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Influencing factors on management of water resources from the perspective of horticulturists in Iran

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Abstract: The aim of this study was to determine influencing factors on management of water resources in Iran. The methodological approach of this study was descriptive- correlative. The research population consisted of 12800 horticulturists, which was selected using stratified randomizing sampling method. Validity of the instrument was established by a panel of experts consisting of senior faculty members in agricultural extension and education department, and research committee advisors. Reliability analysis was conducted by using and Cronbach alpha formula and result was 0.88. The results showed that 57.3, 31.6 and 11.1 percent of horticulturists expressed situation of management of water resources were bad, moderate and good respectively. Variables of age and experience with management of water resources had been relationship of negative and significant. Also variables of garden acreage, yield, cost-benefit, drip Irrigation acreage, connect to experts, social status, social participation, effect of extension- education activities, use of information resources, adaptability and testable innovations of management of water resources with management of water resources had been relationship of positive and significant. The results of the multiple regression analysis (stepwise method) revealed that the variables social participation, drip Irrigation acreage, number of pieces of garden, visibility, testable, effect of extension- education activities and complexity in seven steps explained a variation of 47.6% of management of water resources.

Key words: Management of water resources; Horticulturist; Iran

1. Introduction

Earth have 1400 million cubic kilometers of water is generally. Only 35 million cubic kilometers of water (2.5 percent) is fresh water. However, the agricultural sector accounted for the highest consumption of fresh water (Gumbo, 2011). In Iran, average annual rainfall of about 250 mm of rainfall in the world (860 mm) is much lower. The rainfall distribution is very disproportionate (Moussavi et al., 2008). The efficient use of water resources is of major programs in different countries. In arid and arid countries, stability of aqueous systems requires the application of principles and planning is more accurate (Joanne et al., 2010). Since the maximum amount of water used in agriculture and the highest rate of water shortage in this section are, therefore the need for efficient use of water resources in this section. In other words, agricultural water management is inevitable. Agricultural water management is a set of tasks between the four sectors of economic development, rural development, agriculture, water supply and environmental management (Soleimani and Bozer Jomheri, 2012). Iran is located in a very sensitive position from the different views in the basis of the management of water sources. During the last three decades, this country has invested a lot in basic constructions, which apply 100 dams with saving capacity of 30 billion cube meters and irrigation networks for watering and providing drinkable water for urban areas (The Executive Branch of Agricultural Organization project, 2009). After one period of fast extension of watery territory in the world that took place between 1950S until the beginning of 1980S (Kahrizi and Sangdel, 2001).

Suresh and Kullkarni (2013) showed that integrated water resource management for efficient, equitable and environmentally sustainable, transparent and inclusive participation of all stakeholders is needed. Efficient and effective water management requires that all stakeholders in joint operations, management and protection of water resources take.

Maghsoudi et al. (2013) in their research in Iran in the case of sustainable agricultural water management was concluded Plans and programs of the advantages of stability in rural communities through irrigation development projects do not have much information. Furthermore, increasing knowledge and skills related groups has a positive impact on the development and continuation of successful development. The second factor influencing the results of their research, budget, finance and funding mechanisms for the maintenance of water supply networks have been announced.

This Ponce Hernandes (2012), based on the factors affecting the management of resources showed that promote social capital, physical capital,

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alongside financial and human capital could influenced on improve water and soil productivity.

Domench and Ringler (2013), in their research in South Africa have concluded irrigation on health, nutrition, environmental sustainability and poverty reduction, and therefore has an important role due to the increased production of food irrigation programs to reduce poverty in an integral component of strategies has become.

Mohammadi et al. (2013) concluded that more than %70 of farmers was faced with water shortage. There are significant negative relationships between farmers' perception of water scarcity and variables such as depth of water in wells and also there are significant positive relationship between these variables and challenges such as water conveyance channels and water volume. Hosseini et al. (2011) showed the factors influencing the adoption of indigenous knowledge in agriculture water management. These factors, on the amount of their impact, are classified into four groups, namely, social factors, educational factors, economic factors and administrative factors. Ommani (2011) showed the expanding role in promoting the realization of sustainable water resource management in agriculture. %52.8 of respondents said they were very important to protect water resources in support of sustainable water resources management in agriculture. Hosseini et al. (2010) concluded that seeing other farmers using indigenous knowledge will affect them. They also said that farmers would prefer to see sample farmers to adopt irrigation techniques. Management factors contribute to the adoption of indigenous knowledge in agriculture water management, too. Fraiture and Wichelns (2010) expressed that while at the same time in different areas of water scarcity in agriculture is rising, water demand by the users is extremely competitive to get water. Narayan (1995) showed that in all cases, community empowerment, capacity building, enhancing skills and awareness and interested groups with regard to their participation in water management and how to achieve it, have a positive impact on the development and maintenance of cooperative activities of water users. And also according to Tabrai et al. (2011) transfer of operational management and maintenance of irrigation and drainage network extraction reduce the area of water resources and improve agriculture statues. They also expressed that the major problem about the management transfer is water shortages and lack of planning for the optimal use of water resources. Mahmoodi KaramJavan (2009) showed in a research that there is a significant relationship between the educational level of farmers, incomes satisfaction levels, social status, the ability to predict the results of participation, history of agriculture, understanding the benefits of participation, extent of land and overall service satisfaction with the rate of participation in irrigation network management and extension programs. Moradi and Tavakoli (2008) showed skyrocketing costs of operation and maintenance of irrigation and drainage networks and also inadequacy of water fees for the costs was the first motivation for participation in the management of irrigation and drainage networks. Additional factors such as utilization management and poor, improper maintenance, failure to satisfy farmers, lower performance and accelerating the erosion process network make governments more determined to transfer network management to farmers. Azizi (2007) showed that devolution of irrigation management not only helps to reduce the financial burden of government but also improve network management system. It results in increased productivity and enhanced sensitivity to the maintenance and conservation network. This will have great benefit for farmers.

This study was aimed at investigation of effective factors on management of water resources in Iran viewpoint of horticulturists. In order to achieve this objective, specific objectives are presented as below:

- Study of Status of management of water resources
- Study of relation of horticulture's personal, farming, social, economic, communicational- educational and innovation characteristics with management of water resources
- Role of horticulture's personal, farming, social, economic, communicational- educational and innovation characteristics on management of water resources

2. Method of research

In relation to objective, this research is functional, since the results can be employed by programmer and policy makers. In order to reach precise and reliable data we used quantitative method. Because this research simply investigates existed conditions and defines them and there is no possibility to control or manipulate the variables, it is descriptive. Because the gathering of information about the views, beliefs, thoughts and behaviors or group characteristics of a society is statistical and also it is under recognition, so it is measuring. Furthermore, because it investigates and analyzes the relations between independent and dependent variables, it is correctional.

2.1. Statistical population

The research population consisted of 12800 horticulturists, which was selected using stratified randomizing sampling method (n=375). Finally, 342 questionnaires were analyzed.

2.2. Validity and reliability

Validity of the instrument was established by a panel of experts consisting of senior faculty members in agricultural extension and education department, and research committee advisors. Also a pilot test was conducted to determine the reliability of the survey instrument. In this test, the mentioned questionnaires were given to 30 horticultures which

were similar to statistical society in regional, economic, cultural and social conditions. After gaining the data concluded the Cronbach alpha coefficient for all the variables with degree scale of 88%.

2.3. Variables

The independent variables included personal characteristics of the respondent horticulturists (age, work experience), farming characteristics (garden acreage, number of pieces garden, drip irrigation acreage, age of garden and agro ecological situation), economic characteristics (yield, cost-benefit ratios), communicational- educational characteristics (contact with experts, effect of extension- education activities, Use of information sources), social characteristics (social participation, social status), characteristics of innovation (relative advantage, compatibility, testable, visibility and complexity). The dependent variables was management of water resources

3. Findings

3.1. Status of management of water resources

Status of management of water resources were measured by 13 questions with a range of Likerts 6 items. The scoring of the mentioned range was 0=nothing, 1=very little, 2=little, 3=average, 4=high, 5=very high. Thus, the maximum score of management of water resources was 65 and the minimum score is 0. Table 1 shows mean, standard deviation, the coefficient of variation associated with the status of each questions related to the situation of management of water resources among the respondents. Based on the mentioned table, the first until the third priorities were fight against weeds in fields and along streams, water transmission by polyethylene pipes and use drip irrigation. Priorities of other items can be seen in Table 1.

Table 1: Prioritizing the items related with management of water resources

item	Mean	Standard deviation	Coefficient of variation	rank
Fight against weeds in fields and along streams	3.59	1.39	0.387	1
Water transmission by polyethylene pipes	3.60	1.39	0.388	2
Use drip irrigation	2.82	1.92	0.681	3
Prevent unauthorized wells	2.01	1.46	0.727	4
Prevent water loss in the transmission path	1.93	1.65	0.856	5
Local participation in water and irrigation system	1.64	1.58	0.963	6
Land leveling and consolidation	1.55	1.51	0.975	7
Establish of dams and flood diversion channels	1.27	1.42	1.117	8
Team exploitation of water resources	1.22	1.42	1.167	9
Dredging rivers and canals	1.16	1.43	1.239	10
Control of surface water	1.10	1.38	1.256	11
Concrete the canals	1.13	1.44	1.268	12
Multiple use of water resources	0.96	1.49	1.552	13

The range of Likerts 6 items: 0=nothing, 1=very little, 2=little, 3=average, 4=high, 5=very high

The status of management of water resources viewpoint of the respondents showed in Table 2. According to the mentioned table, 57.3, 31.6 and 11.1 percent of horticulturists expressed situation of management of water resources were bad, moderate and good respectively.

Table 2: Status of management of water resources viewpoint of the respondents

status	frequency	Percent of frequency	Cumulative percentage
Very bad(0-13)	67	19.6	19.6
Bad(14-26)	129	37.7	57.3
Moderate (27-39)	108	31.6	88.9
Good(40-52)	35	10.2	99.1
Very good(53-65)	3	0.9	100
Total	342	100	-

M = 23.9 SD = 10.9

3.2. Relation of horticulture's personal, farming, social, economic, communicational- educational and innovation characteristics with management of water resources

Table 3 showed intensity, relation orientation and a meaningful level of horticulture's personal, farming, social, economic, communicational-educational and innovation characteristics with management of water resources. As the table shows variables of age and experience with management of water resources had been relationship of negative and significant. Also variables of garden acreage, yield, cost-benefit, drip Irrigation acreage, connect to experts, social status, social participation, effect of extension- education activities, use of information resources, adaptability and testable of innovations of management of water resources with management

of water resources had been relationship of positive and significant.

Table 3: The relation of horticulture's personal, farming, social, economic, communicational- educational and innovation characteristics with management of water resources

Variables	Pearson correlation coefficient	Significant level
Age	-0.136*	0.012
Experience	-0.131*	0.016
Garden acreage	0.126*	0.020
Drip irrigation acreage	0.432**	0.000
Agro ecological situation	0.051	0.358
Age of garden	-0.106	0.051
Number of pieces of garden	-0.080	0.123
Yield	0.109*	0.045
Cost-benefit ratio	0.109*	0.045
Connect to experts	0.183**	0.001
Effect of extension-education activities	0.408**	0.000
Use of information resources	0.273**	0.000
Social participation	0.479**	0.000
Social status	0.376**	0.000
Relative advantage	0.066	0.226
Compatibility	0.338**	0.000
Testable	0.348**	0.000
Visibility	0.063	0.243
Complexity	0.028	0.604

*p<0.05 **p< 0.01

3.3. The role of horticulture's personal, farming, social, economic, communicational- educational and innovation characteristics on management of water resources

In order to predict the role of research variables on management of water resources, we used step by step regression. Analyzing the regression enables the researcher to predict the variance of dependent variable through independent variables and determine the role of every independent variable in explanation of dependent variable. In step by step method, the strongest variables enter the equation one after another. This process goes on until the errors of meaning exam reaches to 0.05 errors. Results showed social participation, drip Irrigation acreage, and number of pieces of garden, visibility, testable, effect of extension- education activities and complexity enter the equation in seven of steps, respectively. This means that social participation have the highest influence on management of water resources. This variable alone explained 23 percent of variance in dependent variable. Social participation and drip Irrigation acreage communally explained 31.5 percent of variance in dependent variables, in step two. In final, social participation, drip Irrigation acreage, number of pieces of garden, visibility, testable, effect of extension- education activities and complexity in seven steps explained a variation of 47.6% of management of water resources.

Table 4: Analyzing the regression of management of water resources

Step	R	R Square	Adjusted R Square	F	sig
1	0.479	0.230	0.227	101.28	0.000
2	0.561	0.315	0.311	77.92	0.000
3	0.591	0.349	0.344	60.53	0.000
4	0.616	0.380	0.373	51.61	0.000
5	0.674	0.454	0.446	55.89	0.000
6	0.685	0.469	0.460	49.41	0.000
7	0.690	0.476	0.465	43.34	0.000

Table 5: The standardized and non- standardized coefficients of management of water resources

Variables	B	Beta	t	Sig
Social participation	10.57	0.34	2.90	0.004
Drip irrigation acreage	1.08	0.31	7.38	0.000
Number of pieces of garden	3.57	-0.21	6.84	0.000
Visibility	-1.88	0.35	-5.09	0.000
Testable	1.11	0.34	6.90	0.000
Effect of extension- education activities	1.96	0.15	6.49	0.000
Complexity	0.22	-0.09	3.09	0.002
Constant	-0.46	-	-2.04	0.043

According to the amount of beta in table 5, we can write the regression equation as follows:

Y = 0.34X1 + 0.31X2 - 0.21X3+ 0.35X4- 0.34X5+ 0.15X6- 0.09X7

X_1 = Social participation
X_2 = Drip irrigation acreage
X_3 = Number of pieces of garden
X_4 = Visibility
X_5 = Testable
X_6 = Effect of extension- education activities
X_7 = Complexity

4. Conclusions and suggestions:

This study aimed at studying the management of water resources, indicated that more of the respondents (57.3 percent) believed that management of water resources was bad and very bad. According of results fields and along streams, water transmission by polyethylene pipes and use drip irrigation had been important related to management of water resources. Results from analyzing the Pearson correlation showed that age and experience have 95 percent of meaningful and negative relation with management of water resources. This means that the younger and less experienced gardeners, better water resources management. Also variables of garden acreage, yield, cost-benefit, drip Irrigation acreage, connect to experts, social status, social participation, effect of extension- education activities, use of information resources, adaptability and testable of innovations of management of water resources with management of water resources had been relationship of positive and significant. This means that the increase in social status, social participation, effect of educational activities, resource utilization information and contact with experts, as well as improved management of water resources. Also the gardens acreage and higher yield, better water resources management. Of course Intensity correlation in relate social participation, social status, effect of education and extension activities were moderate and in others variables the Intensity correlation is low and very low. These results conform to the researches of (Lipchin, 2003; Cramb, 2004; Illukpitiya and Gopalakrishnan, 2004; Suresh and Kullkarni, 2013; Soleimani and Bozer Jomheri, 2012; Maghsoudi et al., 2013; Domench and Ringler, 2013). Furthermore, the results of step- by- step regression illustrated that social participation; drip Irrigation acreage, number of pieces of garden, visibility, testable, effect of extension- education activities and complexity in seven steps explained a variation of 47.6% of management of water resources. These results conform to the researches of (Lipchin, 2003; Cramb, 2004; Illukpitiya and Gopalakrishnan, 2004; Suresh and Kullkarni, 2013; Soleimani and Bozer Jomheri, 2012; Maghsoudi et al., 2013; Domench and Ringler, 2013).

- It is recommended to improve water resources management of multiple uses of water resources (fish, etc.) and we had canals with concrete and Exploitation Team of water resources among the farmers in our promotion.
- It is recommended to improve water resources management drip spread among the farmers and land leveling and consolidation them done and gardens.
- It is recommended to improve water resources management in rural community to increase participation and team activities. Also More information on water resources management and use of resources.
- It is recommended to improve water resource management training activities - extension to be more practical and more tangible, and to improve the farmers' awareness and literacy.

It is recommended to improve water resources management, innovations of water resource management be compatible with the values and culture of horticulturists. Also these innovations can be observed and tested in the garden and have been a bit of complexity to making them easier to use.

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