Expert Opinion

Factors affecting the attitude of farmers towards acceptance of pressurized irrigation systems (Case study: West Azerbaijan Province)

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ABSTRACT:
Faced with the problem of water scarcity, it is essential that to be used of the methods for irrigation that by applying them to increase the efficiency of irrigation water. The main objective of this research is the analysis of factors affecting the attitudes of farmers towards the acceptance of pressurized irrigation at (West Azerbaijan province). The population in this study are West Azerbaijan Province farmers who use irrigation systems that were about 899 people. The sample size was calculated by Cochran formula 130 people. The questionnaire was designed according to the aims of research. This research is a descriptive-survey study. The data were collected through questionnaires. To analyze the data in this study used Pearson coefficient test and regression analysis in the SPSS software. Results of the Pearson test showed that there is a significant and direct relationship between pressurized irrigation systems with government support factors, economic factors, social factors, educational factors and environmental factors. We found highest correlation coefficient between the dependent variable of pressurized irrigation systems and economic factors (0.751). Given that the value of coefficient of determination R^2 adjusted is equal to 0.644, it can be stated that the model used to explain 0.628 percent dependent variable changes and the results of regression showed that economic factors have a stronger role in explaining the dependent variable.

Keywords:
Analysis, attitude, farmers, pressurized irrigation, West Azerbaijan Province.

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INTRODUCTION

Irrigation maintains moisture in the soil. Moisture is necessary for the germination of seeds. Seeds do not grow in dry soil. That is why irrigation is done before tilling. Roots of the plants do not grow well in dry soil. Irrigation is necessary for the absorption of mineral nutrients by the plants from the soil. Thus, irrigation is essential for the general growth of the plants (Khanna, 2015). There are many benefits related to the installation of an irrigation system in any residential or commercial landscape.

Over the last 20 years or so, we have seen an increase of awareness in the importance of conserving water, for many states across America has seen the effects of drought. By installing an automatic irrigation system that best suits the needs, farmers will be saving time and money. When watered by hand more than 50 per cent of the water is wasted in runoff and evaporation. Automatic irrigation systems can be programmed to run at night when the evaporation is low, and in times of water restrictions. Individuals who install irrigation systems will benefit greatly, but the environment will also benefit. This is so important that everyone play their part in the conservation of this precious resource (Tweet , 2015).

Agriculture and farming are vital to the nation's economy, and efficient water management is a vital part of farming. With 50 years' experience, access irrigation provide water management and irrigation for agriculture, ranging from water for crops to systems for odour management.

Water is at the core of sustainable development and is critical for socio-economic development, healthy ecosystems and for human survival itself. It is vital for reducing the global burden of disease and improving the health, welfare and productivity of populations. It is central to the production and preservation of a host of benefits and services for people. Water is also at the heart of adaptation to climate change, serving as the crucial link between the climate system, human society and the environment. Water is a finite and irreplaceable resource that is fundamental to human well-being. It is only renewable if well managed.

Today, more than 1.7 billion people live in river basins where depletion through use exceeds natural recharge, a trend that will see two-thirds of the world's population living in water-stressed countries by 2025. Water can pose a serious challenge to sustainable development but managed efficiently and equitably, water can play a key enabling role in strengthening the resilience of social, economic and environmental systems in the light of rapid and unpredictable changes (Decade, 2015).

It is clear that we are now living in a new era for planet earth and its inhabitants. Human beings now dominate the planet and have become a major force driving planetary system trends such as climate change, loss of biodiversity, and resource degradation – including growing water scarcity. We are increasingly dependent on each other – the era of relatively autonomous and isolated communities is finished. This means that the actions of some people, for example those who are relatively wealthy and consuming a lot of resources, are affecting those who are not so well- endowed. It also means that as global citizens, we all must accept responsibility for the future of the earth and its inhabitants (United Nations, 2015).

West Azerbaijan Province is one of the 31 provinces of Iran. It is in the northwest of the country, bordering Turkey, Iraq and Azerbaijan's Nakhchivan Autonomous Republic, as well as the provinces of East Azerbaijan, Zanjan and Kurdistan.

The aim of this study is to find out the factors affecting the farmers' attitudes towards the adoption of pressurized irrigation systems (West Azarbaijan province). Also Specific objectives of this research are as follows: identifying personal characteristics of farmers, evaluation of supportive factors the government,

economic factors, social factors, educational factors and environmental factors affecting the attitude of farmers to accept pressurized irrigation systems that all these issues have been examined from the viewpoint of farmers.

MATERIALS AND METHODS

The research method in this study is a descriptive - survey method and survey instruments in this research are a questionnaire. The survey included both open-ended and fixed-choice questions. A 5-point Likert scale running from 1 (strongly disagree) to 5 (strongly agree) was applied as a quantitative measure. The questionnaire included inquiries regarding the identity of respondents, and furthermore the man part of the survey had inquiries to decide the viable elements influencing the mentality of agriculturists to acknowledge pressurized irrigation system (government support factors, economic factors, social factors, educational factors and environmental factors). The validity of the questionnaire was done by giving a few duplicates of it to a gathering of experts, including teachers and experts. Also, in light of their proposals, the questionnaire was endorsed. Additionally, keeping in mind the end goal to gauge the reliability of the survey, thirty questionnaire were completed by the specialists and Cronbach alpha coefficient 0.87 was calculated.

The population interviewed in the present study was 899 farmers of West Azerbaijan who use the pressurized irrigation systems. To calculate the sample size, Cochran formula was used and were determined to be equal to 130 people. To explore the relationship between independent and dependent variables, regression and Pearson analysis of descriptive type were used. Required data were collected through observation, interviews, questionnaires and using factor analysis technique, the data were investigated. The analysis of quantitative data was carried out using descriptive statistics and regression analysis. In conjunction with descriptive statistics mean, variance, mode, standard deviation, maximum and minimum variables and other statistical analysis were also carried out using SPSS 21 software.

RESULTS

Table 1 shows that the average age of farmers studied was equal to 49 years. The highest and lowest age among farmers are 60 and 17 years, respectively. The results show that most participants (68 people) were in the age range 31 to 50 years. Other results are shown in Table 1. Most farmers (35 Farmers) studied (29.4 percent) had a literacy level of primary education. Most farmers surveyed (66.1%) use from wells to provide water resources for carrying out agricultural activities. Average farmland studied was equal to two hectares that highest land in between farmers was 32 and the lowest is equal to 0.75 hectares. As well as the results showed that most of the participants (110 people) have less than two hectares of the land. Average of production of the farmers investigated is equal to 53 tons that among farmers the highest production was equal to 480 and the lowest 12 tons. Results showed that most of the participants (n = 65) had less than 40 tons of product per year. Other results are shown in Table 1.

Factors influencing the adoption of pressurized irrigation systems

Farmer's view of West Azerbaijan province in relation to the factors affecting the adoption of pressurized irrigation systems were initially examined for the correlation coefficient of factors and the main variables was examined. Based on Pearson test conducted and in accordance with Table 2, The significance level between the pressurized irrigation systems and the factors supporting the government, economic factors, social factors, educational factors and environmental factors are less than 0.001. So H_0 is rejected and the research hypothesis is accepted. Also the results showed that there is a direct and significant relationship between the variable of pressurized irrigation systems and variables of government support

factors, economic factors, social factors and educational factors. The highest correlation coefficient is between the dependent variable of pressurized irrigation and economic factors (Table 2).

Regression Analysis

In research that will be used of regression analysis, the aim is usually to predict one or more criterion variables of one or more predictor variables. If the objective is to predict a criterion variable from several predictor variables then is used of multiple regression model. If the aim is at the same time forecast the criterion variables from predictor variables or a subset of them then is used multivariate regression model. The purpose of this multiple regression is finding predictor variables which it predict the criterion variable changes whether alone or jointly. In this study multiple regression test (from at the same time method) is used and its results are as follows in Table 3.

Given that modified Coefficient of determination R2 is equal to 0.644. It can be concluded that the model used (which contains government support factors, economic factors, social factors, educational factors and environmental factors) explain 0.628 percent of dependent variable changes.

As Table 4 showed the significance level of relevant test is equal to 0.000, that it can be claimed that regression model has significantly ability to predict the dependent variable, therefore, H_1 is accepted and H_0 be rejected.

Government support factor has the most powerful role in explaining the dependent variable (Table 5). And also due to the significance level only educational factor, government support and social factor showed a statistically significant effect and other variables are not significant and they have very little effect in predicting the dependent variable because the significance level is greater than 0.05 (05/0> Sig), therefore, according to column (coefficient of the

regression equation), the regression equation is as follows:

$$Y = 3.174 + 0.408X_1 + 0.185X_3 + 0.192X_4$$

$$Y = 0.0.079X_1 + 0.070X_3 + 0.0.090X_4$$

Results of the Pearson analysis showed that economic factors, government support, social factors, educational factors and environmental factors has a significant and direct relationship with dependent variable of pressurized irrigation systems. This finding is in accordance with Dinani and Boshrabadi, 2010; Abdolmaleki and Chizari, 2012; Azami *et al.,* 2012; Taghvaei *et al.*, 2010; Duc, 2008; Tuttle *et al.*, 2007; Jahromy and Zamani, 2008; Karbasioun *et al.*, 2007; Michailidis, 2007; Oladele, 2005; Damisa *et al.,* 2008 and Abramson *et al.,* 2013.

Actually, it can be interpreted that: By the increase of government support of farmers pressurized irrigation schemes Can better be encouraged for farmers in this regard because pressurized irrigation schemes has high costs and most farmers ability to pay not alone this costs. When farmers are not supplied with these schemes, they are economically not able to accept irrigation projects. So farmers should be provided with schemes economically because the most important target farmers is to achieve income so if farmers to realize that pressurized irrigation reduce costs and subsequently increase revenue so it can be entered plan. Pearson's test results showed that this factor the main factor from viewpoint of farmers.

Other factors including social factors, educational factor and environmental factors showed that by increasing and improvement of each of these factors can be performed better and more effective irrigation schemes among farmers.

DISCUSSION

As Iran is located in arid and semi-arid areas of the planet, it always faces with the problem of water

Table 1. Personal characteristics of farmers

Classification of ages	Frequency	Percent	Average	Lowest	Highest
Less than 30	32	24.6			
31-50	68	52.3			
Older than 51	30	23.1	49	17	60
Grade	Frequency			Percent	
Elementary	35			29.4	
Secondary	25			21	
Middle	19			16	
Diploma	24			20.2	
Collegiate	16			13.4	
How access to water	Frequency			Percent	
River	32			24.6	
Well	86			66.1	
River and Well	12			9.3	
The size of agricultural land	Frequency	Percent	Average	Lowest	Highest
Less than 2 hectares	110	86			
3 to 4 hectares	9	8	3.5	0.75	32
5 to 6 hectares	5	4			
More than 7 hectares	3	2			
Production rate of farmers	Frequency	Percent	Average	Lowest	Highest
Less than 40 tons	65	50			
41 to 80 tons	49	37.7	53	12	480
81 to 120 tons	12	9.2			
More than 121 tons	4	3.1			

crisis. In this regard, there are two fundamental problems: (i) low rainfall and high evapotranspiration, (ii) low irrigation efficiency by about 38%, soil being water transmission path, being inside the farm and creates a lack of surface and underground drains. On the other hand, due to the increasing population and ensuring food security, we should try to take away the traditional irrigation and approach to modern irrigation and the mechanized so that we can increase irrigation efficiency and raise productivity for enhancing our standard of living and income for rural communities. To this end, we must use the modern and mechanized systems as pressurized irrigation methods (Azami *et al.*, 2012).

Dinani and Boshrabadi (2010) concluded that pressurized irrigation in small plots is not profitable with a minimum interest rate. Cost of production is high in the short term but it is profitable in large land.

Abdolmaleki and Chizari (2012) concluded that whatever is more dominated by people and farmers have better financial ability their attitude is better than the pressurized irrigation systems. Whatever price of water is high, farmers' attitude also will be more positive than pressurized irrigation systems. Whatever is high literacy rate of farmers than they will have a better ability in earn and education and adoption of pressurized irrigation systems.

Azami *et al.* (2012) concluded that understanding the different components of pressurized irrigation

Table 2. The correlation matrix between the dependent variable of advantages of pressurized irrigation and factors affecting it from viewpoint of farmers

Description		Pearson correlation coefficient	Significant level
Advantages of pressurized irrigation	Government support Factors	0.617	0.000
	Economic factors	0.751	0.000
	Social factors	0.674	0.000
	Educational factors	0.622	0.000
	Environmental factors	0.720	0.000

Table 3. Table of the regression coefficients to explain the pressurized irrigation from viewpoint of farmers of West Azarbaijan province

Correlation coefficient	Coefficient of determination (R^2)	The modified Coefficient of determination	Standard error
0.803	0.644	0.628	5.87

Table 4. Results of multiple regression significance test

Model (factors)	Sum of squares	Degrees of freedom	Mean squares	F calculated	Significant level
Regression effect	5443.133	4	1360.833	39.431	0.001
remained	3002.495	87	34.511		
whole	8445.826	91			

systems, service and protection of pressurized irrigation systems, introduction of pressurized irrigation systems (knowledge advantages and disadvantages of them), how to use tools and machines in areas equipped with pressurized irrigation systems, how to work with different systems of pressurized irrigation systems (installation of components, etc.,) and time management of water consumption in different systems were identified as the most important educational needs. In contrast, issues such as building the infrastructure for land in order to implementing the system, drainage fundamentals of land equipped with irrigation system and soil and water conservation by implementing the system were at the lowest level educational needs. In this study, they conducted their studies using the combined quantitative - qualitative and descriptive - correlation. Then by distribution of the questionnaire and its analysis concluded that attitude most of beneficiaries of the Kermanshah region relative to the use of pressurized irrigation systems assessed positive to top. From the factors affecting this attitude also were involved factors such as education level, background of exploitation, the cost setting up the system, attend classes specialized, changes in income and land (Azami *et al*., 2012).

Taghvaei *et al.* (2010), stated that the development of new irrigation technologies is one of the most important solutions for the development of agriculture and increase production that due to the serious limitations of water resources in the country is raised as an important issue. They in a research of descriptive - analytical and correlation and meanwhile fieldwork and data collection were selected samples of 212 persons using stratified sampling from among their population. The findings suggest that three factors of structural, socio-economic and natural showed 66.10% of the variance. The main problem in non-use of pressurized irrigation systems in the area also was fragmentation and sprawl of agricultural land.

Duc (2008) reported that factors such as income, farm size, education level of farmers and benefit from extension services affect on farmers' satisfaction of utilizing pressurized irrigation technology. Tuttle *et al.* (2007) stated that promoters that are active in rural development programs are lacking the necessary knowledge toward communication skills and teaching methods and techniques.

Jahromy and Zamani (2008) concluded that promoters who try to when training to farmers raise incentives the farmers through matching educational materials with the needs of farmers and create a positive attitude provide satisfaction and continued use of agricultural technologies as pressurized irrigation systems. Accordingly, it can be said that among various effective factors (economic, social and educational) in sustainability the new irrigation methods, educational factors has been the most important role and infrastructure to provide effective education by exploring educational needs can be considered as underlying

Table 5. results of regression analysis on factors affecting the attitude of farmers to accept pressurized irrigation systems (Case Study: West Azerbaijan Province)

Factors	b	Standard error of b	standardized value of b	T value	Significant level
Constant	3.174	1.588		1.998	0.048
government support factors (x1)	0.408	0.079	0.407	5.169	0.000
Economic factors (x2)	-0.023	0.081	-0.025	-0.278	0.781
social factors (x3)	0.185	0.070	0.227	2.264	0.025
Educational factors (x4)	0.192	0.090	0.209	2.134	0.035
Environmental factors (x5)	0.034	0.045	0.068	0.752	0.453

factors in the acceptance and use of technology. Given that promoters play the main role in agricultural technology transfer (such as pressurized irrigation methods) as well as sustainability, therefore the role of promoters is as transferor of knowledge and new techniques to farmers that should have ability to recognize and correct implementation of the technology in different times and places. Accordingly, it been tried that be addressed to check competencies and capabilities of educators and promoters of pressurized irrigation systems as a specific purpose. Due and Bruening (2007) showed that in order of priority ability to plan, implementation of training program and the ability to change in behavior of farmers have known as the most important competencies required promoters.

Karbasioun *et al.* (2007) in Isfahan concluded that among the teaching methods and sources of information governmental promoters, other farmers, mass media have gained most importance compared to other items, respectively.

Michailidis (2007) in the study of agricultural extension services in the mountainous regions of Greece concluded that mass media (TV, radio, newspapers), other farmers, input dealers, educators, experienced family members and office staff of extension and education have been among the most important methods and data sources.

Oladele (2008) has compared the impact of the use of video as a teaching method versus impact of the face to face trainings by promoters and other forms of traditional education in Nigeria. He believes that use of

Video has greatest impact than face-to-face trainings and other traditional methods.

In another study, Damisa *et al.* (2008) also examined factors affecting the satisfaction exploiters of pressurized irrigation systems in Nigeria. The results showed that access to inputs, farm size, performance and access to water predicted have been satisfaction of beneficiaries of implementation of the systems.

Abramson *et al.* (2013) reported that through exchange without the cost of capital and saving time, drip irrigation always do not lead to optimized net income compared with manual irrigation. The limiting factor is labor force. In manual irrigation, labor force per unit take lower wages compared to drip irrigation.

CONCLUSION

Results of regression analysis showed that support government factor has strongest contribution to other factors. Always to enter any project in the community the farmers should be provided through long-term loans with low interest or, if possible, gratuitous donations from the government can be allowed to farmers who implement pressurized irrigation in their land. In West Azerbaijan province, water shortages in recent years has caused the government in this regard have tried more. Government support of the farmers motivates their participation in this field. The results also showed that pressurized irrigation is associated with educational and social factors but did not show any relationship with economic and environmental factors.

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