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Full Length Research Paper

Factors influencing the utilization of financial facilities for under pressure irrigation system

Seyed Jamal Hosseini* and Sahar Dehyouri

Department of Agricultural Extension and Education, Science and Research Branch, Islamic Azad University, Tehran, Iran.

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The major purpose of this study was to determine factors influencing the utilization of financial facilities provided for under pressure irrigation system by farmers. The total population for this study was 250 participants who adopted the under pressure irrigation systems and 100 respondents were selected by using random sampling methods. The result indicates that 45% of the variance in the perception of respondents about factors influencing them to utilize the financial facilities could be explained by the necessary conditions, amount of water available, social consequences, installation difficulties and number of farming lands.

Key words: Under pressure irrigation system, financial facilities, Esfahan Province, Iran, agriculture bank, utilization.

INTRODUCTION

World Bank predicted that by the year 2035, three billion people will live in the tough conditions because of water shortage (World Bank, 2009). According to the Human Development Report, by the year 2080, climate change would affect the life of many people throughout the world and more than 1.8 billion people would face water shortages (UNDP, 2007).

The management of water resources especially in agriculture sector has always been a major issue. Governments throughout the world have established programs to mange the water consumption more efficiently and effectively (Barnes and Ashbolt, 2006).

Iran is no exception and the policy has been to increase agricultural production for various reasons, such as price stability, improved per capita income and increased need for non-oil foreign exchange resources and this trend has become an unavoidable reality for agricultural sector. Increasing agricultural production has resulted in consumption of more water and there is no other way to change the amount of water used which is the equivalent of 130 billion cubic meters a year unless to use water more efficiently and to adopt new methods of irrigation. Ommani et al. (2009), citing Keshavarz et al. (2003), pointed out that the overall irrigation efficiency in Iran ranges from 33 to 37%, which is lower than the average for both developing countries (45%) and developed countries (60%).

Unfortunately, inefficient use of water in the past decades has nearly reduced more than 40 m in underground water level. Currently, the total water consumption is approximately 88.5×10^3 m^3, out of which more than 93% is used in agriculture, while less than 7% is allocated to urban and industrial consumption. Under the present situation, 82.5×10^3 m^3 of water is utilized for irrigation on 7.5 million ha of land under irrigated agriculture (Ommani and Noorivandi, 2003).

In order to combat this problem, there is need for new technologies and methods to manage water more efficiently especially in agricultural sector (Karami et al., 2006). On one hand, a more comprehensive water management is needed to achieve sustainable development, and participatory mechanism could accelerate this process (Guterstan, 2008).

Chandran and Chackacherry (2004) in a study about factors influencing the participation of farmers in irrigation management in India reported the socio-psychological variables, namely, social participation and attitude of the individuals significantly influenced the extent of

*Corresponding author. E-mail: Jamalfhosseini@srbiau.ac.ir.

Table 1. Variables and their measurement scale.

Variable	Measurement scale
Attitudes about necessary conditions to adopt the irrigation system	Five- point Likert
Social consequences	Five- point Likert
Economic consequences	Five- point Likert
Financial factors	Five- point Likert

participation. This in turn, calls for evolving appropriate extension strategies to create attitudinal changes and awareness on scientific water management

The traditional methods of water management have many problems and the best option currently to be used for irrigating farms is to use modern irrigation systems. The results of the study show that implementation of irrigation methods resulted in decreasing rate of water consumption from 12,000 m^3 in hectare to 6,200 m^3 (Vojdani, 2006).

In order to expand and accelerate the adoption of new methods of irrigation, government has decided to allocate financial facilities to farmers. However, financial facilities which are allocated each year for farmers did not increase the participation of farmers to a satisfactory level.

The overall purpose of this study was to examine the perception of farmers who adopted the under pressure irrigation system, and about factors influencing them to utilize financial facilities provided by the Agriculture Bank of Iran. The following objectives were formulated to guide the study: identify the personal characteristics of respondents; assess the perception of farmer about factors influencing them to utilize the financial facilities for under pressure irrigation systems and provide suggestions for policy recommendations.

MATERIALS AND METHODS

The methodology used in this study involved a three stage combination of descriptive and quantitative research. Stage one involved a series of in-depth interviews were conducted with senior experts in the Department of Agriculture in Esfahan Province and Agriculture Bank. A questionnaire was developed based on these interviews and relevant literature. The questionnaire included fixed-choice questions. A five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) was used as a quantitative measure.

The final questionnaire was divided into several sections. The first section was designed to gather information about personal characteristics of respondents. The second section was designed to measure the attitudes of respondents about factors that influence them to utilize financial facilities for under pressure irrigation system. The respondents were asked to indicate their agreements with statements by marking their response on a five point Likert-type scale. The variables and their measurement scale are presented in Table 1.

Content and face validity were established by a panel of experts consisting of faculty members at Science and Research Branch, Islamic Azad University, and some experts in the Department of Agriculture and Agriculture Bank. Minor wording and structuring of the instrument were made based on the recommendation of the panel of experts.

Stage two involved a pilot study with some experts who had not been interviewed before the earlier exercise of determining the reliability of the questionnaire for the study. Computed Cronbach's alpha score was 86.5%, which indicated that the questionnaire was highly reliable.

Stage three involved a survey held in the fall of 2010. The research population included all farmers in the Esfahan Province who utilized the financial facilities provided for under pressure irrigation system (N = 250). Using random sampling and the results of the pilot test, a sample of 100 was constituted. The data collected by interviewing the respondents and analyzed by using correlation and regression techniques.

For measurement of correlation between the independent variables and the dependent variables, correlation coefficients have been utilized and include spearman test of independence

RESULTS

The results of descriptive statistics indicated that the average age of respondents was 48 years old and average experience in farming was more than 27 years. It was also reported that more than 61% of respondents had well in their lands. Based on the perception of respondents, quantity of water resources in this region was very limited and slightly more than half of them indicated that amount of precipitation was not enough to fulfill their needs.

In order to find the perception of respondents about necessary conditions to utilize the under pressure irrigation system, they were asked to express their views. Table 2 displays the respondents' means about the four items. As can be seen, the highest mean number refers to the soil texture (mean = 4.16) and lowest mean number refers to amount of sands in the soil (mean = 2.47).

The perception of respondents about economic consequences of irrigation systems was displayed in Table 3. In relation to the perception of respondents, the highest mean refers to increasing lands under cultivation (mean = 4.17) and the lowest mean refers to increasing production per acre (mean = 3.15).

In order to find the perception about the social consequences of under pressure irrigation system, respondents were asked to express their views. Table 4 displays the respondents' means about the six statements. As can be seen, the highest mean number refers to role of farmers groups in utilization of irrigation system (mean = 3.55) and lowest mean number refers to participation of farmers in developing irrigation systems (mean =3.08).

The perception of respondents about financial supports

Table 2. Means of respondents' views about the necessary conditions to utilize the under pressure irrigation system (1 = least important; 5 = most important).

Source	Mean	SD
Soil texture	4.16	0.199
Salinity of soil	3.91	0.259
Farming lands being inflate	2.51	0.298
Amount of sands in soil	2.47	0.320

Table 3. Means of respondents' views about economic consequences of under pressure irrigation systems (1 = strongly disagree; 5 = strongly agree).

Item	Mean	SD
Increasing lands under cultivation	4.17	0.691
Reducing labor cost	3.65	0.591
Decreasing the cost of combating pest	3.58	0.604
Decreasing the cost of fertilizers	3.51	0.612
Increasing the production per acre	3.15	0.861

Table 4. Means of respondents' views about social consequences of under pressure irrigation systems (1 = strongly disagree; 5 = strongly agree).

Item	Mean	SD
Role of farmers groups in utilization of irrigation system	3.55	0.669
Dependence to income from agricultural activities	3.43	0.717
Lack of skillful labor force	3.31	0.808
Contact with agriculture experts	3.11	0.595
Contact with extension agents	3.10	0.589
Participation in developing irrigation system	3.08	0.589

for irrigation systems was displayed in Table 5. The highest mean refers to amount of loans and financial facilities (mean = 4.19) and the lowest mean refers to easiness in getting loans (mean = 2.66).

Spearman coefficient was employed for measurement of relationships between perceptions of farmers about factors influencing the utilization of financial facilities for under pressure irrigation system. Table 6 displays the results which show that there was relationship between perception of respondents working experience, amount farming lands, number of agriculture lands, and amount of water available, quality of water, amount of precipitation, necessary constitution and social consequences.

Table 7 shows the result for regression analysis by stepwise method. Independent variables that were significantly related to perception of respondents about factors influencing the utilization of financial facilities for under pressure irrigation systems as dependent variable were entered. The result indicates that 45% of the variance in the perception of respondents could be explained by the necessary conditions, amount of water available, social consequences, installation difficulties and number of farming lands. Among all variables, "amount of water available "(Beta coefficient: 0.448, sig.: 0.000) was the most important factors which affect the utilization of financial resources for under pressure irrigation systems.

DISCUSSION

The role of new irrigation systems in water management has been the subject of intense debate among stakeholders. The perception of farmers about the factors influencing the utilization of financial facilities for under pressure irrigation system was discussed in this article. The results demonstrated that utilization of financial facilities depends upon participation of beneficiaries in developing and implementing the irrigation system.

Table 5. Means of respondents' views about financial supports for under pressure irrigation systems (1 = strongly disagree; 5 = strongly agree).

Item	Mean	SD
Amount of loans and financial facilities	4.19	0.671
Personal investment in developing system	3.61	0.858
Rate of loans	3.12	0.749
Time of repaying loans	2.89	0.782
Easiness in getting loans	2.66	0.939

Table 6. Correlation measures between dependent and independent variables.

Independent variable	Dependent variable	Farmers	
		r	Sig.
Working experience	Financial facilities	0.305	0.002**
Amount of farming lands	Financial facilities	0.287	0.004**
Number of farming lands	Financial facilities	0.242	0.012*
Amount of water available	Financial facilities	0.295	0.003**
Quality of water	Financial facilities	0.210	0.038*
Amount of precipitation	Financial facilities	0.335	0.002**
Necessary conditions	Financial facilities	0.253	0.010*
Social consequences	Financial facilities	0.246	0.013*
Installation difficulties	Financial facilities	-0.281	0.004**

**p<0.01, *p<0.05.

Table 7. Multivariate regression analysis.

Parameter	B	Beta	T	Sig.
Constant	8.033	……	3.590	0.000
Necessary conditions	0.324	0.289	3.633	0.000
Amount of water available	1.488	0.448	5.759	0.000
Social consequences	0.200	0.315	3.668	0.000
Installation difficulties	-0.152	-0.306	-3.773	0.000
Number of farming lands	0.209	0.181	2.132	0.036

$R^2 = 0.45$; $Y = 0.289\ x_1 + 0.448\ x_2 + 0315 x_3 - 0.306\ x_4 + 0.181\ x_5$.

As the regression analysis showed, informing about necessary conditions, amount of water available, social consequences, installation difficulties and number of farming land caused 45% of variance on the perception of the farmers regarding the utilization of financial facilities. This result is consistent with Caswell and Zillberman (2000) conclusion in which quality of water and amount of water available in United States had role in developing the new irrigation system.

Based on the results of the study, decreasing the cost of labor influenced the utilization of financial facilities provided to them for under pressure irrigation system. Shrestha and Gopalaukrshanan (1998) reported increasing income and decreasing the cost of labor force influenced the adoption of under pressure irrigation systems.

The results of this study point out the impact of soil texture and quality of soil in utilization of financial facilities by farmers for under pressure irrigation system. Developing new and modern irrigation system depends upon to the quality of soil. In addition, loans with low rate influenced the adoption of this system (Lichtenberg, 1997).

The results of this study point out the role of social factors which affect the utilization of financial facilities for under pressure irrigation. This is in accordance with findings of research by Chandran and Chackacherry (2004).

In order to improve the awareness and understanding of the irrigation systems, farmers should be informed and trained about benefits, risks and impacts of this system.

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