



## Feasibility of Farmers' Participation in Optimal Irrigation Management System (Case of Guilan Province)

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### Abstract

Farmers' participation in the maintenance and operation of water facilities has a positive impact on their attitude and internal trends and incentives to have closer cooperation with Regional Water Organization. The transfer of irrigation management to farmers enhances the productivity of water facilities and ultimately, results in efficient water use in agriculture. In order to evaluate the effect of participation and transfer of irrigation management to farmers, four hypotheses have been proposed. The study was an applied research according to the goal and was a descriptive survey as data collection method. Judgmental sampling was used to take samples from the population. A researcher-made questionnaire was employed for data collection. It was conducted among 120 people in Guilan Regional Water Organization engaged in agricultural sections. The questionnaire's validity was confirmed by content validity and its total reliability was estimated by Cronbach's alpha as to be 0.86 using SPSS software. The effects of participation on farmers' commitment, cooperation, and satisfaction and the legitimacy of Regional Water Organization of Guilan province were evaluated at 0.01 level, and no evidence was found to reject the hypotheses.

**Keywords:**

*Farmers' participation, Commitment, Cooperation, Satisfaction, Legitimacy and irrigation system*

## INTRODUCTION

The great challenge for the current century is to use less water to produce more food, particularly in countries with more limited water and land resources. The effective and sustainable use of water for agriculture has become a global priority requiring urgent and immediate solutions in view of intensifying competition. The current solution adopted by many countries, especially in Iran as one of the developing countries, is to create more and more irrigation facilities. However, these irrigation schemes have not achieved to high level of success as most of them are managed by government where farmers' participation is non-existent. Farmers' participation in the maintenance and operation of water facilities and irrigation management transfer to farmers are among the topics that have attracted the interests of officials and those involved in the water industry in recent decades (Omid *et al.*, 2012; Sato *et al.*, 2007; Tanaka and Sattto, 2005). Numerous studies indicate that most of the regional water companies, especially during the construction phase and the operational phase, do not care much for the wishes and opinions of farmers who are in essence the major water consumers and do not use their full potentials and power in the management of water utilities. Unfortunately, such an approach to water industry management results in the lack of maintenance and utilization of water facilities and has provided the grounds for early depreciation, while farmers' effective involvement in the management of water utilities can play an important role in solving these problems and helping regional water companies in the provision of maintenance and operation costs and the implementation of regulations for efficient water use in agriculture. Although, numerous studies have been carried out on the effects of participation on different items, there is shortage in research on the factors influencing participation. Thus, this article was organized to evaluate the effects of farmers' participation in the optimal management of irrigation systems in Guilan Province.

Bolfikova *et al.* (2009) suggest that "participation shall be exactly defined as ... who, what, when and what kind of involvement aspects".

Participation is people's mental and emotional involvement in group situations that encourages them to achieve the group objectives and to share responsibility and assist the group. Mental and emotional involvement, motivation to assist and acceptance of the responsibility are considered as three important ideas of participation (Davis and Nyvastorm, 2013; Toosi, 2014).

In the Indian localization movement, participation is defined as social and creative process by those who determine and meet their needs and interests. This is not a passive participation in activities designed by others and not simply the exploitation of the results of the economic and social activities; rather, it is indeed pioneering in making decisions about the type of work, how to work and then doing the work" (Ackley and Marsden, 2011). Participation can include all members of a working group or just appears between two persons. When all members of a working group are involved in one issue, they will have more information and provide different ideas (Toosi, 2014). Involvement and participation in decision making and implementation leads to the satisfaction of the members of the group. Michell (2013) believes that people, who are involved in management decisions, are satisfied with the decisions and are likely to support Z theory. By participation, people not only satisfy their emotional needs but also achieve to their higher levels of needs and return to their original human nature i.e. their social life – and in addition to natural growth, they increase their labor productivity (Moshabaki, 1998).

Rosenbach and Sashkin (2014) state satisfaction as a key factor for increasing the consent and believes that it is a causal relationship between them. Lower and Hickman also showed that service provision by a participatory approach has much higher quality than in authoritarian style (Moheb Ali, 2014). Participation is a complex process with dual strategic significance; in other words, participation is a strategy to improve the socio-economic system and requires social actors to understand the conflicting values and interests and to negotiate in order to improve this system (Rahnavard, 1998).

Development and promotion of intellectual,

innovation and empowerment of individuals depend on the use of intellectual resources. In this way, participation in decisions making strengthens all levels of organization. In general, participation will entail the following results:

- Creating a "commitment"
- Increasing the quality of work
- Flourishing new ideas
- Reinforcing motivation and increasing satisfaction
- Giving the feeling of ownership to participants
- Increasing efficiency and job satisfaction, and reducing losses and the costs and conflicts
- Breaking the culture of silence
- Providing the required backgrounds to "change"
- Destroying marginalization
- Leading to better acceptance of the decisions
- Creating "responsibility" among participants for doing work (Mehdizade *et al.*, 2013).

The advocates of participation regard cooperative management as the best method with an emphasis on the results of studies. Henkel (2014) identifies the key advantages of participation for learning according to which the participants learn the functions of the organization and gain richer understanding of the dynamics and priorities of a larger system. Rosenbach and Sashkin (2014), also, believe that the implementation of participatory management is morally necessary. There are three important properties in the process of participation that make people accept the commitment: selection (the creation of opportunities for participation), to be revealed (doing job in relation to everyone, especially those who understand the importance of the subject) and irreversibility and the feeling that the limit should be overstepped (Tashmn and Ariel, 2009).

McLgan and Krystvnel (2012) believe that participatory methods have a significant impact on our achievements. Also participatory working methods, closely related to the replacement rate, increase production and improve performance. Some management writers know participation as a process in which people have the opportunity to actively participate in management processes affecting affairs (Towers, 2012). In addition, it is emphasized that participation plays an important role in the devel-

opment of the atmosphere and style of management in an organization (Cornelius, 2011). Others know participation effective in the spirit and the quality of life (Foot and Caroline, 2009). Mehdizade *et al.* (2013) found out that the participative style could improve organizational performance by two variables including attitude and feeling which included effectiveness, efficiency, productivity and innovation. Participation in high level prepares people for four key elements: power, information, knowledge and rewards. Authority is divided through a variety of mechanisms in order to receive the data for decision making. Information on the activities of the organization are given to people as so they can appropriately participate in decision-making with sufficient understanding (Taleghani *et al.*, 2014). Knowledge allows people to do their complex affairs and thus, increase decision-making responsibilities through skill training, learning from each other about related affairs and education of the group working. Finally, reward systems are modified to provide incentives to increase the skills and commitment to the organization's overall effectiveness.

Hyman and Meisen (2014) noted the different aspects of participation in decision-making. They emphasized that TQM will be establish with individuals' collaborative partnership and their commitment. The effect of participation not only on commitment but also on other aspects of management has been studied. The available evidence about the impact of participation on satisfaction, productivity and conflict show that participation techniques have potentially useful results for these areas (Cowling and Philip, 2014). Despite the positive aspects of participation in management, some authors have considered the limitations of this management style which is briefly discussed below.

Participation is like a plant that does not grow easily in the human environment (UNDP, 1993). Powerful interest groups that are motivated by personal greed are making numerous barriers against the way of people's political and economic power. These barriers include legal and juridical systems, bureaucratic constraints, values and social traditions and improper distribution of assets (Toosi, 2014). Some researchers believe

that participatory and group decision-making has some disadvantages as follows:

Working group is slower. Group spends more time to reach final decision and the waste of time means the waste of capital.

The team's efforts lead to reconcile that from the view of its effectiveness, is not always a good decision.

Group is under the influence of an individual or a small group.

Excessive dependence on the group decision may limit the management's ability to act quickly and decisively in the urgent cases (Michell, 2013).

In general, there are eight components affecting the implementation of the partnership: monitoring will disappear; the decision will take longer time; the group thinking will reduce the quality and efficiency; individualism will be lost; apathy will be a threat; rights and responsibilities are not equal and the management will be gone (McLgan and Krystvnel, 2012). Scientific resources of research considered various aspects of participation in the management as far as they were relevant to the present study. A review of their findings will shed light on how consistent these theoretical debates are with the results of the present study.

Humans are social creatures tending to live in groups for material needs (Golabi, 2012) because participation in group activities leads to increase team collaboration and plays an important role in satisfying them. With this description in mind, the present study proposes the following hypotheses:

**H<sub>1</sub>:** There is a significant relationship between participation and farmers' commitment.

**H<sub>2</sub>:** There is a significant relationship between participation and farmers' cooperation.

**H<sub>3</sub>:** There is a significant relationship between participation and farmers' satisfaction.

**H<sub>4</sub>:** There is a significant relationship between participation and legitimacy among farmers.

**H<sub>5</sub>:** There is a significant difference between mean of commitment, cooperation, satisfaction and legitimacy.

## MATERIALS AND METHOD

The research method according to goal was

applied and based on data gathering, it was a descriptive survey. Research was conducted on farmers and Regional Water Organization of Guilan Province. Statistical population consisted of all staffs that work in Guilan Regional Water Organization and engaged in agricultural sections. Judgmental sampling method was used for taking samples from the population. The population size was 600 people but all of them were not engaged in agriculture section. So, after negotiating with supervisions of the related departments of the organization, 120 people were introduced who were working in Guilan Regional Water Organization and were engaged in agricultural sections. Questionnaires were distributed through judgment sampling and finally, 105 questionnaires were extracted and used.

The questionnaire used in this study consisted of five sections: (1) participation; (2) commitment; (3) cooperation; (4) satisfaction and (5) legitimacy. The survey instrument was composed of 16 items. Respondents were asked to indicate the extent to which they agreed or disagreed with each item by using five-point Likert type scale from "1=strongly disagree to 5=strongly agree". In order to ensure the content validity of the questionnaire, ten experts were interviewed about the relationship between the proposed questions and hypotheses. The reliability of the measurements in the survey was tested using Cronbach's alpha ( $\alpha$ ). The reliability coefficients ( $\alpha$ ) of different parts were as follows: participation (0.843), commitment (0.791), cooperation (0.814), satisfaction (0.703), and legitimacy among farmers (0.809).

The data were entered into SPSS software package for processing and the necessary calculations; thus, the needed information was extracted by drawing frequency and contingency distribution table; and the possibility of describing the population and analysis of data and hypothesis has provided. According to research properties and hypotheses, "Chi-square" was used to test the differences in the means of the constructs. Then, the significance relationship between dependent variables to each other and with independent variable was analyzed by using ANOVA and Tukey post-hoc procedure for means comparison.

**RESULTS**

The result of descriptive statistics showed that in terms of age, the highest frequency allocated to the age range of 30- 40 years. In terms of the land area, the highest frequency (78.1%) was belonged to land area of <2 Hectare. The study of statistical population table showed that the farmers of statistical population had very high level of commitment (45.7%) and cooperation (61%) and that their satisfaction with the organization was 66.7 percent. Furthermore, following the implementation of participation plant, the legitimacy of the Water Organization was increased to 62.9% among farmers.

Also the study of frequency of statistical sample in terms of participation showed that 59% of the statistical samples had high participation, 36.2% average participation and 4.8% low participation. Then, to determine whether there was evidence for confirming or rejecting research hypothesis, research hypotheses were tested and were ranked based on the influence of participation variable. Chi-square was used for hypothesis testing and according to Table 1 no evidence was observed to refute all four hypotheses at the 0.05 level.

This question to answer was which independent variables the participation had the highest relationship with and whether there was a significant relationship between the dependent variables.

Table 1 show that not only was there a correlation between participation and dependent variables but also there was a correlation between the dependent variables. According to the above descriptions and Table 1, it was observed that participation had the highest correlation with the satisfaction and the lowest correlation with the commitment.

According to Table 1, Chi- Square with a confidence level of 95% show a significant relationship between dependent and independent variables (such as farmers' commitment, farmers' cooperation, farmers' satisfaction and legitimacy among farmers); and these variables are not independent. Therefore, the hypothesis H<sub>1</sub>, H<sub>2</sub>, H<sub>3</sub> and H<sub>4</sub> are accepted.

Also, there was a correlation between dependent variables commitment, cooperation, satisfaction and legitimacy, so that cooperation had a significant correlation with satisfaction (r<sub>s</sub>=0.532), the farmers' cooperation had the highest correlation with farmers' satisfaction (r<sub>s</sub>=0.636), the legitimacy had the highest correlation with farmers' satisfaction (r<sub>s</sub>=0.527), the legitimacy had the highest correlation with farmers' cooperation (r<sub>s</sub>=0.454), farmers' commitment had moderate correlation with the legitimacy of the organization (r<sub>s</sub>=0.446), and farmers' cooperation had the highest correlation with farmers' commitment (r<sub>s</sub>=0.612). Also, according to Table 2, there are

Table 1: Result of hypothesis testing

No.	Hypothesis	$\chi^2$	p-value	Result
H <sub>1</sub>	There is a significant relationship between participation and farmers' commitment.	66.54	< 0.05	Accepted
H <sub>2</sub>	There is a significant relationship between participation and farmers' cooperation with water organization.	63.44	< 0.05	Accepted
H <sub>3</sub>	There is a significant relationship between participation and farmers' satisfaction.	73.11	< 0.05	Accepted
H <sub>4</sub>	There is a significant relationship between participation and legitimacy among farmers.	86.07	< 0.05	Accepted

Table 2: Spearman Correlation between participation and dependent variables.

Dependent variable	Farmers' satisfaction	The legitimacy of the organization	Farmers' cooperation	Farmers' commitment	Participation
Farmers' satisfaction	1				
The legitimacy of the organization	0.527	1			
Farmers' cooperation	0.532	0.454	1		
Farmers' commitment	0.636	0.446	0.612	1	
Participation	0.808	0.783	0.744	0.716	1

Table 3: Results of Tukey HSD method

Variable	n	$\alpha=0.05$	
		1	2
Commitment	105	.1762	-
Cooperation	105	-	3.4143
Satisfaction	105	-	3.4429
Legitimacy	105	-	3.4476

significant relationship between participation and farmers' satisfaction ( $r_s=0.808$ ), the legitimacy of organization ( $r_s=0.783$ ), farmers' cooperation ( $r_s=0.744$ ), farmers' commitment ( $r_s=0.716$ ).

Also, using analysis of variance (ANOVA), means were compared to determine whether there was a significant difference between the means and if there was, which one was due. Finding shows that at the confidence level of 95%, there is a significant differences between commitment, cooperation, satisfaction and legitimacy ( $F=4.88$ ,  $p<0.05$ ).

To answer this question which variables the difference result of, using the method of analysis of variance, "Tukey HSD", the difference was investigated and it was found that at the 95% confidence level commitment is significantly different from the average of other variables. Thus, according to Table 3, commitment was placed in a group and cooperation, satisfaction and legitimacy were classified in the other group.

### CONCLUSIONS

The results of the study revealed a significant, positive relationship between participation and commitment of farmers and confirmed the theoretical discussions so that as participation increased, farmers showed greater sense of commitment to the maintenance and exploitation of water facilities and also efficient water use.

It was shown that 3.15% of farmers showed low to moderate commitment; in other words, they do not show interest in issues and events of the optimal management of irrigation system. Given the direct relationship of partnership and commitment, the root of the lack of interest should be sought in their unwillingness to participate.

Several factors play role in farmers' unwillingness to participation including: unfair distribution of water, dissatisfaction with contractors

of pumping stations, the distance of agricultural lands to water divider valves, fatigue of irrigation channels, inappropriate behavior of water organization staff with farmers, not voting of farmers about current issues and future of pumping stations and not to go on sale of agricultural products after harvest. Based on the principles of scientific research, there is a relationship between participation and cooperation. As the results of the study showed, the relationship between farmers' participation and cooperation with water organization was significant and direct meaning that farmers' cooperation with water organization would increase with higher participation, and the coefficient of the correlation between these two variables was high. Farmers' cooperation with regional water companies about issues of irrigation may be done in different forms including the provision of all or part of the costs of maintenance and exploitation of irrigation channels, cooperation in canal dredging and weeding, distribution of water, settled disputes over water rights, the implementation of efficient agriculture water use. In general, regional water companies if know that there is a strong relationship between participation and cooperation will be able to perform their laws and programs with minimum cost and difficulty meanwhile they will provide financial and human resources needed for water installations and ultimately, increase organizational productivity. Also, the evaluation of research scientific resources emphasized the relationship between participation and satisfaction. The findings of this study corroborate the theoretical foundations. The results of the study showed that there was a direct, significant relationship between farmers' participation and satisfaction with water organization, and test of "Chi-square" also confirmed this point so that the correlation coefficient be-

tween farmers' participation and satisfaction was as high as  $r_s = 0.808$ . In other words, participation has the highest effect on farmers' satisfaction with organization water. Several factors may play role in farmers' satisfaction with water organization, some of which are mentioned below:

After implementation of participation plan, the employees of water organization established a close relationship with farmers, so that they tried to resolve the problems and issues related to the pumping stations in several public meetings with all farmers and private meetings with their representatives. Also in order to improve the condition of stations and the equitable distribution of water, joint decisions were made including participation in the selection of exploitation contractor, determination of the rate of delivery water, and the distribution of agricultural water.

Water requirements of agricultural land after the implementation of participation plan will be given at the disposal of farmers regularly, confidently, fairly and timely.

The participation system has been designed bottom-up in accordance with.

The organization of water helps farmers as much as possible in times of water scarcity and drought and other unexpected events

It will be seen that the above-mentioned actions are possible to be done in the form of participation plan. They had a positive impact on the attitude of the farmers and consumers of water of pumping stations and is effective in satisfying and their cooperation with the water organization. It is evident that awareness of the relationship between above variables will help regional water companies in implementing the program and achieving the organization's objectives. Based on the results, the relationship between participation and the legitimacy of water organization among farmers is significant and direct. Also, Table 2 shows that the correlation between two above variables is as high as  $r_s = 0.783$ . As previously mentioned, several factors may be involved in increasing the legitimacy of water organization among farmers of water consumer of pumping stations, some of which are as follows:

After the implementation of participation plan, Water Organization of Guilan Province had

more powerful presence in related activities of pumping stations. Observing the principle of impartiality, the organization also provided technical and advisory services and monitored constantly on matters relating to the station. It was able to distribute water among farmers fairly and on-timely.

Before the implementation of the participation plan, most of the devices and facilities of pumping stations were old and often inefficient such as pumps, alternators, electrical panels, water transfer channels and... due to their undesirable and incorrect exploitation by farmers. After implementation of the project, most of defective channels and systems were repaired and re-launched under the management of water organization and farmers' cooperation and self-empowerment.

Understanding the existing conditions, Water Organization provides farmers with the required facilities such as mechanical shovel (if necessary).

The staff of water organization is involved in resolving problems related to pumping stations by listening to farmers' complaints in the water sector.

All these factors, in addition to several other factors have led farmers to understand the legitimacy and necessity of the presence of water organization as an adjusting and amplifying lever and to trust it. In principle, the ultimate goal of any research is to give recommendations to help overcome the existing problems. Also research results and its recommendations pave the way for researchers who want to study the same issue. Therefore it is necessary for any research to finally present some suggestions to direct future researchers and to solve the problems of related organizations and companies, at least partially. Based on the results of the present study, the following recommendations can be drawn:

According to the positive and strong relationship between participation, commitment and cooperation, regional water companies can increase farmers' sense of commitment and responsibility towards their water facilities by implementing participatory plans and delegating irrigation

management to farmers and can make a profit in meeting the costs of maintenance and exploitation of water facilities overcoming the problems of shortage of human resources by using their cooperation. Also, implementation of participation plan will be followed by optimum consumption of agricultural water and increasing productivity of facilities and irrigation networks.

A pattern of participation can be fully successful if it is designed on the basis of farmers' opinions and demands and local culture of major consumers of water so that after the implementation of the plan it is also necessary for the coordination to be in accordance with farmers by holding successive meetings on the current problems of water facilities.

In order to increase the effectiveness of water users' participation and satisfaction, it is recommended that main water consumers of are studied the construction of water facilities and their suggestions are considered.

Farmers' participation in the ownership and exploitation of irrigation systems had positive effect on increasing their cooperation and commitment. To achieve this goal it is essential that regional water companies encourage farmers by implementation of promoting programs and assignment of long-term loans and share them in the ownership of water facilities.

It seems that participation is effective in the reduction of maintenance and exploitation costs, reduction of depreciation and the increase in irrigation efficiency and optimal use of agricultural water. We suggest that researchers interested in participation investigate the above-mentioned variables in special studies. Also, it seems appropriate that a comparative study is conducted to compare farmers' participation in the management of water facilities among selected two or more regional water companies. In addition, a comparative study of farmers' participation in the management of water facilities in the country with other countries will provide good results. The results of this type of researches can play an important role in identifying the strengths and weaknesses of farmers' participation and offer more useful methods for their participation.

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