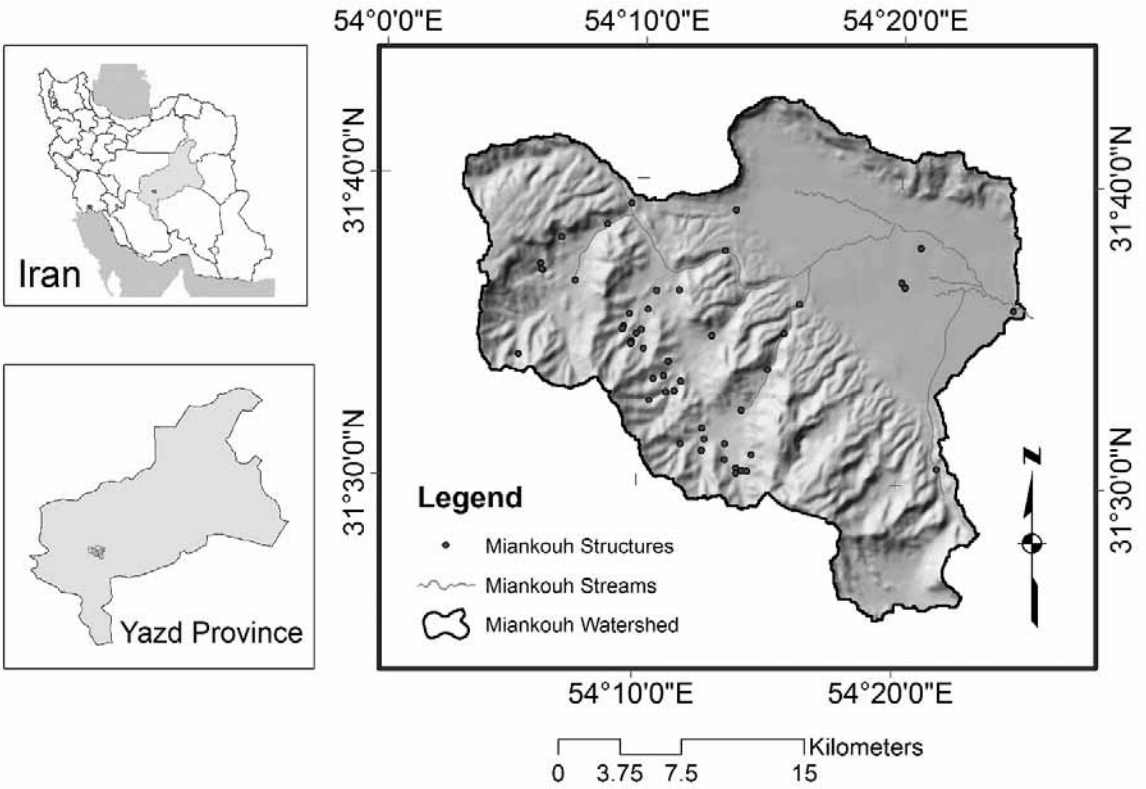

Figure 1: Study area in Yazd, Iran

Methodology

This study is regarded as a descriptive field survey with respect to the control degree, data collection and finding generalization. Research population is consisted of all the residents of MianKouh in Yazd province. Using Cochran Formula, a statistical sample was taken from the given society. Regarding the extent of population, a randomized class sampling method (120 samples) has been utilized in order to collect the required information (Fig. 2).

Data collection tool is a questionnaire which involves seven sections such as occupational and personal specifications of respondents (13 items), cultural and social elements (12 items on the basis of Likert spectrum including 1- very high and 5- very low), participation levels (8 items on the basis of Likert spectrum including 1- very high and 5- very low), economic factors (7 items on the basis of Likert spectrum including 1- very high and 5- very low), social relationships (9 yes/no questions), information and promotion sources (11 yes/no questions) and individual participation rate in watershed projects as dependent variables.

In order to evaluate the dependent variables based on the studies conducted in this respect by Baghaee (2006), Noori Kamari et al. (2009), Liu et al. (2010) and Bagdi (2005), different participation levels have been classified into three classes like villagers' participation rate in making decisions and designing, implementing and evaluating the watershed projects and then, assessed by the means of the Likert spectrum (1- very high and 5- very low). Finally, the sum of the three classes were given and analyzed as a combined dependent variable.

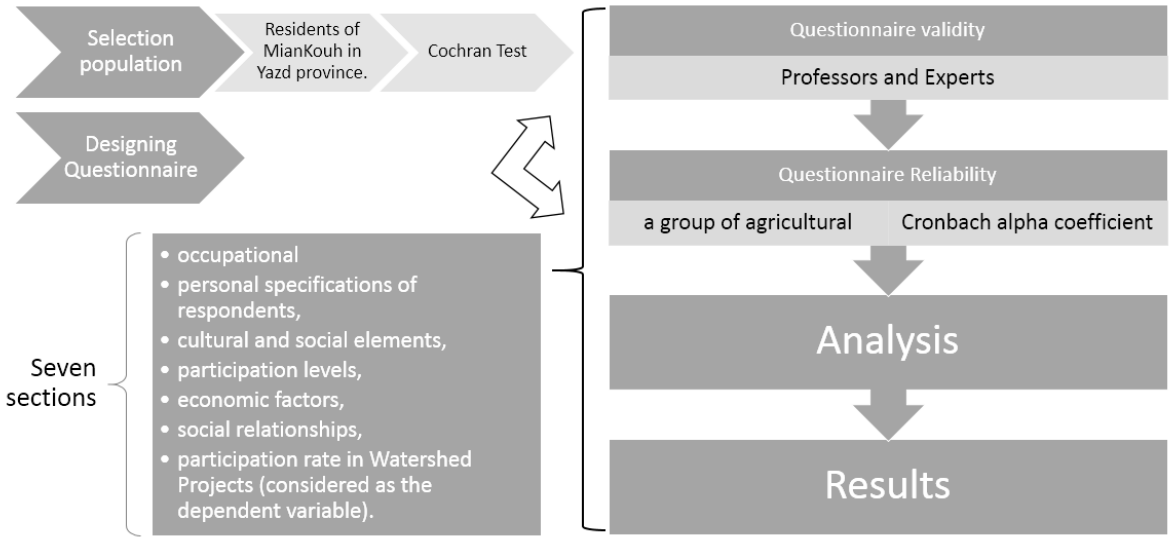

Figure 2: Methodology flow chart

Face validity of the questionnaire has been confirmed by a panel of agriculture, watershed and natural resources sciences' experts. Pilot test was performed in a similar region with a similar statistical population using 32 questionnaires. Questionnaire items were confirmed by the collected data, Cronbach's alpha coefficient and SPSS software (table 1). In this paper, after collecting and classifying data by the use of SPSS software version 22, descriptive statistics (mean, standard deviation, frequency and percent) and inferential ones (Pearson correlation coefficient and multivariate regression analysis), data were analyzed.

Table 1: Calculated Cronbach's alpha coefficients

Basic section	Number of items	Cronbach's alpha coefficient
Likert five choice spectrum	26	0.757
Two choice spectrum	20	0.819
Total	46	0.72

Results

Individual characteristics

Findings show that the mean age of respondents is 45.6 years old and the highest frequency can be attributed to the range of 31-40 years old (23.6%). Almost 79% are able to read and write. 90 and 92% are men and married, respectively. Most of them are farmers and ranchers (53.6%) and self-employed (26.4%). 86% of the population have a family of four.

Crop and livestock characteristics of population

Average of agricultural activities for the population has been given as 20 years. The highest frequency as 46.3% is related to the class of more than 20 years. Owned land area is averagely estimated at 1.5 ha and the highest frequency given as 55.5% is related to the class of less than 1 ha indicating the existence of petty landowners. Average of livestock activities has been computed as 4.9 years. The highest and lowest frequencies as 71.8 and 6.4% are attributed to the classes of less than 5 years and more than 16 years, respectively. Furthermore, the mean number of livestock is given as 8 livestock and the highest frequency as 75.5% is related to the class of less than 10 livestock. Crop and livestock characteristics are presented in table 2.

Table 2: Statistical parameters of crop and livestock characteristics

	Agricultural experience	Ranching experience	Land area	Number of livestock
Mean	20.5	4.9	1.5	8.1
Standard deviation	16.4	5.3	1.8	9.3
Lowest	0.0	0.0	0.0	0.0
Highest	60.0	20.0	10.0	38.0

Cultural elements

Almost 90% of residents are familiar with the watershed activities and 21% believe that the implemented plans achieved the predetermined goals and met the residents' needs. In total, 37% considered these plans as successful ones, but 63% rejected it due to the inappropriate construction, location of plans based on the regional conditions (slope, runoff, etc.). Also, 60% mentioned that they were informed only when the plans were to be implemented. Table 3 presents the priority of effective cultural elements concerning the villagers' participation in watershed projects. As it has been found, the respondents proposed that watershed projects should be based on the regional conditions, predetermined goals and residents' needs.

Social elements

About 50% of the residents stated that their suggestions and comments were not applied in the plans, whereas 17% mentioned that their comments were fully applied. Almost 61% discussed that after implementing the watershed projects, number of consumers have not changed in the region and quarrels for water resources have not decreased (confirmed by 73% of residents). Almost 51% referred to the suitability of watershed projects with respect to the drought years in the region (table 3).

Table 3: Prioritization of effective cultural elements in villagers' participation

Priority	Mean	Standard deviation	Description
1	3.63	1.305	Is the selection of construction location suitable based on regional conditions (slope, runoff, etc.)?
2	3.64	1.339	How much are the plans effective in meeting people needs and achieving the goals?
3	2.85	1.024	How do you assess total performance of watershed projects?
4	2.86	1.424	Have you ever heard the word "watershed management"?
5	2.24	1.125	To what extent are you familiar with watershed management activities?
6	2.25	1.169	We are informed of plans only when they are implemented.

1: very high, 2: high, 3: moderate, 4: low, 5: very low

Table 4 indicates the priority of effective social elements in the villagers' participation in watershed projects. Respondents believe that watershed projects must be based upon the competition and quarrels for water resources and the increase of consumers as well as their comments.

Table 4: Prioritization of effective social elements in villagers' participation

Priority	Mean	Standard deviation	Description
1	4.05	0.764	How much have the quarrels for water resources decreased by implementing watershed projects?
2	3.64	1.339	How many have the consumers increased after implementing the plans?
3	2.85	1.024	How much have your suggestions been applied for watershed projects?
4	2.86	1.424	Have watershed projects affected your social relationships with authorities?
5	2.24	1.125	To what extent have watershed projects met your needs?

1: very high, 2: high, 3: moderate, 4: low, 5: very low

Participation levels

According to the results, 56% of respondents stated that they are willing to participate in the watershed projects. Almost 48% explained that they were asked some questions on the implementation of projects, but their comments were not applied. All the residents mentioned that the authorities did not guarantee to review and apply their viewpoints in order to design and implement the plans. Also, 16% of respondents have contributed to implementing the plans and proposed several approaches. 17% of them suggested the plans and implemented the plans with the help of watershed experts. Only 7% were paid as the workers to take part in the plans while 43% were not paid as a working force but they participated in the projects. After prioritizing the effective elements of villagers' participation levels, it has been observed that the respondents must be paid as the workers and should suggest their own approaches with the help of experts and authorities in order to participate in the implementation of watershed projects (table 5).

Table 5: Prioritization of villagers' participation levels

Priority	Mean	Standard deviation	Description
1	3.85	1.124	We were paid as workers to participate in the plans.
2	3.59	1.236	We contributed to authorities and suggested techniques to implement plans.
3	3.57	1.281	We suggested and implemented the plans with the help of authorities.
4	3.25	1.184	How much are you willing to participate in watershed projects?
5	3	1.496	We participated in the plans as workers but we were not paid.
6	2.65	1.309	We were asked on plans but our comments were not applied.
7	2.63	1.38	We participated in the plans by creating groups and goals.
8	1.46	0.501	We were asked on plans but our comments were not guaranteed to be applied

1: very high, 2: high, 3: moderate, 4: low, 5: very low

Economic factors

Almost all the respondents stated that watershed projects had no considerable impacts on the regional economy as well as water quality. In addition, after implementing the watershed projects in the studied area, cultivation area has not increased. Also, selling the livestock was not altered during drought years before and after implementing the plans in MianKouh watershed; however, 40% of

residents referred to the increases in water levels of springs and wells. Finally, almost 46% mentioned a partial improvement in the region after the implementation of watershed projects. After prioritizing the effective elements of economic factors, it has been seen that watershed projects did not play critical roles in improving the livestock sale and increasing the springs and wells' water levels in the region (table 6).

Table 6: Prioritization of effective economic elements in villagers' participation

Priority	Mean	Standard deviation	Description
1	4.45	0.569	Were land areas increased after implementing plans?
2	4.28	0.706	Was water quality improved after implementing plans?
3	3.87	0.996	Were incomes increased after implementing plans?
4	3.86	1	How much did watershed projects affect the regional economy?
5	2.95	1.008	Were water levels of wells and springs increased after implementing plans?
6	2.92	0.825	Was livestock sale increased after implementing plans during drought years?
7	2.72	1.307	Was your life improved after implementing plans?

1: very high, 2: high, 3: moderate, 4: low, 5: very low

Social relationship elements

Almost 22, 50, 31, 6.4 and 41.8% of the population are the members of Islamic Councils, Rural Cooperative, Islamic Campaign, the board of Rural Cooperative and PTA, respectively. 52% are interested in contributing to the charities and only 30% are in relation to the existing libraries. 97 and 37% attend the rituals and Islamic Council meetings, respectively. After prioritizing social relationships concerning villagers' participation in watershed projects, it has been found that most the respondents attend the rituals actively and are interested in charities so that planning and holding these rituals appropriately can attract the residents to participate in watershed projects (table 7).

Table 7: Prioritization of effective social relationships in villagers' participation

Priority	Mean	Standard deviation	Description
1	1.05	0.209	I attend rituals actively.
2	1.48	0.502	I helped charities.
3	1.5	0.502	I am a member of rural cooperative.
4	1.58	0.496	I am a member of PTA.
5	1.63	0.486	I participate in the activities of Islamic Council.
6	1.69	0.464	I am a member of Islamic campaign.
7	1.7	0.46	I take part in the activities of library.
8	1.78	0.415	I am a member of Islamic Council.
9	1.94	0.245	I am a member of cooperative board.

1: very high, 2: high, 3: moderate, 4: low, 5: very low

Information and promotion sources

Based upon the results, only 25.5 and 31.8% of respondents follow the educational and promotional programs related to watershed projects by television and radio, respectively. Almost 59 and 39% of villagers are familiar with these plans through talking with friends and acquaintances and the experts of services centers and Agriculture Department, respectively. 37% of individuals have visited the regional watershed projects and almost 50% have met and talked with the farmers

who have implemented watershed projects in MianKouh. 38% of villagers participated in the mentioned courses and workshops and enhanced their knowledge of the watershed, though watching educational movies and CDs and reading journals. 36% of them were provided with information and training by the private sector. After prioritizing the information and promotion sources for the villagers' participation in watershed projects, it has been found that the residents of MianKouh have become familiar with these plans and projects through talking and meeting friends and farmers who implemented the plans in the desired area and the experts of services centers and Agriculture Department. Using the media is the last priority in the region showing that the residents are not interested in watching TV and listening to radio or they are not informed of the related programs' schedule whereas they are more willing to talk face to face (table 8).

Table 8: Prioritization of promotion and information sources in villagers' participation

Priority	Mean	Standard deviation	Description
1	1.41	0.494	Talking with friends and relatives
2	1.53	0.502	Meeting farmers who implemented watershed projects
3	1.56	0.516	Talking with the experts of services centers and Agriculture Department
4	1.61	0.49	Watching TV and CDs
5	1.62	0.488	Talking and meeting the experts of watershed management
5	1.62	0.488	Attending the mentioned courses and workshops
5	1.62	0.488	Reading watershed journals
6	1.63	0.486	Visiting watershed projects of other areas
7	1.64	0.483	Presenting information and training by the private sector
8	1.68	0.468	Listening to radio
9	1.75	0.438	Watching educational programs on TV

1: very high, 2: high, 3: moderate, 4: low, 5: very low

Effects of independent variables on dependent variables

Here, in order to study the effects of independent variables on a dependent variable "villagers' participation rate in watershed projects", multivariate regression analysis (stepwise) has been performed to assess the effects of independent variables on dependent ones, predict the dependent variable's variations and determine the share of independent variables for explaining the variance of dependent ones. Results of regression analysis have been presented in table 9. According to the results, the highest variance value is attributed to the variable of first variable entered: "attendance in watershed courses and promotion workshops". Generally, after the entrance of two variables in the analysis, the operation was stopped and in total, these two variables (second one: a meeting with farmers who implemented the watershed projects) could explain almost 35% variations of the dependent variable that is public participation rate in watershed projects (table 9).

Table 9: Final features of regression equation

Model	Significance of model	Parameters	Coefficient value
		Constant coefficient	4.33
1	99%	Attending the watershed management courses and workshops	-0.67
		Constant coefficient	5.18
2	99%	Attending the watershed management courses and workshops	-0.70
		Talking with farmers who implemented watershed projects	-0.51

1: very high, 2: high, 3: moderate, 4: low, 5: very low

Regarding the results, a linear equation by the means of stepwise regression analysis has been achieved as follows in formula (1):

$$Y= 5.18-0.70*X1-0.51*X2 \quad (1)$$

Where is: Y=Participatory Rate; X1= first variable entered attendance in watershed courses and promotion workshops; X2= second one: a meeting with farmers who implemented the watershed projects

Discussion and conclusion

In general, results demonstrated that the participation rate of respondents is low and moderate in all the assessed aspects like cultural and social elements, participation levels, economic factors, social relationships and information sources. Undoubtedly, such circumstances result in some problems for sustainable management of watershed projects in the studied area and high costs of conserving and developing the plans and projects as if similar conditions exist in the region. The results are confirmed by those reported by Liu et al. (2010), Bagdi (2005) and Noori Kamari et al. (2009). Based on research results, three items involving "we were paid as a worker to participate in the projects", "we contributed to the authorities to implement the watershed projects and suggested some approaches" and "we suggested and implemented these projects with the help of advisors and experts" are considered as the most important participation obstacles for the plans in MianKouh watershed. In this respect, it is necessary to gather and apply the tools and suggestions in order to provide working force while supervising the implementation procedures and controlling the costs and credits in order to prevent from spending the financial resources for the unrelated aspects. The results are confirmed by the studies conducted by Ghodosi (2007), Mazlom Khorasani et al. (2012), Alipour & Malekian (2012), Vivien (2011), Abdolmaleky (2011) and Brahmi (2011).

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