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Factor Affecting the Sustainable Management of Agricultural Water

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Abstract

The main purpose of the study was to investigate the factors affecting the sustainable management of agricultural water in Hamedan. The study population included all wheat farmers possessing irrigated farms in Hamedan city (N=1800). Of these farmers a sample of 317 people has been selected by using randomized multi-stage sampling method. The data were collected through a questionnaire's tool with help of the interview technique. Accuracy of the questions in the questionnaire was face validated by a panel of specialists. To test the reliability of the questionnaires, the questionnaires were first given to 30 farmers and Cronbach's Alpha was calculated (Alpha=0.92) then the questionnaire was finalized. Data analyzing methods such as Multiple Regression and the coefficient of variation (CV= standard deviation /mean) were used in this study. To determine the level of sustainability of the farms Bossel method proposed for classification and grading the fields was used. The results showed that variables agronomic factors, policy factors and institutional factors were able to explain 34 percent of the dependent variable's changes (sustainable management of agricultural water). According to the results, 95.3 percent of the farmers were categorized into unsustainable group, 4.1 percent into semi-sustainable and only 0.6 percent in sustainable group.

Keywords:
Sustainable management, Agricultural water, Multiple regression,Farmers irrigated wheat, Hamedan city

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INTRODUCTION

Several studies indicate that the amount of water allocated for agriculture will be further restricted in the entire world due to continuous population growth, development of Urbanization and Industrial Development till 2025 (Ehsani and Khaledi, 2003) which results in the lesser agricultural production, especially in dry areas. The problem in many arid and semi-arid countries has led to the importation of food (Hamdy *et al*., 2003). Iran is among the countries where facing a water crisis based on the classification that is done by International Water Management Institute (Ehsani and Khaledi, 2003). In addition, it is predicted that by 2030, Iran will be among those countries that renewable water resources per capita will be less than 1500 cubic meters per year that it will lead to a critical water situation (Rijsberman *et al.,* 2006). What is emphasized is that the negative social effects of resource scarcity, including migration, conflicts and competitiveness, reduce production and income and thus reduction of the life quality, will disappear through increasing the community's capacity to deal with these shortages (Bocchi *et al*., 2006).

With the knowledge that in a national scale, the most important use of water is for agriculture, so, better management of water in agriculture will have the greatest effect on the availability of water resources (Frozani andKarami, 2012). Iran water use efficiency is about 30% at the national level. Thus, water scarcity and misuse of currently available water resources are the major threats to the sustainable development of the agricultural sector (Hamdy *et al*., 2003). Today, water management challenges and shortcomings have increased due to excessive pumping of groundwater which cause a rise in water salinity. Notion of water consumption in most countries shows the increasing pressure on water resources and the need for new approaches to managing the consumption has increased drastically (Sullivan, 2002). The challenge of water scarcity and droughts in recent years has doubled the focus to the issue of water management in agriculture sector; which, consequently, is introducing a wide range of related approaches to water management at the farm level (Frozani and Karami, 2012).

During the past few decades, increasing degradation of natural and environmental resources reveals that, the development did not have a rhythmic motion and it causes instability and worsens environmental hazards in the environment. Water as part of the environment – is the environmental, basis of life and the fundamental component of each development model, and it has a central and important role in sustainable development. Unfortunately, in the last few years, as a result of human activities, despite its limited resources, this valuable resource has suffered from irreparable damage and its quality and quantity in many communities declined sharply (Poorasghar, 2001). In this regard, experts say, growing demand for water and the severe limitations of this vital element in the global scale will be considered as the main challenge to the world in the next few years (Sayer and O'Riordan, 2000). Supply management and development of water resources, as a major dynamic and effective element in sustainable development, draws its attention to the environmental, political, legal and organizational issues (Dungumaro, 2003; Serageldin, 1995).

Agriculture has an important role in planning and policy as the largest consumer of water (Borimnejad and Yazdani, 2004). Because more than 90 percent of total water consumption in the country is devoted to agriculture and less than 7 percent is devoted to urban and industrial uses (Godarzi *et al*., 2009). Globally, agriculture accounted for the highest consumption of fresh water so that in 2002 about 70 percent of the water used in the world has been devoted to agriculture (Anonymous, 2003). Therefore, proper management of water in agriculture can influence the development of sustainable agriculture in Iran (Godarzi *et al.,* 2009). Due to limited renewable water resources and allocating the bulk of its production in agricultural products, all of the growth in world population and food shortages, the importance and sensitivity of water resources management has increased (Howarth *et al*., 2005) and pronounced the need for attention to mechanisms and programs to increase productivity and optimal use of water resources in the agricultural sector (Hartley, 2006).

Distribution of precipitation in the world is very heterogeneous and its distribution is such that has placed Iran among the countries with severe water restrictions. The average annual precipitation is about 250 mm in Iran which this rate is about a quarter of the global average (Hasheminia, 2004). Based on Meteorological Organization studies, Iran is among the countries that are already in water stress and this stress intensity remain is increased each year (Ansari *et al*., 2010). This issue requires much attention to the sustainable management and optimal use of water resources. Sustainable management of water resources is a systematic process for sustainable development allocation and is used for the monitoring of water resources for social, and environment economy purposes (Taylor *et al*., 2008).

Review of literature:

Without a doubt, understanding the factors affecting agricultural water management is a leading provider of water management in agriculture. Azizi (2001) classifies these components in several categories as management factors (age, history of agriculture, education, frequency of attendance extension ...), physical (cropping pattern, number of components, climate, irrigation ...), economic (insurance, difficult access to inputs), community (neighbors consumer behavior, time dependent, non-agricultural income), institutional (ownership of water resources, lack of enforcement of laws and regulations, rental of water ...).

Zahtabian (2005), considers lack of irrigation management due to the low efficiency of knowledge and believes that the role of education in promoting and improving irrigation management irrigation efficiency is significant. Ehsani and Khaledi (2003) considered role of agricultural extension and education in increasing water productivity. Khadem Adam (2003) mentioned factors such as: irrigation at the wrong time and flooding of agricultural land and the influence of water on earth as the most important problems related to water loss. Borimnejad and Yazdani (2004) analyzed sustainable water management of calibration irrigation efficiency and water stability index by multi-objective fractional programming, was.

In this study, it was found that when the performance values of the ratio of gross efficiency of water is 35%, the stability index equals to 15; while in irrigation efficiency of 75%, this index increases to 31.2. Zarei Dastgerdi *et al.* (2006), in a research, to improve agricultural water management, considered the instruction, research and awareness, understanding agricultural water management skills and new technologies important. Saadi (2008) in a study entitled need for training farmers in water management to cope with drought basis for coping with drought, acknowledged that farmers themselves should be familiar with appropriate methods of irrigation and figuring out ways to use less water. If in a long-term program, irrigation to be diverted and drip irrigation to optimum use of water, we won't face is the water limitation in the coming years. Farmers should be ready to cope with drought and the necessary training in coping with drought.

Ansari *et al,* (2010) study the water management in parallel with sustainable development anf they concluded at the end of their study that significant reductions in precipitation, degradation of water resources, lack of systematic and efficient management of water are inefficient factors to sustainable development in the world. Ommani (2010) investigated the factors affecting the sustainable management of water resources and concluded that crop payments and the extension of educational activities, economic characteristics, farmers' knowledge, social activities and government support are the most important factors affecting the sustainable management of crop water requirements. Frozani and Karami (2012) as in the study of water management: wheat producers across city near Shiraz, Fars Province reached to the conclusion that n general, farmers have limited knowledge and poor management in relation to agricultural water in their study area. Despite the significant positive relationship knowledge between farmers and water management and optimal management at the farm level, there is the total amount of available water and agricultural knowledge of water management there is a significant negative relationship between management and their optimization.

According to research of Regner *et al,* (2006) failure to provide necessary training for farmers on irrigation management is an important problem in the field of successful water management. Riesgo and Gomez (2006) in a study analyzed the effect of different policy scenarios of agricultural policy and water pricing policies in the agricultural sector in Spain using several criteria of mathematical programming models. The results showed that cover the full cost pricing of water than normal conditions in the price of water are zero can be used in about 50 percent and reduce water demand.

Gruber *et al.* (2009), in their study, considering water demand agricultural season, reached to the conclusion that improving knowledge about better managing administrative structures, technical knowledge and access to credit for farmers should be used in national strategies for improving agricultural water.

Osooli *et al*. (2011), in a study entitled, factors affecting the sustainable management of agricultural water in dry areas, reached to the conclusion that the most important factors affecting the sustainable management of agricultural water are educational, agronomic, technical, social and economic factors. Ommani (2011), in a research entitled factors affecting the sustainable management of water resources in agriculture, concluded that factors related to farm size, factors of agricultural knowledge, social factors and mechanization are the factors affecting the sustainable management of water resources in agriculture.

MATERIALS AND METHODS

This research is a survey. In this method, by selecting and studying samples chosen from the abundance, and distribution, relationships between variables are reviewed and evaluated. The population of the survey are irrigated wheat farmers in Hamadan city engaged in farming which are 1,800 among which a total of 317 cases have been selected by sampling (multistage sampling).

For data collection, a questionnaire containing 21 open questions and 60 closed questions was used. The accuracy or validity of indicators and items in the questionnaire has been confirmed by specialists. To evaluate the reliability of the research instrument the questionnaire was given to a number of farmers in Hamadan city. Obtained results for Cronbach's alpha was 92% which is rather an acceptable figure. Due to the nature of the research, the data are described and analyzed in this study. In data description, the descriptive statistics such as frequency, percentage, median, mode, standard deviation, variance, mean, and others were used. In the data analysis, multiple-regression was used. The dependent variable in this study named composite index of sustainable management of agricultural water of irrigated wheat farmers is presented below:

$$S = \sum_{i=1}^{9} Xi - \sum_{j=1}^{5} Yj$$

In this formula, S is stability, X1 to X9 are respectively agricultural water productivity, crop rotation, use of legumes, the use of animal manure, the use of green manure, conservation tillage, transmission channels of agricultural water, deep water wells, irrigation and Y1 to Y5 are intake of pesticide spraying, the amount of herbicide, pesticide, phosphate fertilizer consumption, the rate of chemical fertilizer nitrogen and the amount of potash chemical fertilizer (Ommani, 2010). Independent variables in this study are agronomic factors, policy and institutional factors, education and extension factors, social factors and economic factors.

RESULTS

Individual characteristics of the study population

Based on the findings mean age was 41.50 years (SD = 13 years). The youngest of samples was18 and the oldest of them was 79 years old. Among the total respondents, the most common examples are illiterate (36.9%). The depth of the water wells in the study is as the following: thus, 9 farms with less than 70 m depth wells, 238 fields with wells with depths of 70 to 100 meters, and the number farms with more than 100 deep wells are 70; and about 60 percent of farms are with electric pump and about 40 percent of them are with diesel pump; and about 40 percent of farms use polyethylene pipes, about 33 percent of them use cement channel and about 26 percent of them use soil creeks to convey water from source to field.

Pesticides, herbicides and pesticides are discussed as the two main factors in the sustainable

Table 1. Description of Farming on sustainable water management in the target Farms, Farmers' perceptions

Priority	Variable	M	SD	CV
1	Prevent the accumulation of waste in the water channel	4.22	0.689	0.163
2	Fertilization performed using water	4.14	0.810	0.195
3	Fight timely and proper weed	4.09	0.809	0.197
4	Removing the winding water channels on the farm	4.00	0.882	0.220
5	Proper distribution of water to the land surface	4.10	1.01	0.246
6	Water storage tanks, water storage and seasonal rainfall	3.87	1.00	0.258
7	Reuse of waste water and excess	3.59	1.05	0.292
8	Sponsorship agricultural rotation	3.64	1.10	0.302
9	Early planting plants in order to escape from the stress and tension	3.65	1.12	0.306
10	The use of drought resistant wheat cultivars	1.95	0.627	0.321
11	Irrigation in the morning or evening	3.52	1.19	0.338
12	Use of pressurized irrigation	3.47	1.46	0.420
13	Integrating land to prevent water loss	3.94	1.81	0.459

Note: very low=1, low= 2, moderate= 3, much=4, very much= 5; M=mean, SD=standard deviation.

management of water in agriculture distribution of the samples show that the cache-offs in terms of pesticides. Most of the study population between 1.5 to 2 liters per hectare consumption of pesticide has and distribution of samples based on the amount of chemical herbicides indicates that the population studied more than 2 liters per hectare consumed poison.

The use of chemical fertilizers has considerable influence on the sustainable management of agricultural water. To evaluate the amount of chemical fertilizers in the fields of study we have classified phosphate fertilizer (Black) and N (white) in three categories: describing the following consumption of 200 kg per hectare, 200 to 400 kg ha and more than 400 kg per hectare, potash fertilizer also classified as the following three categories: 150 kg ha 150 to 200 kg ha. We have more than 200 kg ha category: distribution of samples based on the amount of chemical fertilizer phosphate (black) shows that most of the study population have consumed between 200 to 400 kilograms per hectare fertilizer. Frequency distribution of samples based on the amount of chemical fertilizer N (white) indicates that most of the study population have consumed between 200 to 400 kilograms per hectare fertilizer and the distribution of samples based on the amount of chemical fertilizer potassium indicates that the population have studied more than 150 kilograms per hectare fertilizer consumption.

Variables affecting the sustainable management of water in terms of priority:

A. Agronomic Factors

The most important agronomic factors are those that its variation coefficients are less. The most important elements farmers observed in their fields were: prevent the accumulation of waste in the Water Channel with the coefficient of variation of 0.163, fertilization using water with the coefficient of variation of 0.195 and timely and accurate struggling with weeds with the coefficient of variation of 0.197 (Table 1).

B. Policy and Institutional Factors

The most important policy and institutional factors are those that its variation coefficients are less. The most important policy and institutional factors from the perspective of farmers' are: reduction rules to obtain bank credit with the coefficient of variation of 0.175, longer term of returning the financing system with the coefficient of variation of 0.179 and lowering interest rates on loans related to agricultural water management high productivity with the coefficient of variation of 0.180 (Table 2).

C. Education and Extension Factors

The most important education and extension factors are those with less variation coefficients. The most important factor from the viewpoint of education and extension farmers are: visits to successful farms with the coefficient of 0.149, teaching sessions for optimal management of

Table 2. Description of Policy making and Institutional Factors, the Farmers' Perceptions

Priority	Variable	M	SD	CV
1	Reduction rules to obtain bank credit	4.21	0.740	0.175
2	Longer repayment system facilities	4.15	0.746	0.179
3	Lowering interest rates on loans related to water resources management	4.13	0.746	0.180
4	Investments or for modification and repair facilities Rivers	4.13	0.769	0.186
5	Increased use of irrigation facilities with high productivity	4.07	0.766	0.188
6	Funds allocated by the government for long-term reconstruction and rehabilitation of water sources	4.16	0.791	0.190
7	Public investment to improve the condition of a water conveyance canals	4.09	0.816	0.196
8	Treatment and use of wastewater in agricultural production	4.16	0.824	0.198
9	The diesel-electric wells	4.15	0.824	0.198
10	Coordination between government agencies concerned with water	3.86	0.956	0.247
11	Support private sector investment in agricultural water management sector	3.88	1.00	0.257
12	Operations aquifer	3.79	1.07	0.282
13	Regarding the privacy and legal distance between wells	3.59	1.14	0.317
14	Blocking unauthorized wells	3.63	1.18	0.325
15	Installation of water meters on wells	3.62	1.21	0.334
16	Obtaining fine harvest unauthorized users	3.68	1.24	0.336

Note: very low=1, low= 2, moderate= 3, much=4, very much= 5; M=mean, SD=standard deviation

agricultural water with the coefficient of variation of 0.187 and teaching farmers the necessity for efficient use of water with the coefficient of variation of 0.198 (Table 3).

D. Economic Factors

The most important economic factors are those with less variation coefficients. The most important economic factors in farmers' views are: reduction of costs by using modern irrigation methods with a coefficient of variation of 0.184, financial ability of the farmer and providing sufficient initial capital for new irrigation methods with a coefficient of variation of 0.210 and quotas to limit production with high water demand with CV of 0.210 (Table 4).

E. Social Factors

The most important social factors are those with least variation coefficients. The most important factors in the farmers' perspective are: public participation in decision-making in agricultural water management projects with a coefficient of variation of 0.182, people's participation in agricultural water management projects with a coefficient of variation of 0.185 and the formation or group of people to oversee the efficient use of water resources with a coefficient of variation of 0.188 (Table 3).

Analysis of the stability fields of study

To analyze the level of stability of the fields of study, standard deviations from the mean is

Table 3. Description of Education and Extension Factors, the Farmers' Perceptions

Priority	Variable	M	SD	CV
1	Views from the field and successful demonstration	4.23	0.633	0.149
2	Teaching sessions for optimal management of agricultural water	4.13	0.776	0.187
3	Training farmers to the need for efficient use of water	4.11	0.817	0.198
4	Regular visits of new irrigation systems and rural education	4.02	0.857	0.213
5	Distribution of educational brochures and magazines	3.90	0.955	0.244
6	Expertise experts agricultural extension	3.90	0.957	0.245
7	Educational film on water management	4.07	1.01	0.248
8	Expertise in irrigation sector experts	3.83	0.966	0.252
9	Increase participation in agriculture, agricultural water management	3.81	1.04	0.272
10	Farmers referred to counseling centers for agricultural water management problem	3.76	1.04	0.276
11	Farmers encouraged to attend training classes	3.78	1.06	0.280

Note: very low=1, low= 2, moderate= 3, much=4, very much= 5; M=mean, SD=standard deviation

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Table 4. Description of Economics Factors on basis of the Farmers' Perceptions

Priority	Variable	M	SD	CV
1	Reduce costs by using modern irrigation methods	4.14	0.763	0.184
2	Level of funding sufficient financial ability of farmers to use modern irrigation methods	4.04	0.849	0.210
3	Quotas to limit production with high water requirements	3.96	0.835	0.210
4	Rationing of energy supply	3.94	0.873	0.221
5	Production quotas on the amount of available water	3.81	1.00	0.263
6	Increased price of chemical inputs as inputs to supplement water	3.64	1.06	0.291
7	Local water supply rationing	3.70	1.11	0.300
8	Increasing the price of water rights (water pricing)	3.58	1.08	0.301
9	Energy prices in groundwater as a supplemental water input	3.57	1.10	0.308
10	Reduce subsidies for agricultural inputs	3.55	1.14	0.321

Note: very low=1, low= 2, moderate= 3, much=4, very much= 5; M=mean, SD=standard deviation

used (Taghipoor *et al*., 2013). In this method, the converting methods of the obtained scores based on the proposed Bossel table are estimated in 3 categories:

A < Mean – St.d: A unsustainable

Mean- St.d < B < Mean: B semi-sustainable

C > Mean + St.d: D sustainable

To analyze the stability fields of study Bossel proposed method for classification and grading of the fields are used. Bossel proposed method is shown in table 6.

Based on the Bossel proposal, stratification for the stability of unsustainable field values is between 0 and 0.4, unsustainable farmland values are between 0.4 and 0.6 and sustainable farmland values are between 0.6 and 1. Given the stability of the proposed Bossel and the mean of the combined formulation of sustainable management of agricultural sustainable management of water, land leveling is studied (Table 7).

Most fields of the study were in a unsustainable agricultural water management means that roughly about 95 percent of the farms in terms of sustainable management of agricultural water are unsustainable which this is a serious problem in the agricultural sector if that trend continues this practice in the near future there would be problem regarding agricultural water supply.

Table 5. Description of Education and Extension Factors In the Farmers' Perceptions

Priority	Variable	M	SD	SD/M
1	Public participation in decision-making in agricultural water management projects	4.21	0.769	0.182
2	People's participation in agricultural water management projects	4.12	0.764	0.185
3	Focus formation or group of people to oversee the efficient use of water resources	4.19	0.790	0.188
4	The use of local traditions and local laws among farmers for water management	3.93	0.820	0.208
5	Identification and use of indigenous knowledge for agricultural water man-	3.94	0.830	0.210
6	agement practices			
7	Coordination between government agencies and community organizations	3.94	0.849	0.215
8	Public participation in the preservation of agricultural water management projects	4.06	0.898	0.221
9	Local norms regarding the proper utilization of water resources	3.86	0.940	0.243
10	Cooperative formation of water users to improve water management in rural areas	3.72	1.02	0.274
	Together with the growing possibility of increased cooperation and participation of non-governmental organizations	3.68	1.09	0.296

Note: very low=1, low= 2, moderate= 3, much=4, very much= 5; M=mean, SD=standard deviation

Table 6. Sustainability Level

Level	Values
unsustainable	0 - 0.4
semi-sustainable	0.4 – 0.6
sustainable	0.6 - 1

Reference: (Bossel, 1999)

Table 7. Sustainability Level of the target Farms

sustainable	Equivalent	Number	Percent
unsustainable	0 - 0.4	302	95.3
semi-sustainable	0.4 – 0.6	13	4.1
sustainable	0.6 - 1	2	0.6

Table 8. ANOVA and Brief Model of Correlation and Determination Coefficient

correlation	R^2	F	Sig
0.542	0.340	17.581	0.000**

Regression analysis of factors affecting the sustainable management of agricultural water

To analyze the factors affecting the sustainable management of agricultural water, multiple regression analysis was used. In this method, first, all independent variables that have a significant relationship with the dependent variable enter into the equation simultaneously.

Regarding factors affecting the sustainable management of agricultural water multiple correlation coefficients (R) equals to 0.542 and coefficient of determination (R^2) equals to 0.340 (table 8). In other words, 34% of the variability is explained by the independent variables and other factors are related to changes that have not been studied in this research.

Factors that influence the sustainable management of agricultural water in this study were including crop factor policy and institutional factors that have significant relationship with the dependent variable which is the sustainable management of agricultural water; that the amount of crop factor equals to 0.462 means that a unit changing in the standard deviation causes the standard deviation of the dependent variable to be changed 0.462. And policy-taking and institutional level is 0.241 and the results of the obtained coefficients are given in table 9.

But according the results of the regression, significant relationship with educational and extension of social, economic was not observed.

According to the results in table 9, the linear regression equation is as follows:

$$Y = 2.078 + 0.119X_1 - 0.061 X_2$$

in which:

Y = Sustainable agricultural water management

X_1 = farming factors

X_2 = Policy and institutional factors

Therefore, the agronomic factors have a larger proportion in comparison with other variables in predicted the dependent variable. So, one unit change in standard deviation cause the standard deviation of the dependent variable to be 0.462. While the standard deviation of a unit change in policy and institutional strength to standard deviation of the dependent variable in size equals to 0.241.

DISCUSSION

The correlation between the sustainable management of agricultural water and each of the 5 factors (independent variables of research) the results showed that there is a positive and significant relationship between agronomic factors

Table 9.The Calculated Coefficient Related to Influencing Factors on Sustainable Agricultural Water Management

Variable	(B)	Beta	t	Sig.
Constant factor	2.078	-	2.175	0.000**
Agronomic Factors	0.119	0.462	4.521	0.000**
Policy and Institutional Factors	-0.063	-0.241	-2.610	0.005**
Education and Extension Factors	-0.021	-0.105	-0.876	0.298
Economic Factors	0.036	0.124	1.156	0.243
Social Factors	-0.031	-0.095	-1.361	0.124

and policy factors institutional framework and sustainable management of surface water; and there is no correlation significant between education and extension agents, social and economic factors and the level of sustainable management of water in agriculture. In other words, there is a 99 percent probability of a significant relationship between the dependent variable the sustainable management of water in agriculture and agronomic factor; the more improved the agronomic factor, the more sustainable management of water in agriculture will be. In addition, policy and institutional factors are significantly associated with the sustainable management of agricultural water in the present study (95%).

The results of the grading fields of study in terms of sustainable management of agricultural water showed that the majority of farms in terms of sustainability in water management are unsustainable that is a problem in the agricultural sector. As was previously stated in conjunction with the stability fields of sustainable management of agricultural water Ansari *et al*. (2010) showed there is a low level of water sustainability in the fields of and in a research done by Chatorudi (2001) the same problem is seen in less developed countries.

The problem reminds us that water consumption in agriculture in the studied population is highly unsustainable and if this trend continues it causes destruction and loss of the agricultural sector over time; and this requires deep and careful study to solve this big problem in the agricultural sector. Perhaps a quick solution to this problem is continuous government support for the creation and operation of pressurized irrigation methods and determination of governments to avoid drilling new deep wells and determination of harvest levels for farmers This can temporarily relieves these great problems in the agricultural sector and it requires a long-term planning in order to solve this problem. Other solutions to this problem culture-building in rural communities that help of local leaders, clergy and mass media use are highly appreciated.

CONCLUSION

The results of the regression analysis showed that an agronomic factor has a larger proportion in comparison with other variables in predicting dependent variable. So, one unit change in standard deviation cause the standard deviation of the dependent variable to be 0.462. While the standard deviation of a unit change in policy and institutional strength to standard deviation of the dependent variable in size equals to 0.241. The results of this study on agronomic factors in predicting the dependent variable is consistent with the results of Azizi (2001), Noruzi and Chizari (2007), Ommani (2011) and Gruber *et al*. (2009). The role of the policy and institutional and agronomic factors were positive in the works done by Khalilian Mehrjardi (2006), Ommani (2010). Shortt *et al*. (2006), also stated that it is better to rely on social factors instead of applying the laws and policies.

The results of the regression again indicated the important things we can do on the farm regarding the sustainable management of agricultural water. One of the simplest but most important, as pointed out by farmers, for example, prevent the accumulation of waste in the water channels. It should be noted that other factors must be met, for example, a family of legumes in crop rotation can significantly contribute to the sustainable management of water to maintain soil moisture. Unfortunately, in the fields we study, this was not done due to the habit of sole harvesting. However, the role of policy and institutional factors the results indicate negative effect of the policy and perhaps one of the reasons is that in the agricultural sector the things cannot be relied upon by force and, as stated by Shortt *et al.* (2006), social factors has better effects instead of applying the rules to achieve sustainability. Another guidelines in this section is to assign water management institutions and community organizations to the local people; and the government observe the affairs and shouldn't involve directly in water matters. However, this study showed that other factors have no significant role in predicting the dependent variable and other studies are needed. In general, it can be said that many factors involved in the management of agricultural water sustainable in which some of these factors were expressed in this study.

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