

The Artificial Feeding of Qanat: An Approach towards Satisfaction and the Reduction of Villagers' Migration Motivations (Case Study: Bakhazr County)

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Abstract

The In Iran, the reduction of qanats water supplies has encountered most villagers' social and economic activities with challenges. Due to water shortage, they leave their home and village and migrate to large cities to work as workers or do other activities. In some villages of Bakhazr County, Khorasan-e Razavi Province, earth dams have been constructed to feed qanats and springs since 65 years ago. The main objective of this study is to see how these earth dams affect rural development including villagers' satisfaction and the reduction of their migration motivation. Objective-wise, this study is an applied research. Yet, in nature and method, it is a descriptive-analytical research. This is carried out using document (library) research and filling out questionnaire (survey). Results show that feeding qanats through constructing earth dam leads to villagers' satisfaction and reduction of their migration motivations.

Keywords: Artificial Feeding, Bakhazr County, Qanat, Migration Motivation

1. Introduction

In Water is placed at the heart of the present global challenges. It is necessary for economic and social development, food security, and ending poverty and hunger¹⁶. In a study as “water scarcity”, Florin Buddemeier et al.¹⁶ sought for resolving water demand and supply problem via providing water through rain in the wetlands of dams and reservoirs. They state that two third of people in the world will face with water scarcity in 2025⁶. In a study as “the adverse effects of drought on the suitable development of agriculture and management strategies for reducing damages from this phenomenon”, Ghobadi Aliabadi et al.⁸ emphasise on the fact that the incidence of drought is among the main characteristics of Iran weather observed both in wet and dry areas⁸. Despite having over %1.2 of total dry area of the earth, Iran only has %0.36 (252mm) of total precipitations. This is one third of global average and half of Asia (Goudarzi, 2011:243). Beside the shortage of precipitation, its distribution is so inappropriate in terms

of the time and place¹⁷. Rapid population growth has been the main factor of renewable water per capita in Iran during the last eighty years. The amount of renewable water in Iran is reduced from 13000m³ in 1921 to about 1900m³ in 2006. If the trend continues, the condition will become worse in future². At the time, with over 70 million population, Iran's renewable water per capita is 1670m³ a year. It is anticipated that it reaches below 1250m³ in 2021¹¹. In an article as “studying management strategies in the long term development of Iran water resources”, Maghrebi¹² cites management strategies for enhancing the productivity of water resources in long term. He concludes that countries implemented this management decision making in their macro planning have been able to suitably move toward the sustainable development of their water resources¹. In a study as “studying and analysing the effects of drought on the changes of underground water levels and its consequences for the agriculture sector of Ghaein Plain watershed basin”, Saghafi et al.¹⁴ concluded that the incidence of the recent drought in the area has led to the

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severe reduction of qanats and springs water resources¹⁴. In an article as “drought consequences and strategies for fighting it”, Kohansal¹⁰ considered drought to be one of the most hazardous acts of God always affected Iran. Iran is located in the dry and semi-dry belt of the world. The intensity of drought has increased in recent years¹⁰. In dry areas (like a great part of Iran), human has always been faced with lack of water. Collecting water is among the effective actions; especially, for the proper exploitation of the existing waters¹¹. In a study as “the challenges of water management in Iran’s sustainable development”, Fotovvati⁷ stated that management theories formulated based on the abundance of resources a while ago must be reestablished based on the scarcity of resources, today⁷. In an article as “the indigenous knowledge of agriculture and traditional methods of water resources management to fight drought crisis”, Chramzadeh et al.⁴ emphasised the construction of dam on the course of water as one of the ways to fight drought; beside highlighting this indigenous knowledge⁴. In an article as “the importance of dams and their role in reducing drought damages”, Salarian et al.¹⁵ emphasises the use of indigenous and traditional method of each area to reduce the effects of water scarcity¹⁵. One of the ways to fight water resources scarcity resulted from population increase and unusual use of water includes rain water collection and artificial feeding. Collecting ground waters can be used for feeding underground waters aiming to enhance the level of underground waters as well as creating water resources on the ground⁹. One of the suitable strategies for maintaining and reviving qanat is the artificial feeding of underground water tables and also to prevent qanat water from wasting. Collecting rain water and runoffs is among effective actions; especially in the proper exploitation of waters existing in dry areas. Runoff from showers in a watershed basin is a potential resource of water. If used properly, it can be applied to feed and enhance qanats water⁵. The history of qanat appearance in Iran plateau goes back to at least 4000 years ago¹³. It is necessary to support and protect these water resources. To compensate for the discharge of these water resources, short earth dams aimed to control flood and artificially feed qanat aquifer is among executive strategies of some public organisations. They have also drawn people’s interest. The reduction of qanats discharge in the last decades has brought about numerous damages including the increase of dissatisfaction and migration.

2. The Area under Study

Bakhazr County is one of the newly founded counties of Khorasan-e Razavi Province. It is located in southeast of this province in northeastern Iran. Geographically, it is located between 60° 00' 45.7" E to 60° 40' 23.7" E and 34° 47' 22.1" N to 35° 19' 31.3" N. villages with earth dams constructed between 1991 and 2006 to feed qanats include Kordian, Arkhoud, Arzaneh, Fariabad, Chahartagh, Estajroud, Tangalmazar, Gorazi, Abnyyeh, and Kouhsefid.

3. Materials and Methods

Objective-wise, this study is an applied research. Yet, in nature and method, it is a descriptive-analytical research. This is carried out using document (library) research and filling out questionnaire (survey) as well as dependent-independent variables correlation. Household is the study unit of field research. Here, dependent variable includes the reduction of rural migration. Independent variable includes the artificial feeding of qanats. To accomplish the objectives of the study, a questionnaire was developed by 10 questions based on research hypotheses. The sample of the study consisted of the heads of households lived in 11 villages with feeding earth dams. Total sample included 3848 households. In the next step, 350 respondents were selected by simple random method using weighed classification.

4. Descriptive Results

Respondents included 96% men and 4% women with 75% over 30 years old. 84% household heads were literate. 95% respondents were farmer among whom 71% had over 10 years of farming experience. 62% of these farmers earned over 60% of their income by farming.

5. Inferential Results

Data from 10 questions of 350 questionnaires were analysed using Likert scale. The percentage of responses with much and so much effects is given in Table 1.

6. Hypothesis Testing

6.1 H1: The construction of earth dam has led to the maintenance of villagers’ population and reduction of their migration motivation.

In this study, H1 was tested by questions 1 to 6. Respondents cited their opinions about the relationship between these two variables.

Table 1. The percentage of responses to each question with much and so much effects

1. How much is water scarcity effective in villagers' migration?	
2. To what extent do the effects of constructing earth dam increase hope for future in the village?	
3. How much does the construction of the earth dam affect Development of your village?	
4. How much does the construction of the earth dam affect villagers' stay in the village?	
5. How much does the construction of the earth dam affect the return of immigrated villagers?	
6. How much does the construction of the earth dam improve your economic status?	
7. How much does the construction of the earth dam improve your living status?	
8. How much does the construction of the earth dam satisfy you?	
9. Specify the effect of the earth dam on the improvement of condition in the village?	
10. How much are interested to cooperate in earth dam construction?	

Table 2. Frequency and frequency percent of responses to questions regarding H1

frequency (%)	frequency	response
5.29	111	little
16.95	356	a little
23.48	493	medium
26.43	555	much
27.85	585	so much
100	2100	total

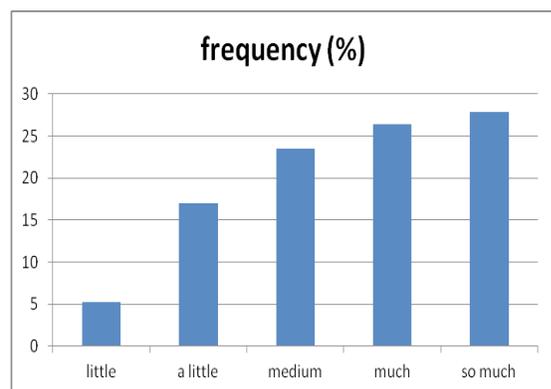


Figure 1. The frequency percent of responses to questions regarding H1

As seen in Table 2, 111 (5.28%) responded little, 356 (16.95%) a little, 493 (23.48%) medium, 555 (26.43%) much, and 585 (27.85%) so much. Based on H1, this study includes two states: $H_0 = \mu$ and $H_1 = \mu > 18$. Since the calculated mean is larger (20.588) than the default mean of the questionnaire (18) and also since P-value calculated in single-group t-test is smaller than α P-value (0.05), H_0 is rejected. That is, the construction of earth dam affects the maintenance of population and the reduction of villagers' migration motivation. And (or), on the other hand, mean difference calculated is significant. Hence, H1 is also approved.

Table 3. Statistics related to single-group t-test

confidence interval difference		mean difference	mean	Sig	df	T	
max	min						
3/226	1/951	2/588	20/588	0	349	7/986	population maintenance

6.2- H2: The construction of earth dams has led to villagers' satisfaction.

H2 was tested by 7 to 10 questions. Respondents answered these questions regarding the effect of earth dams' construction on villagers' satisfaction. Results are listed in Table 3-5.

Table 4. Frequency and frequency percent of responses to questions regarding H2

frequency (%)	frequency	response
4/5	63	little
13/36	187	a little
19/64	275	medium
27/71	388	much
34/79	487	so much
100	1400	total

As seen in Table 4, 63 (4.5%) responded little, 187 (13.36%) a little, 275 (19.64%) medium, 385 (27.71%) much, and 487 (34.79%) so much. Respondents' opinion about the effect of constructing earth dam on villagers' satisfaction is 14.315. To test the significance of this relationship single-group t-test was used based on the nature of questions in the questionnaire. Accordingly, H2 includes two states: $H_0 = \mu$ and $H_1 = \mu > 12$. Since the calculated mean is larger (14.315) than the default mean of the questionnaire (12) and also since P-value calculated in single-group t-test is smaller than α P-value (0.05), H_0 is rejected.

That is, the construction of earth dam affects villagers' satisfaction. And (or), on the other hand, mean difference calculated is significant. Hence, H1 is also approved.

Table 5. Statistics related to single-group t-test

confidence interval		mean difference	mean	Sig	df	T	
max	min						
3/226	1/951	2/588	20/588	0	349	7/986	Satisfaction

4. Conclusion

Results indicate that the effects of earth dam aimed to feed qanats have led to villagers' satisfaction and reduction of their migration motivation in Bakhazr County, eastern Iran. Similarly, the effects of constructing earth dam on the upstream of qanats has increased hope to future in the village, the development of village, villagers' stay, return of rural immigrants, the improvement of economic condition, the improvement of livelihood, the improvement of the village condition and the enhancement of motivation for participating in the construction of the earth dam. Hence, it is recommended that water supply management is placed in the rubrics of other villages having qanats regarding the emergence of problems resulted from water shortage and villagers' dissatisfaction and migration.

5. References

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