

Factors Affecting Farmers' Engagement to Co-Management of Watershed Conservation Programs in Hamedan Province, Iran

¹Mohammad Abdolmaleky, ²Mohammad Chizari, ³Jamal Farajollah Hoseini and ²Mehdi Homaei

¹Agricultural Extension and Education, Science & Research Branch, Islamic Azad University, Tehran, Iran

²College of Agriculture, Tarbiat Modares University, Tehran, Iran

³Faculty Member of Science & Research Branch, Islamic Azad University, Tehran, Iran

Abstract: This study was carried out to analyze effective factors on farmers and users' participation residing in watershed zones in watershed management activities from Hamedan Province. Fourteen thousand four hundred and ninety seven (14497) users of natural resources were randomly selected out of which 285 respondents were determined as sample size that were selected through classified sampling. This study is a kind of descriptive-correlation research which has been accomplished through questionnaire. For determining the validity of questionnaire, the face and content validity was used. Reliability for the instrument was estimated at 0.81. The results obtained from calculating correlations between variables showed positive and statistically significant relations between the extent of participation in watershed programs and the extent of users' participation in extension and educational courses, the extent of utilizing mass media, income, educational level, the extent of relationship with extension workers, the extent of trust to government staffs, membership in public and local institutions variables. Also, there was negative and statistically significant relation between users' participation and the extent of dependence to the government. Enter multiple regression analysis indicated that the extent of users' participation in extension and educational courses, utilizing mass media, trust to governmental staffs, income variables explained a statistically significant portion of variance ($R^2 = 46/6$) for the extent of users' participation in watershed management programs. Regarding the standardized coefficients, "the extent of users' participation in extension and educational courses" was considered as the most effective factor in predicting variance of the dependent variable.

Key words: Farmers' Participation • Conservation • Watershed Management Programs

INTRODUCTION

Incorporation of stakeholder participation in watershed management in order to achieve better watersheds has become a major topic of discussion among scientists, planners, government and non-government organizations. This is probably motivated by the poor results recorded in many watershed projects. Many watershed developments around the world emphasize coercion and subsidies and have often performed poorly or resulted in failure because they fail to take into account the needs, constraints and practices of local people. In most South Asian countries, watershed protection has been the overt objective of a great deal of government policy dealing with management of upland areas. In many cases, watershed projects ask the

poor people who use upper watersheds to provide an environmental service for their wealthier neighbors in lower watersheds. To make watershed development more successful and sustainable, participation of the stakeholders, for example local people, is therefore an important issue. Thus community participation is a precondition of integrated watershed management [1].

The change in development thinking, over the past years represent a fundamental shift away from the technology-dominated paradigm developed in the 1960s toward a more people centered approach of sustainable growth. Along this a new development paradigm has emerged that fits well with this current form of populism [2]. This approach calls for local people's direct involvement in development activities while at the same time promoting both economic and social development

[3]. Rural areas in developing countries closely linked with agriculture, consequently to bring progress in the rural area requires changes and improvements in the agricultural sector. On the other side agriculture is strictly linked with land and water resources, without land and water, agriculture are not possible [4].

Natural resources are directly relevant to sustainable agricultural development. Despite the high value of natural resources in environmental and socio-economic development they are being gradually destroyed in developing countries [5]. The Islamic Republic of Iran is located in south west of Asia on the arid belt of the world and covers a land area of 165 million ha. Iran is a country composed of several climatic divisions, more than 90% of which comprises arid to semi-arid conditions. Thus, as a result of the climatic conditions and dominant natural characteristics, a major part of the country is very sensitive and susceptible to degradation. During the last years land and water resources in Iran have suffered severe degradation. According to statistics average soil erosion in Iran is about (30 tons ha.) in a year and sediment rate is about (10 tons ha.) per year, consequently the area that have potential for flash floods in Iran is about 90 million ha. These land degradations caused to waste annually 22 billion m² (square meter) water per year, due to continuing the land degradation, this amount increases annually 6 billion m² (square meter) in year. Moreover, degradation of land and water resources has caused to decrease forest area from 18 million ha in 1970-12.4 million ha in 2005 [6]. Over the last 30 years there has been also a major decline in the quality and productivity of the country's rangeland resources. Statistics shows that good-fair rangelands area in Iran has declined from 14 million ha in 1974 to 9.3 million ha in 2005 and also fair-poor rangelands area has declined from 60-37.3 million ha [6]. Also, in Hamedan province there is 855 thousands tons of soil erosion per year, (yearly 8000 to 10000 kg in a hectare) and 900 million m³ waste of water [7].

All of these realities have placed Iran's land and water resources in a challenging position. On the other side due to some socio economic limitations, government of Iran in managing watershed area has a limited budget, according to statistics, the annual budget for this purpose is about 987140 Million Rials, amount of budget government manage 900,000 ha while the potential degraded areas which need managing and protection is about 90 million ha. In other word with this amount of budget, government can manage and protect only 10% of this area and 90% of area still remains for protection

and conservation, which is impossible to government due to economic limitations [4].

During the past years, government of Iran has developed community base natural resources management in several rural areas. These initiatives attempt to combine both conservation and development initiatives into an integrated approach, aimed at promoting rural development-based on natural resources as well as encouraging natural resources conversation awareness. In this regard a people centered program for sustainable management of land and water resources was initiated as a joint program of UNDP and the government of the Islamic Republic of Iran in 1997 in Hable-Rud basin. Iran's participation is quite a challenge for this country with a long tradition of top-down management [4].

It is concluded that, there is a need to investigate the essential elements and mechanisms of village community participation in the development and management of natural resources [8].

Many studies have shown that the level of participation may differ among the people based on their socio demographic characteristics. Several studies have shown that participation may depend on individual characteristic such as age, gender, marital status, household size, income. Knowledge(educational level) is also an important factor that has effect on people's participation. People cannot be expected to exhibit positive attitudes toward watersheds if they are unaware of the benefits and cost associated with their participation. Knowledge about watershed management issues make people more positive in their views [9]. Kraft *et al.* [10] found that farmers with a negative attitude toward governmental involvement with wetland regulations were less likely to want to participate in the water quality incentives program. Shahroudi and Chizari [11], in their study in Iran found that there is significant and positive relationship between farmers' attitude and participation in irrigation networks management.

Many studies also have shown the importance of people previous experience on decision of participation in the current projects [12]. Vishnudas *et al.* [13] reported that there is significant relationship between farmers' income and level of participation in natural resource management. Also, Malekmohamadi and Sarani, [5] in their study in Iran found that there is significant and positive relationship between "the extent of farmers' participation in extension and educational activities" and "the extent of farmers' relations with extension workers" and their participation in reclamation of Hamoon lake.

Ghasemi, [14] indicated that there is significant and positive relationship between farmers' trust to government staffs, usage of mass media, membership in public and social institutions and significant and negative relationship between their dependence to the government and their participation in developmental projects in Kashan, Iran. Moreover, in relation to watershed management, Osooli *et al.* [15] indicated that from the viewpoints of farmers and experts all economic, technical, farming, socio-cultural and educational-extensive factors had significant effects on the sustainable management of water resources in Lorestan Province under drought conditions with 99% certainty.

Therefore, the primary purpose of this study was to analyze people participation in WMP and explore to factors that significantly influence people participation in watershed management programs (WMP) in Hamedan Province, Iran. The specific objectives of this study were to: Describe the demographic profile and socio demographic characteristics of Hamedan Province farmers and users; Investigate the relationships between the extent of farmers' participation in WMP and demographic variables such as age, gender, level of education, income and socio demographic characteristics; Identify effective factors that significantly influence people participation in relation to watershed management programs.

MATERIALS AND METHODS

This study was conducted in Province of Hamedan, located in the west part of Iran. Fourteen thousand four hundred and ninety seven farmers from Hamedan were selected out of which 285 were randomly selected based on their water usage characteristics. The survey was divided into two sections. The first section was designed to gather data on personal characteristics of farmers included gender, age, income, years of work experience, level of education etc. and socio demographic characteristics. The second section was designed to gather data about the extent of their participation in watershed management programs. Respondents were asked to rate their responses concerning their participation on a five point Likert-type scale: (5 = very much, 4 = much, 3 = moderate, 2 = low and 1 = very low). Face and content validity of the questionnaire were established using a panel of experts consisting of Extensionists. Questionnaire reliability was estimated by calculating Cronbach's alpha coefficient. Reliability for the instrument was estimated at 0.81. The data were collected between October, 2006 and March, 2007. After

gathering and encoding information from the questionnaires, data was obtained for analysis. Data collected were analyzed using the statistical package for the social sciences (SPSS14). Beside descriptive statistics, analytical statistics (Regression Analysis) were employed for detailed analysis. Also, the dependent variable of the research is "the extent of farmers' participation in WMP in the province of Hamedan, Iran" that was assessed through a five point Likert-type scale and independent variables are personal and socio demographic characteristics of farmers included gender, age, income.

RESULTS

Descriptive Statistics: The demographic profile and socio demographic characteristics of farmers and users of Hamedan Province, Iran showed that average age of respondents was 46 years. The minimum age of respondents was 18 and the maximum age was 87. Majority of the respondents were male (88%). Eighty-seven percent (87%) of them were married. Data showed that average household size in study area was 5 members in a family. Study also revealed that main occupation of the majority was farming (50%). Regarding respondents' education levels, 24% of them were illiterate. 34% were in elementary school; 22% were guidance and the rest were in secondary school. Only 5% of farmers had academic education. Forty-eight percent of farmers had less than 20 years of work experience. Their average work experience was 21 years. The average of their total monthly income was 2 million Rial per month. 78.7% of the respondents had less than 2.5 million Rial income monthly and 90% had less than 3.75 million Rial income monthly. Findings of study also showed that 77% of respondents were members at least in one public or local institutions. Their average of farming land holding was 3.9 ha. Nearly 80% of them had less than 5 ha farming land holding. Findings of the assessment of farmers' attitude towards sustainable natural resource management using several proper questions through a five point Likert-type scale showed that 94% of them had positive and favorable attitude in this regard. Farmers' participation was assessed and measured in relation to four levels of participation included awareness, program planning and decision-making, implementation, satisfaction and evaluation through a five point Likert-type scale: (5 = very much, 4 = much, 3 = moderate, 2 = low and 1 = very low) used for each level. Findings of study showed that, 94.6% of the respondents joined

Table 1: Results of respondents' participation in levels of participation

Levels of participation	Very low (%)F	Low (%)F	Moderate (%)F	Much (%)F	Very much (%)F	No participation (%)F	Non-response (%)F
Awareness	42(14.7)	20 (7)	36(12.6)	90(31.6)	58(20.4)	39(13.7)	42(14.7)
Program planning and decision-making	30(10.6)	39(13.7)	61(21.5)	41(14.4)	15(5.3)	98(34.4)	1(0.4)
Implementation	48(17.1)	33(11.7)	57(20.3)	26(9.3)	18(6.4)	99(35.2)	4(1.4)
Satisfaction and evaluation	11 (3.9)	13(4.7)	42(15.1)	83(29.9)	107(38.5)	22(7.9)	7(2.5)

Source: Results of the Research

Table 2: Results of correlation analysis for the independent variables and level of farmers' participation in watershed management programs

Variables	Sig.	Correlation Coefficient
The extent of users' participation in extension and educational courses	0.000	**r = 0.489
The extent of utilizing mass media	0.000	**r = 0.270
Income	0.001	**r = 0.194
Age	0.811	r = 0.014
Level of education	0.026	*r = 0.135
The extent of relationship with extension workers	0.000	**r = 0.448
The extent of trust to government staffs	0.000	**r = 0.443
Main job	0.476	X ² = 2.490
The extent of dependence on government	0.026	*r = -0.134
Membership in public and local institutions	0.000	**r = 0.325

(r) or (p) =Spearman's correlation coefficient (X²)= Chi-Square

*: Correlation is significant at the 0.05 level; **: Correlation is significant at the 0.01 level

Source: Results of the Research

Table 3: Multiple regression analysis of factors on participation

Variable	r	Standardized beta	t	Sig.
Constant	2.695		2.134	0.034
The extent of users' participation in extension and educational courses	2.111	0.356	5.719	0.000*
The extent of trust to government staffs	1.496	0.241	3.612	0.000*
The extent of utilizing mass media	0.82	0.125	2.008	0.040*
The extent of relationship with extension workers	0.422	0.075	1.15	0.251
The extent of dependence on government	0.002-	0.005-	0.087-	0.931
Level of education	0.007	0.046	0.843	0.400
Membership in public and local institutions	0.714	0.083	1.509	0.133
Income	0.776	0.161	3.015	0.003*

R²= 0.466, R= 0.682, R² ad=0.437
F= 16.247, Sig. = 0.000, P<0.05*

Source: Results of the Research

and participated at least in one or more stages of delivering watershed management program with their self interest. The results of measurement and assessment of respondents' participation in every levels of participation is shown in Table 1.

The second objective was to investigate the relationships between “the extent of farmers' participation in WMP” and demographic and socio demographic characteristics. The results obtained from calculating correlations between variables showed positive and statistically significant relations between the extent of participation in watershed programs and the extent of users' participation in extension and educational courses, the extent of utilizing mass media, income, educational level, the extent of relationship with extension workers,

the extent of trust to government staffs, membership in public and local institutions variables. Also, there was negative and statistically significant relation between users' participation and the extent of dependence on government. Results from correlation analysis is shown in Table 2.

Analytical Statistics: The third objective was to identify effective factors that significantly influence people participation in relation to watershed management programs. Data on multiple regression analysis indicated that the extent of users' participation in extension and educational courses, utilizing mass media, trust to the government staffs, income variables explained a statistically significant portion of variance

(R square = 46/6) for the extent of users' participation in watershed management programs. Regarding the standardized coefficients, "the extent of users' participation in extension and educational courses" was considered as the most effective factor in predicting variance of the dependent variable. ($\beta = 0.356$). Therefore, in comparison with the other factors, this factor is considered as the most effective factor of level of participation in watershed programs regarding Co-management of them to conserve water and soil. Results have been indicated in Table 3.

According to the findings of Table 3 regression equation is as follows:

$$Y = 2/695 + 2/111(x_1) + 1/496(x_2) + 0/82(x_3) + 0/776(x_4) \quad (1)$$

Findings of this study showed that, 8 variables, as mentioned above, have significant relationship with level of people participation in WMP. However regression analysis discovered that, four independent variables provide the best prediction for level of participation and explained about 46.6% of variation in the level of participation as dependent variable.

DISCUSSION

In this study influence of ten factors on level of participation were examined. Data showed that there is significant relationship between level of participation and eight factors; (1) The extent of users' participation in extension and educational courses, (2) The extent of trust to government staffs, (3) The extent of utilizing mass media, (4) The extent of relationship with extension workers, (5) The extent of dependence on government, (6) Educational level, (7) Membership in public and local institutions and (8) Monthly income. Enter multiple of regression analysis discovered that only four factors have significantly contribution in level of participation, these factors explained 46.6% of variation in level of participation as dependent variable. Based on the findings of this study it can be concluded that, a person who has more participation in extension and educational programs is more likely to participate in program activities, this is consistent with findings of Malekmohammadi and Sarani [5] and also person who has more trust to government staffs is more likely to participate in watershed program, this finding is in congruent with [14], which found positive relationship between the extent of trust to government staffs and level of participation. In addition people who have utilized mass media are more

likely to participate in WMP. This finding is consistent with results of [14] too. Finally, findings of study showed that a person who has high income is more likely to participate in program activities. Many studies have shown that there is significant relationship between income and level of people participation such as [4, 9, 13].

CONCLUSION

The result of this study provided a number of theoretical and practical implications on participation in WMP. People's participation is viewed as a dynamic group process in which all members of a group contribute to the attainment of common objectives, share the benefits accruing from group activities, exchange information and experience of common interest and follow the rules, regulations and other decisions made by the group. Need for people's participation is articulated in terms of efficiency and/or cost-effectiveness, equity in distribution of benefits, sustainability and empowerment of the people. Participatory watershed management in Iran can be effective strategy for sustainable management of land and water resources for developing agriculture. For the strategy to succeed, a partnership between local participants and the watershed management department is required [4]. This study investigated a survey in four watershed zones were people's participation in watershed management is favored. The results showed that average age of respondents was nearly high, so, with regard to levels of participation, it is recommended that managers try to encourage and promote people's participation in the areas of consultation and decision-making to program development instead of physical participation. Also, according to the descriptive statistics of the study, educational level of the majority of respondents was nearly low. Therefore, it is recommended that, for communicating with farmers in this area, using indigenous communication channels would be very useful to promote participation in WMP. Findings of the assessment of farmers' attitude towards sustainable watershed management showed that 94% of them had positive and favorable attitude in this regard. It is recommended that managers try to assign gradually management of watersheds to themselves and help them whenever is needed. A regression analysis showed that under which conditions people more likely to increase their participation. This study discovered that the extent of respondents' participation in extension and educational courses have a positive relationship with level of

participation in WMP. Therefore, extension services must continue to deliver such educational programs to various farmers to deliver sufficient knowledge and information on WMP to promote people participation in WMP. Because, according to the results of this study, participation in implemented and offered extension and educational programs to farmers, has been the most effective factor to increase and enhance farmers' participation in watershed management. Study also showed that respondent's trust to government staffs has a positive relationship with level of participation. This is a potential to managers for attracting people confidence and trust to government and project staffs, by using suitable strategies and approaches for example participatory extension and watershed management.

Based on the findings of the present study, it is recommended that, the government and extension services must apply mass media (such as TV and Radio) to increase rural farmers' knowledge and awareness regarding watershed management programs. According to the results of regression analysis, the extent of utilizing mass media by farmers is another effective factor in respondents' participation in WMP.

This study also highlighted the need for future research on participation in WMP by considering other factors in other populations.

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