



**ORIGINAL ARTICLE**

## **Factors Affecting the Adoption of Pressurized Irrigation Systems by Beneficiaries in Mehran City**

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### **ABSTRACT**

*This study aims to investigate the factors influencing the adoption of pressurized irrigation systems by farmer's city of Mehran and the general framework of the survey has been conducted. The population of this study, 800 patients was randomized, 260 were determined by using farmers and Krejcie and Morgan were studied using a questionnaire. In order to determine questionnaire reliability coefficient of Cronbach's alpha was used to calculate the amount equivalent to 0/94, which is acceptable for research. Content validity of the questionnaire was confirmed by experts associated with the topic. Data analysis was performed using SPSS<sub>v20</sub> statistical software. Regression analysis showed that the estimated coefficients of the explanatory variables of culture, experience, and education are not statistically significant and coefficients of the explanatory variables increase revenue, advisory services, reduce labor and educational factors are statistically significant.*

*Keywords: Adoption, Pressurized irrigation system, Stakeholders*

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### **INTRODUCTION**

Pressurized irrigation methods are facing many constraints in terms of water resources in various areas of Iran, including Ilam province. However, this development does not follow a sustainable trend in Iran, such that, the imported technology of pressurized irrigation methods is not compatible with the climate, soil, land and agriculture conditions in different areas of Iran. Therefore, adoption process of these systems in Iran is very slow. On the other hand, difficulties of using these systems are beyond the technical and technological issues; socio-economic, educational, and promotional factors are also effective (1). This case is particularly true about Ilam province. Generally, instability in development of pressurized irrigation systems can be due to difficulties that farmers face from the time they apply for implementation of the system, until long after the operation and will affect the attitude of beneficiaries toward these systems. In the first and second economic development programs, the government has paid considerable attention to increasing water productivity and improving irrigation efficiency in agriculture by development of new irrigation methods. But the expansion and development of pressurized irrigation systems face too many unknown issues which lead to rejection and discontinuation of utilization (3). One of the important issues that we witness after distribution and adoption of pressurized irrigation technology is suspension and discontinuation of utilization by beneficiaries. In fact, there are many problems in the process of developing pressurized irrigation systems which affect the attitudes of beneficiaries' even years after the promotion of this new system and away from the eyes of experts and irrigation systems designers. When farmers submit for installation of the system, until they gain the operational experience needed, they face challenges that look very difficult or impossible to overcome. Identifying these issues and problems, the factors affecting the adoption of this system and correct analysis of strengths and weaknesses of pressurized irrigation systems, can play a major role in reducing errors and improving the underlying operational mechanism in the operating projects [2]. Despite successes that have been achieved in the field of pressurized irrigation systems in the country, there are also failures and drawbacks. Failures of pressurized irrigation systems have made it important to study the adoption factors of this system. The adoption percentage in Ilam province is 9.5%, and is 26.5 per unit area. The adoption percentage in Mehran city is 15.5%, and is 56.5 per unit area. This study aims to answer this major question: what is the role of personal and social characteristics of beneficiaries in the

agriculture sector, in the acceptance or rejection of pressurized irrigation systems? And other sub-questions such as: What are the effects of factors such as financial resources, ownership of the means of production, location and ownership of agricultural land, source of water supply, size of agricultural land, number of components, and product type, on the adoption of pressurized irrigation systems? What are the effects of agricultural education and promotion on the adoption of pressurized irrigation systems? What are the effects of having access to relevant bank loans, methods of reimbursement, operating costs of the system, and changes in system costs on the adoption of pressurized irrigation systems?

## MATERIALS AND METHODS

This study is practical in terms of purpose, quantitative in terms of type and nature of the data, library (documentary) and filed method in terms of methods of data collection, and is causal (cause and effect) in terms of topic or research question.

## RESULTS

### The results of analyzing the collected data from beneficiaries

The average age of farmers in the study is 47, the youngest is 28 and the oldest is 76 years old. The majority of respondents were born in villages (82.1%). The majority of respondents were married (69.9%). Average household size of respondents is 4, the maximum was 8 and minimum was 2. Average annual household income was 13 million Tomans, the maximum was 56 and minimum was 4. The majority of respondents have elementary school education (78%).

### The results of the correlation coefficient

The results of the correlation coefficient showed that there is a positive and significant relationship at 99% level between variables of increase in revenue, educational factors, consulting services, experience, reduction in workforce, level of education, and cultural factors, and the independent variable of adoption of pressurized irrigation systems. Therefore these variables were considered in the multiple regression analysis.

Table 1. Results of Spearman correlation coefficient to determine the relationship between research variables, in short

Independent Variable	Dependent Variable	$r_s$	P
Increase in revenue	Adoption of pressurized irrigation systems	0.625**	0.000
Educational factors	Adoption of pressurized irrigation systems	0.723**	0.000
Consulting services	Adoption of pressurized irrigation systems	0.251*	0.006
Experience	Adoption of pressurized irrigation systems	0.252**	0.000
Reduction in workforce	Adoption of pressurized irrigation systems	0.875**	0.000
Level of education	Adoption of pressurized irrigation systems	0.466**	0.000
Cultural factors	Adoption of pressurized irrigation systems	0.281*	0.000

Note:  $p \leq 0.05 = *$ ,  $p \leq 0.01 = **$

### Results of multiple regression analysis

Stepwise multiple regression analysis has been used in this study in order to assess the role of independent variables in explaining the dependent variables. Table 2, shows the estimated results of multiple regression analysis in order to assess the role of independent variables in explaining the dependent variables. As can be seen in table 2, the estimated results of the multiple regression coefficient is  $R = 0.650$  and the value of the coefficient of determination is  $R^2 = 0.602$ . Also, the adjusted coefficient

of determination is  $R^2 = 0.658$ . Significance of the multiple regressions is calculated using F, which is significant at 99% level ( $Sig = 0.000$ ).

Table 2. Estimated results of multiple regression analysis

Variable	B	Standard error B	Beta	t	Sig
Constant	12.213	2.658	-	4.311	0.000
Increase in revenue	0.365	0.062	0.759	7.314	0.000
Consulting services	0.264	0.081	0.402	2.014	0.000
Reduction in workforce	-0.154	0.037	-0.283	-0.737	0.000
Educational factors	0.222	0.041	0.144	2.822	0.004
$R = 0.650$ , $R^2 = 0.602$ , $Adjusted R^2 = 0.658$ ,					
$F = 261.202$ , ( $Sig = 0.000$ )					

Note:  $Sig < 0.05$  = Significance level of 5%.  $Sig < 0.01$  = Significance level of 1%.

Estimated coefficients of explanatory variables of cultural factors, experience, and level of education are not statistically significant, and coefficients of explanatory variables of increase in revenue, consulting services, reduction in workforce, and educational factors are statistically significant. Also, the multiple regression equation is as follows:

$$y = 12.213 + 0.365 x_1 + 0.264 x_2 - 0.154 x_3 + 0.222 x_4$$

Where  $x_1, x_2, x_3$ , and  $x_4$  represent increase in revenue, consulting services, reduction in workforce, and educational factors respectively.

## DISCUSSION

Results of regression analyzes showed that the variable of increase in revenue is statistically significant [1]. Also, Results of regression analyzes showed that the variable of consulting services is statistically significant [2]. The variable of reduction in workforce is significant which confirms the findings [1].

## SUGGESTIONS

According to the results obtained, increase in revenue, consulting services, reduction in workforce, and educational factors are statistically significant. In this regard, it is suggested that by providing consulting services and effective communication between the relevant authorities, promoter, and beneficiaries, encourage them to adopt pressurized irrigation systems and by using available educational factors such as organizing training courses related to modern irrigation systems to point out the benefits of such systems especially reduction in workforce, and finally practical steps to be taken to promote the adoption of innovations especially pressurized irrigation systems.

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