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Research Paper

Solutions to Enhance the Farmers' Participation in Water Users Associations (WUAs) in Lorestan Province, Iran

Fatemeh Sepahvand [a], Saeed Gholamrezai [b,] and Mehdi Rahimian [b]*

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Abstract

Water Users Association (WUAs) is one of the methods of participatory water resource management whose success and efficiency requires the participation of farmers. Purpose of this study was to identify and prioritize the solutions for farmers' participation enhancing in WUAs. This exploratory article was carried out by the mixed methods design. The qualitative part of the study was conducted by Grounded Theory (GT). The statistical population consisted of 14 key informant experts of water resources management. Data were gathered by semi-structured interview. The triangulation of peers in different position was used to enhance the accuracy of the data. Categories were derived from interviews by MAXQDA 12 software. In the quantitative phase, 133 members of WUAs were sampled in Lorestan Province (N=1990) using the Cochran formula. Solutions proposed by experts were provided to the members of WUAs in the form of a questionnaire. Results showed that there were distrust among members, members' distrust to WUAs mangers and tension in management of this organization. The most important solutions for farmer's participation in WUAs were to reduce local tensions, motivating mechanisms for cooperation of farmers in WUAs and helping farmers for a better consensus.

Keywords:
WUAs, farmer's participation, Grounded Theory, Lorestan Province, software MAXQDA12

[a] *M.Sc. of Rural Development, Department of Agricultural Economics and Rural Development, Lorestan University, Iran*
[b] *Department of Agricultural Economics and Rural Development, Lorestan University, Iran*

** Corresponding author's email: gholamrezai.s@lu.ac.ir*

INTRODUCTION

Constituting 97.4% of the total water of the world, the water of seas and oceans is of no use in practice. Freshwater resources cover only 2.6% of the Earth's surface mostly in the form of ice at the poles, glaciers, and groundwater. Although around 70% of the Earth's surface is covered with water, only a small portion contains easily accessible and renewable freshwater. These water resources mainly consist of groundwater and surface water, including rivers, lakes, and wetlands (Kochhar et al., 2015). As is evident, even though the Earth is mostly covered with water, human beings can use only a small part of water resources. Indeed, all plans need to consider these restrictions[1]. Unfortunately, the meager amount of water that exists in the rivers is reducing and this threatens crop quality and even human life (Bagherian, 2009). Water scarcity has seriously been addressed in the last few decades (Davies & Simonovic, 2011) because factors such as resource overuse and irrational consumption in industrial, agricultural, and municipal areas have decreased the recharge of rivers and lakes (Jingling et al., 2010)

Investigations have proven the negative effects of water scarcity on economies (Kochhar et al., 2015). Furthermore, they confirm that the pressure on the public budget of countries will heighten (Milton & January, 2010). Therefore, water scarcity can be a threat to more than a billion people living in the world, for sustainable livelihoods, and, in particular, for agricultural production in developing countries. As a scarce life resource, the reduction of water will lead to an increase in its price, which will consequently affect low-income families. In March 2007, the Global Bank announced that by 2050, the available water around the world will be halved. Several countries are already facing a crisis (Milton & January, 2010). Iran's share in global freshwater resources is lower than elsewhere. While 1% of the world population resides Iran, its share of freshwater resources is only 3%. Of 397.9 billion m^3 of annual precipitation in Iran, 66% evaporates before reaching the rivers. The total annual renewable interior water resources comprise 128.55 m^3, with an estimated 9 billion m^3 of renewable exterior water resources. The annual volume of resources is estimated at 137 billion m^3. Annual rainfall in the Middle East and Iran is 217 and 228 mm, respectively, which are less than one-third of the world's average rainfall. Although Iran is a dry and semi-arid country, more than 90% of the country's water consumption is allocated to agriculture (Gholamrezai & Sepahvand, 2017).

Several studies have revealed that low water efficiency that leads to the waste of water emanates from the exclusion of farmers from water management. So far, several methods have been suggested as per the status of water resources management but the results show that paying attention only to water projects with no regards to the participation of villagers has led to the fact that the efficiency and productivity of the irrigation systems have been much lower than what predicted in the planning and feasibility study phases of the water projects (Jingling et al., 2010). Therefore, water use efficiency has reduced to about 25% to 30% and investment in the development of water resources has faced decreasing returns (Gholamrezai & Sepahvand, 2017). Hence, public participation can be a key factor in improving natural resource management (Sharifi et al., 2010) and the efficiency of water resources (Jingling et al., 2010).

Nowadays, an increase in the perception of social and environmental systems and its significant association with agricultural production has led to a significant change in the management of water resources within a paradigm called "participatory management" (Hu et al., 2014; Joanna et al., 2010). This paradigm requires bottom-up management in which most errands are to be handled by the people (Uysal & Atıs, 2010). Today, in many

[1]A look at the status of water resources in Iran and the world, The Information Office of the Vice President of Strategic Planning and Control of the Presidency.

countries, irrigation systems management has been delegated to Water Users Associations (WUAs), the challenges are water scarcity and the accomplishment to the goals of sustainable agriculture management in an efficient manner (Gholamrezai & Sepahvand, 2017; Hosseinpur et al., 2016).

Transferring irrigation management to farmers through WUAs increases water productivity and ultimately leads to better use of water in agriculture (Taleghani, 2015). Franzén et al. (2015) depict a structure that can both be accountable and increase participation. They enumerate some cases such as "leadership" and "good management", "institutional facilities", and "performance evaluation" as the main components of this structure.

Considering the public participation in water resource management is in need of a series of requirements and settings, this is because as the participation of the people in this important issue depends on the circumstances and the farmers' characteristics since the participation of the farmers in water resources management is connected with various aspects of individuals' lives. So far, there has been a vast body of research in this field, each of which has identified the facilitator(s) for participatory programs. Some studies have suggested that factors such as involving farmers in all water management processes, solving participation problems, and increasing people's information through media (Qiao et al., 2009), the role of promoting and addressing supply problems, as well as administrative and democratic factors, and social and economic factors (Kazbekov et al., 2009) can accelerate the participation.

Goetz et al. (2017) showed that "farmers' profit and loss", "uniform rules", and "satisfactory performance" of the water users' associations can contribute to the success of the associations and can increase the participation of farmers. Hu et al. (2014) identified water shortage as a critical issue in arid areas in the northwest of China, mentioned water users' associations as the water resources management strategy, and reported that if "increasing women's participation in villages", "making trust between farmers", as well as "satisfying farmers' needs" are considered, these associations would succeed. Hosseinpur et al. (2016) introduced the establishment of WUAs as one of the cooperative irrigation management strategies that would provide a basis for the participation of farmers in coping with the challenges of water shortage and achieving agricultural water sustainable management goals in an efficient way. He asserted that increasing farmers' participation would be a prerequisite for the success of these associations, and mechanisms such as "support", "management", "economics" and "education" would be important in this regard.

In another study, it was found that the transfer of irrigation management to farmers increased water productivity, and "farmers' satisfaction" was very important for the success and participation in water users' associations (Taleghani, 2015). Also, Ghoalmrezai & Sepahvand (2017) showed that "related training courses", "farmers' literacy level", and "farmers' subjective norms" would increase their participation in WUAs. Valizadeh et al. (2016) conducted a study on pro-environmental analysis of farmers' participatory behavior toward conservation of surface water resources in the southern part of Lake Uremia's catchment area. They showed that participation norms had the highest effect on farmers' participatory behavior. In another study on farmers' participatory-oriented water conservation behavior from the environmental psychological perspective, it was shown that there was a significant difference between farmers who had participated in training courses related to water issues and those who had not (Valizadeh et al., 2018).

This study will answer the following questions:

1-What are solutions to increase farmers' participation in WAUs in Lorestan Province?

2-Which solutions are perceived by farmer's viewpoints to be the most important?

METHODOLOGY

Qualitative section

The qualitative part of the study was conducted with a grounded theory approach and an exploratory approach (solutions for enhancing farmers' participation in WUAs in Lorestan Province). The studied population consisted of 14 experts[1]. Sampling in the qualitative phase was completely different from that in the quantitative phase because it aims to provide a deeper understanding of the studied phenomenon rather than a generalization of the findings. In the qualitative phase, the participants were selected to elicit the most possible information about the studied phenomenon. In this study, the interviewees were taken by the purposeful snowball sampling technique. The snowball sampling technique is a non-probabilistic sampling method for cases where the studied units are not easily identifiable, especially when these units are very rare or a small part of a very large society (Creswell, 2012). In this method, after identifying or selecting the first sample, it is used to identify and select the second sample unit and this process is repeated for the other sample units. This technique can be carried out through both linear and non-linear (exponential) approaches. The selection of samples was continued until no new data was collected anymore; in other words, the criterion for reaching the stage of saturation was the lack of access to new data in new samples (Creswell, 2012; Khosravi et al., 2015).

Interviews began with simple and general questions and proceeded towards more detailed questions. Each interview lasted about 30-40 minutes. In this study, informed consent, anonymity, the confidentiality of information, the right to leave during the study, and other ethical obligations were taken into account. Data were collected and analyzed with a systematic, continuous, and simultaneous comparison of the data.

After received the consent, all interviews were transcribed and reviewed several times; furthermore, the participants approved all the recorded and transcribed interviews. Through the process of data collection and analysis, any reflections and ideas related to the data that came to the researcher's mind were recorded and used in the subsequent interviews. The data obtained from each interview was written down to be coded. Finally, the analysis of this data was performed through the most commonly used methods, namely, open coding, axial coding, and selective coding of Grounded Theory.

Although the essence of reliability for qualitative research lies with consistency, data were extracted from the sources, and their accuracy was verified with peers by triangulation. To analyze the data, three types of coding were performed: "open coding", "axial coding", and "selective coding".

In these three coding processes, the original codes were first extracted. Then, the initial codes that were related and could form the potential classes were categorized into one group and formed the corresponding classes of themes. Subsequently, each of these potential themes was examined and adjusted with the statements quoted from participants. In this research, all the steps (open coding, axial coding, and selective coding) were performed by the MAXQDA 12 software package.

Quantitative section

The statistical population of the research included all the households of farmers using 24 agricultural water pump stations in Lorestan Province (1990 farmers).

Sampling method

Using Cochran's formula, 133 respondents were selected as samples by the proportional stratified sampling method.

Step 1: The first stage of sampling was an assessment made by the respective organizations. The farmers were divided into three groups in terms of participation in water resources management" weak, medium, and strong" (Table 1)

[1] Lorestan Regional Water Authority (LWA) and Water and Soil Deputy of the Jahad-e Agriculture Organization in Lorestan Province

Table 1
Farmers' Participation Categories

Farmers' participation type	Weak	Medium	Strong
Number of stations	5	9	4
Number of the selected stations selected	3	4	1

Table 2
Samples from Water Pumping Station

County/township	Viewed station	Participation status	The number of beneficiaries	Samples
Chegini	1	Medium	123	18
Selsele	2	Weak	231	33
Poldokhtar	1	Medium	94	13
Mamolan	1	Medium	88	13
Delfan	1	Week	100	14
Biranshahr	1	Strong	175	25
Khoramabad	1	Medium	120	17
Total	**8**	**.....**	**931**	**133**

Step 2: For each category, the number of operators was chosen in proportion to the total number.

Step 3. The number of operators was selected randomly (Table 2).

The main data collection instrument of the research was a questionnaire composed of two sections: 1) Demographic and professional characteristics of farmers (age, experiences, literacy level, etc.) and 2) 22 items solutions[1] for enhancing the farmers' participation in WUAs, according to the importance of the items on the 5-point Likert[2] scale.

RESULTS

Research findings in the qualitative research section

The results showed that the age of participants ranged from 37 to 53 years, with an average of 46 years. Since the experts of the construction of these stations had full knowledge of the region and its inhabitants and have been interacting with the villagers from the beginning of the construction up to the operation of agricultural water pumping stations, they proposed several strategies to increase the participation of farmers. By integrating the data and performing axial and selective coding, solutions for increasing farmers' participation in WUAs of Lorestan Province were derived within three categories (Table 3).

According to experts, three major strategies were presented including "supportive strategies", "management strategies", and "strategies for promoting cooperation between farmers". The first category was related to "collaboration promotion (A1-A3)". The second category was related to "support" including "training (B1-B3)" and "facilitation of interaction with experts (B4-B8)". The third category was related to "management", which included some subcategories such as "manager selection" (C1-C4), "elimination of discrimination (C5-C7)", "water price (C8-C11)".

[1] 22 items solutions proposed by experts in Qualitative section were provided to the members of WUAs in the form of a questionnaire

[2] Very much = 5; High = 4; Average = 3; Low = 2; Very low = 1

Table 3
Categories and Subcategories of Factors Promoting the Management of Water Resources Participation from Interviewees' Viewpoints

Main category	Sub-category	Content
Collaboration promotion	Collaboration promotion (A1-A3)	A1 = Reducing local tensions A2 = Promoting the cooperation between farmer. A3 = Rewarding farmers for cooperating in WUAs
Supportive	Training (B1-B3), Facilitation of interaction with experts (B4-B8)	B1 = Training farmers about equipment maintenance to reduce the maintenance cost of irrigation systems B2 = Conducting training courses for minor and trivial repairs of irrigation equipment. B3 = Using state technicians to supervise the irrigation systems and pumping engines to reduce the expenses charged to farmers B4 = Transferring stakeholders' concerns to executive sectors B5 = Paying attention to villagers' demands to set up and solve stagnant station problems. B6 = Avoiding suspension in the construction of the water pumping station. B7 = Farm land consolidation B8 = Establishing constant communication ways with the executors to solve potential problems. B9 = Establishing constant communication ways with the executors to solve potential problems.
Management	Manager selection (C1-C4), Elimination of discrimination (C5-C7), Water price (C8-C11)	C1 = The participation of literate peoples in each village as the managers of the WUA C2 = Possibility of people's monitoring the performance of board administrators. C3 = Agreement among the villagers to manage the water supply WUAs. C4 = Employing workers from among the villagers themselves to construct the agricultural water pumping station. C5 = Political parties not involving in the WUAs. C6 = Experts' attention to all stakeholders. C7 = Non-discriminatory treatment towards farmers in decisions making C8 = Participation of village councils among administrators for control water price C9 = Announcing the annual price rate of water supply for the stations. C10 = Consulting all the owners of farmlands - not just prosperous villagers - to determine the water price.

Then, according to excerpted categories, solutions for enhancing farmers' participation in WUAs of Lorestan Province are depicted in Figure 1.

Research findings in the quantitative research section

Demographic characteristics WUAs' members

The results about the demographic analysis showed that the farmers' age range was 25-85 years with an average of about 50 years, and their average work experience was 30.22 years. In terms of education level, the majority of the farmers (28.6%) were of elementary levels. Moreover, according to the results, the majority of farmers (66.4%) had less than 3 hectares of land. The lowest and highest numbers of land parcels of each farmer were

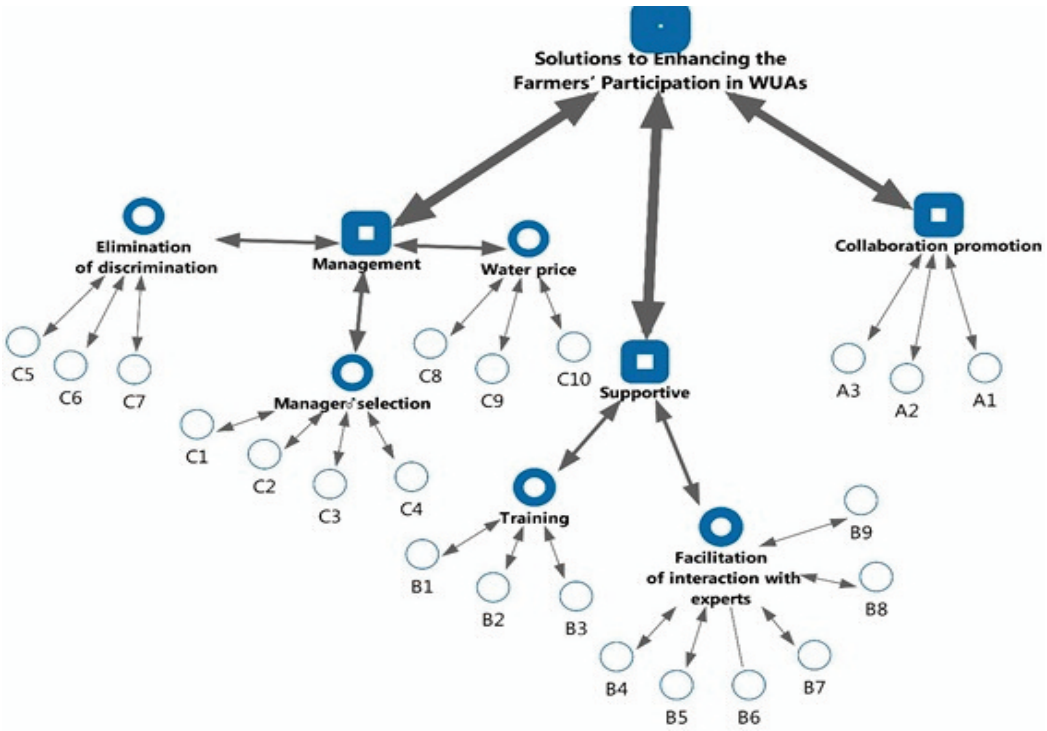

Figure 1. Solutions for enhancing the farmers' participation in WUAs

1 and 9 pieces, respectively. The majority of farmers (80.5%) used state funds to improve their irrigation systems. Also, most of them (60.16%) had not participated in the related training courses (Table 4).

Prioritization of the solutions to enhance the farmers' participation in WUAs from farmers' viewpoints

Table 5 shows the prioritization of the solutions for farmers' participation enhancing WUAs. The results in Table 5 indicate that solutions of "reducing local tensions" and "rewarding to farmers for cooperating in WUAs" and" non-discriminatory participation of all farmers in decisions" most priority and "announcing the annual price rate of water supply for the stations", "transferring stakeholders' concerns to executive sectors" and "possibility of people's monitoring the performance of board" had the least priority.

Table 4
Demographic Characteristics of WUAs, Members

Variable	Level			
Literacy (%)	Illiterate	Elementary	Diploma	Bachelor or higher
	9.4	62	12.6	16
The number of agricultural land parcels	Minimum	Maximum	Mean	
	1	9	3	
Age (years)	Minimum	Maximum	Mean	
	25	85	50	
Participation in training courses (%)	Yes	No		
	39.84	60.16		
Use a loan (%)	Yes	No		
	80.5	19.5		

Table 5
Prioritization of the Solutions to Enhancing the Farmers' Participation *in WUAs From Farmers' Viewpoints*

	Solution	Mean*	CV
1	Reducing local tensions	4.50	0.21
2	Rewarding to farmers for cooperating in WUAs.	4.30	0.18
3	Non-discriminatory participation of all farmers in decisions	4.20	0.14
4	Consensus among farmers on how to management the WUAs	4.10	0.16
5	The involvement of village councils for monitoring the water price	4.00	0.16
6	Promoting the farmers cooperation in WUAs	3.90	0.18
7	Experts' attention to all stakeholders.	3.90	0.24
8	Using state technicians to supervising the irrigation systems and pumping engines to reduce the expenses charged to farmers	3.80	0.28
9	Conducting training courses for minor repairs of irrigation equipment	3.84	0.39
10	Training farmers about equipments maintenance to reduce maintenance cost of irrigation systems	3.75	0.31
11	Paying attention to the villagers' demands to set up and solve stagnant station problems	3.69	0.41
12	Consulting all the owners of farmlands - not just prosperous villagers - to determine the water price	3.64	0.51
13	Employing the workers from among the villagers themselves to construct the agricultural water pumping stations	3.59	0.59
14	The participation of literate peoples in each village as the managers of the WUAs	3.44	0.69
15	Establishing constant communication ways with the executors to solve potential problems.	3.39	0.75
16	Political parties' not involvement in the WUAs	3.28	0.83
17	Avoiding suspension in the construction of the water pumping station	3.18	0.81
18	Farmland consolidation	3.00	0.88
19	Announcing the annual price rate of water supply for the stations	2.99	0.90
20	Transferring stakeholders' concerns to executive sectors	2.89	0.91
21	Possibility of people's monitoring the performance of board	2.78	0.98

*Very much = 5; High = 4; Average = 3; Low = 2; Very low = 1

DISCUSSION

For sustainable water management factors including physical infrastructure development, financial capability, and collective participation in irrigation activities play the vital role (Sharma et al., 2015). One of the methods for stable and continuous participation is community involving the in water resources management. The water user associations is a local participatory organization consisted of a group of community water users, who pool their financial, technical, material, and human resources for the operation and maintenance of a water system(Xu et al.,2014). For realizing this method comprehensive stakeholders participation is vital.

Regarding the solutions priorities selected by farmers, it was observed that the selected cases are more likely to indicate problems and conflict among farmers. The solutions selected by farmers mainly focus on paying attention to socio cultural issues among members, such as distrust, disagreement as to how to manage the association, etc. are evident among members. For solving this obstacle conducting the participatory planning,

use of literate and young people in starting point of association, use of external and internal facilitators for reducing the local conflict was recommended.

It is evident that farmers have difficulty in determining water prices. Since all activities related to water supply, distribution, pricing, etc. are the responsibility of the government and the serious participation of beneficiaries in irrigation management is illegal, the reform of water laws and related regulations is necessary.

The results showed that farmers, sometimes, would not be able to afford the repairs or replacement of the irrigation systems on their farms and gardens because of poor financial situation of farmers. This is may be due to the lack of non-agricultural income sources. Also, it could be ascribed to the fact that the scattered and small plots of land in these villages are incapable of meeting the financial needs of households. They can hardly make ends meet and the only source of income is achieved through gardening and agriculture (most farmers in this research own less than 3 hectares of land). Therefore, it is necessary to pay attention to non-farm activities in rural communities, multi-functional agriculture, rural tourism and small businesses in villages, to increase the financial level of farmers and villagers.

Otherwise, it will be obligatory for the government to take care of the financial affairs of the villagers. In this study, if the financial situation of the villagers is improved, maintenance or replacement of new irrigation devices will be easily done by them. Experts in the field have argued that sometimes, as a result of damage or failure of equipment and financial problems, farmers had rejected the use of these stations, and had restarted the use of running water resources abundantly like previous with the use of electronic pumps. It is even suggested to provide farmers with non-formal short-term training to maintain and repair their equipment so that they can solve their problems by them.

Other results of this study showed that even though experts emphasize land integration in the villages of the region, farmers do not like this strategy and it is not their top priority. The results showed that plots of land are scattered in the area (1-9 land plots) and are small in size. This scarcity makes it difficult and sometimes impossible to utilize scientific and technological achievements. Undoubtedly, the use of technology can result in increased production and facilitated agricultural activities, but due to the lack of land integrity and the existence of physical and natural obstacles of these lands, the beneficiaries cannot use them optimally. Hence, it is necessary to implement targeted programs in cooperation with village elders and trustees, members of rural councils, and the educated people in each village. The main purpose of these programs should be to emphasize the importance and benefits of land integrity in order to attract farmers' interests in this region.

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REFERENCES

Afshar, Z., & Zarafshani, K. (2010). Analyzing participation in irrigation management: Case Study: Wastewater cooperatives "Sefed Barg" and "Sarab Bas" Kermanshah Province. *Iranian Agricultural Extension and Education Sciences*, *6*(2), 99-114. (In Persian)

Bagherian, R. (2009). *Factors affecting variation in levels of participation in watershed management programs in Iran*. Unpublished thesis, University Putra Malaysia.

Creswell, G. (2012). *Qualitative inquiry and research design: choosing among five approaches*. (3rd ed.), SAGE Publications, Inc. P. 472

Davies, E.G.R., & Simonovic, S.P. (2011). Global water resources modelling with an

integrated model of the social–economic–environmental system. *Water Resources*, *34*(6), 684–700.

Franzén, F., Hammer, M., & Balfor, B. (2015). Institutional development for stakeholder participation in local water management an analysis of two Swedish catchments. *Land Use Policy, 43*, 217-227.

Gholamrezai, S., & Sepahvand, F. (2017). Farmers' participation in Water User Association in western Iran. *Journal of Water and Land Development Section of Land Reclamation and Environmental Engineering in Agriculture, 35* (X–XII), 49–56.

Goetz, R. U., Martínez, Y., & Xabadia, À. (2017). Efficiency and acceptance of new water allocation rules - The case of an agricultural water user's association. *Science of the Total Environment*, *601–602*, 614-625.

Hosseinpur, Z., Menhaj, M.H., & Kavoosi - Kalashami, M. (2016). Assessment Improving and organizing mechanism of water users cooperatives using AHP method in Esfarayen County, Iran. *International Journal of Agricultural Management and Development, 6*(3), 339-351.

Hu, X., CaiXiong, Y., JinLi, Y., XinWang, J., MinLi, F., YangWang, H., & LanLi, L. (2014). Integrated water resources management and water users' associations in the arid region of northwest China: A case study of farmers' perceptions. *Journal of Environmental Management, 145,*162-169.

Joanna J., Fatch, M, E., & Mabiza, C. (2009). *Local participation in Tran's boundary water resources management: The case of Limpopo basin*. Unpublished thesis*,* University of Zimbabwe.

Jingling, L., Yun, L., Liya, S., Zhiguo, C., & Baoqiang, Z. (2010). Public participation in water resources management of Haihe river basin, China: the analysis and evaluation of status quo. *Procedia Environmental Sciences, 2*, 1750-1758.

Kazbekov, J., Abdullaev, I., Manthrithilake, H., Qureshi, A., & Jumaboevo, K. (2009). Evaluating planning and delivery performance of Water User Associations (WUAs) in Osh Province, Kyrgyzstan. *Agricultural Water* Management, *96*(8), 1259-1267.

Khosravi, A., Gholamrezai, S., Rahimian, M., & Akbari, M. (2015). Analysing the barriers to organizational entrepreneurship development in agricultural cooperatives using the basic theory approach. *Cooperatives and Agriculture*, *6*(22), 123-150.

Kochhar, K., Pattillo, C., Sun, Y., Suphaphiphat, N., Swiston, A., Tchaidze, R., Clements, B., Fabrizio, S., Flamini, V., Redifer, L., Finger, H., & IMF Staff. J.J. (2015). Is the Glass Half Empty or Half Full? Issues in Managing Water Challenges and Policy Instruments. International Monetary Fund. *Retrieved from https://www.imf.org/en/search#q,* 4-42.

Liu, J., Luan, Y., Su, L., Cao, Z., & Zeng, B. (2010). Public participation in water resources management of Haihe River Basin, China: the analysis and evaluation of status quo. *Procardia Environmental Sciences*, *2*, 1750–1758.

Milton, H., & Saier, Jr. (2010). Water Crises.*Water, Air, and Soil Pollution*, *205*, 27–28.

Qiao, G., Zhao, L., & Klein, K.K. (2009). Water user association in Inner Mongolia: Factors that influence farmers to join. *Agricultural Water Management*, *96* (5), 822-830

Sharifi, A., Golamrezai, S., & Rezaei, R. (2010). Factors affecting villagers' participation in Jiroft Watershed Projects. *Journal of Watershed Management Sciences and Engineering. 4*(12), 1-10

Sharma, K.R., Dongol, R., & Khanal, A. (2015). Role of water users association in successful operation and management of Adhikhola Irrigation System, Syangja, Nepal. Conference: Sixth International Seminar on Small Scale Irrigation System: Challenges to Sustainable Livelihood, At Kathmandu, Nepal, 6.

Taleghani, M. (2015). Feasibility of farmers' participation in optimal irrigation management system (Case of Guilan Province*). International Journal of Agricultural Management and Development, 6*(1), 51-59.

Uysal, Ö K., & Atıs, E. (2010). Assessing the performance of participatory irrigation management over time: A case study from Turkey. *Agricultural Water Management, 97*, 1017–1025

Valizadeh, N., Bijani, M., & Abbasi, E. (2016). Pro-environmental analysis of farmers' participatory behaviour toward conservation of surface water resources in southern sector of Urmia Lake's catchment area. *Iranian Journal of Agricultural Extension and Education*, *11*(2), 183-201.

Valizadeh, N., Bijani, M., & Abbasi, E. (2018). An Environmental psychological analysis of farmers' participatory-oriented behavior toward water conservation. *Iran-water Resources Research*, *13*, 17-27.

Xu, H., Sui, L., Li, Y., & Zhang, D. (2014). The role of water users associations in integrated water resource management of Zhangye City in Heihe River Basin, China, in Editors: Victor R. Squires, Hugh M. Milner, Katherine A, Daniell. Book: River Basin Management in the Twenty-first Century Publisher: CRC Press.

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