

## Factors Affecting Tendency to Use more Water Qanats: Case Study Arsanjan – Iran

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### Abstract

The aim of this study most gardeners like to use is the amount of qanat water. This study to achieve the objectives of the research interviews and questionnaires completed by a total of 170 questionnaires were completed. Factors affecting farmers also use water from the qanat of the Eviews econometric software and Logit models were used. The results show that 84 percent of people surveyed in this study are the use of qanat water and this could be due to reduced agricultural water wells. Logit model estimation results indicate qanat water flow location, ownership and age of the qanat water one level significant percentage and make greater use of qanat water is and garden area and cheaply than qanat water pumping system and a significant increase in the level of five per cent interest is the use of qanat water. The irrigation pumping system and a significant negative effect on farmers to use less water in the qanat.

**Keywords:** Tendency to use, gardeners, logit model, Qanat, Arsanjan, Iran

### Introduction

Water is one of the greatest challenges facing humanity this century can be the source of many positive developments. Water crisis in this century is one of the important issues that the country's growing demand for agricultural, domestic, industry, and also face resource constraints. Population growth, uncontrolled consumption, climate change, development industry, up go level hygiene and welfare general reduction in per capita resources renewal is augmented. This can be a lot of problems, especially for dry and shallow water areas where water resources are limited (Rahimi, 2010). Shortage of freshwater resources, is one of the greatest things in the world Developing world is facing. In the Earth's surface in a billion four hundred million cubic meters of water there. From this amount, only 2.5 of it is freshwater and only 0.3 to 0.4 percent of the fresh water is renewable. Significant proportion of renewable fresh water is unavailable and the evaporation losses as about 40 thousand cubic kilometers of renewable freshwater per year, the runoff flows.

Deficiency water wt Iran one of factors limited manufacturer the main development activities economic at decade future to of the is. Unfortunately at the we still use desirable of water to the a culture special status own the by not is to the direction access to balance relative at background offer and consumption a water principle of and necessary is that the important but with resource management water possible will not. Iran with average precipitation 260 mm atmospheric meter at year of countries dry world and with water resources limited is. Factors like growth population, need to food more necessity promotion level hygiene and welfare social, development industrial and protection ecosystems, demand water the day to day more the it. (UN, 1997).

Extraction of groundwater a long history in various countries such as china, egypt and ancient Iran there. Manouchehr persian king about 3400 years ago and ordered to dig kariz (qanat) the to learn agriculture. Active groundwater wells and transmission pipelines to link gravity to tolerate the Iranians have been exhausting its head. The oldest traces of it remain qanat has been found in northern Iran. The canals were dug with the arrival of Aryans is. Gonabad qanats life of the main well depth is 300 meters to 2,500 years have been estimated.

Qanats in 2002 in the Fars of Arsanjan 11 is active about a thousand hectares of irrigated land in the making. The total discharge of 262 liters per second is qanat. Table 1 shows the discharge qanat in the study area.

Table 1. Water discharge Qanats in different years

year	Name Qanat	
	Bonab	Aisha
2003	95	85
2004	106	25. 87
2005	25. 116	75. 89
2006	106	50. 87
2007	80. 72	66
2008	20. 48	80. 36
2009	38	21
Average (liters per second)	18. 83	61. 67

Source: Department of Agriculture, water and soil and water resources management Arsanjan Arsanjan.

Iran and the world in many studies to analyze trends (acceptance), people have been made. Author, a study that shows more interest to gardeners or farmers or using qanat water pumping systems have not been observed.

### Materials and Methods

Logit probability model of normal and logistic distributions used and the predicted probability values between zero and one is located. To investigate what factors affect the probability of selecting an option, it is assumed that the average utility obtained from a select choice of traits that are different for different people, depending on. If a sample with the observed t is a likelihood estimation function is defined as follows:

$$L = \prod_{i=1}^T f(y_i) = \prod_{i=1}^T P_i^{y_i} (1 - P_i)^{(1-y_i)} \quad ( )$$

Function ( ) also can be indicated as follows:

$$L = \prod_{i=1}^T F(X_i'\beta)^{y_i} [1 - F(X_i'\beta)]^{(1-y_i)} \quad ( )$$

If the first option is selected and otherwise Is. Logarithmic likelihood estimation function is as follows:

$$\text{Ln}L = \sum_{i=1}^T y_i \text{Ln}F(X_i'\beta) + \sum_{i=1}^T (1 - y_i) \text{Ln}[1 - F(X_i'\beta)] \quad ( )$$

According to two studies, Brown et al (1994), a profile likelihood estimation can be expressed as follows:

$$(1 - d_1)(1 - d_2) \int_{-\infty}^{b_2} dF(x) + d_1(1 - d_2) \int_{b_1}^{b_2} dF(x) + (1 - d_1)d_2 \int_{b_2}^{b_1} dF(x) + d_1d_2 \int_{b_2}^{\infty} dF(x) \quad ( )$$

That F (x) cumulative distribution is likely to use. In this expression, If the proposal is accepted and i , Is otherwise.

The regression model used in this study are as follows:

$$y = \Gamma + S_1x_1 + S_2x_2 + S_3x_3 + S_4x_4 + S_5x_5 + S_6x_6 \quad ( )$$

Y is the dependent variable and the use of qanats water pumping system for the show. If a person more likely to use water from the qanats would be one y. If y is less used and considered to be zero.

$x_1$  = Area of the garden     $x_2$  = Inexpensive qanat water     $x_3$  = qanat flow     $x_4$  = Use of pumping systems  
 $x_5$  = Age     $x_6$  = ownership of qanat water

For estimation of the model and the spss software package used is Eviews.

### Results

The estimation results in Table 1 show that the qanat flow of water, qanat water ownership and age are significant and positive effect on the level of the variable and inexpensive water garden area of the qanat level of five percent are positive and significant while other variables have significant negative effects.

Estimated coefficient for variable flow water flume is 0.730. This stated that the flow of qanat water increases the tendency to increase.

Estimated coefficient of variation of water entitlements 0.404, which is marked with what was expected, is consistent. In other words, the relationship between ownership and shareholders may wish to use more water from the qanat, is positive.

Coefficient of the age 0.26 is obtained. This suggests that increasing age, more than likely want to use the water increases.

Also, qanat water, respectively, with values of variables and inexpensive garden area of 0.19 and 0.1621 of a positive effect on tendency to use qanat water shows.

Factor pumping system used in the model were -0.311, which indicate that the reduction of qanat water pumping increases the tendency to use the system.

Mc Faddn coefficient of determination, equivalent to 0.41 and show that the calculated changes in the dependent variable, as well as by the independent variables of the model are described. Percentage of correct prediction of the 80.3 is estimated. Accordingly, the high percentage of the values associated with the explanatory variables, will foreseen. Words, about 80.3 percent of respondents, tend to use more water from the qanat with a YES or NO answer, providing a fit with the data were properly allocated.

Table 1. Results of logit model

Variables	coefficients	T statistics	Significance
Constant	-0.35	-0.940	0.7902
Qanat water flow	0.73	4.89	0.0019
Ownership of qanat water	0.404	3.4	0.0016
Age	0.26	-2.9	0.00435
Garden area	0.19	2.105	0.0142
Qanat water cheaply	0.1621	2.046	0.049
The pumping system	-0.311	2.002	0.035

Source: Research Findings

### Conclusion

According to the findings and results of this study, suggestions are offered as follows:

- 1- The qanat water flow variables should be meaningful Dredging and other factors that increase the qanat water and the officials are being considered.
- 2- Integration of pomegranate orchards in the study area
- 3- Determine the optimal price of water qanat to tap

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