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A Study of The Citizens' Attitude Towards Water Pollution Prevention and Soil Resources Identification

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ABSTRACT

Objective: The world is currently facing with various problems including water and soil pollution as well as a major threat to the health of the citizens due to the advancement at human civilization, technology development, pesticides and chemical fertilizers application, the increasing exploitation of natural resources by the agricultural sector and the increasing usage of fossil energy. Therefore, the aim of this study is evaluation of citizens' attitude towards water and soil pollution and the measurement of their different approach regarding to this environmental issue. **Methods:** Using the quantitative research method and questionnaires, this research sampled 150 people living in Khayyam and Tabarsi areas as well as 70 farmers from the outskirts of Mashhad (Jagharq, Ferdow,Torghabeh) to assess public awareness about the contamination of water and soil. **Results:** The results of this study show that most of farmers have little knowledge about soil contamination while residents of Khayam and Tabarsi areas have considerable information about status of their water. Moreover, most of the studied people believe that education and culture can be an effective method for water conservation and quality improvement which can act more effectively compared to fine and other methods. It also was found that education and communication with information sources and communication have effective role in farmer's attitude towards agriculture innovation such as organic farming. This shows the importance of education and agricultural extension system as the trustee training in the field of agriculture.

1.INTRODUCTION

Several environmental problems created as a result of urbanization so that the growing population caused to increment of agricultural production and food expanding and provided the expansion of agricultural activities. This has various environmental effects such as greater usage of pesticides and fertilizers which caused to their washing and moving into different layers of soil and ground water and their pollution (Khazaei, 2010). Environmental contaminants such as water and soil pollution lead to changes in the properties of the components of the environment so that makes their pervious usage impossible and directly or indirectly endanger the benefits of living organisms (Kalhori et al, 2004).

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Variety of surface and groundwater resources such as producing too much garbage, inaccurate collection and incomplete recovery of house hold waste, industrial and hospital, construction debris and hoarding garbage in border towns (city), non-normative usage of fertilizers and chemical toxins in agricultural, oil agents, various industrial activities, acid rain, industrial wastewater and municipal sewage are as water and soil pollution factors. Water pollution is one of the most important: waste that requires oxygen, pathogen, vegetarian food, synthesized (artificial) organic compounds, oil, inorganic chemical and minerals, sediments, radioactive material (radioactive) and heat are some of the main water pollutants while various organic and inorganic pollutions especially heavy metals leading to soil contamination (Babayi et al, 2008). Pollutants are involved in environmental pollution by causing severe toxic effects in humans and other organisms. Drink plenty of water with high levels of pollution has various health risk including gastrointestinal cancer, thyroid, inefficacy of the brain. Presence of contaminants such as heavy metals in excessive amounts of standard, can also lead to the anesthesia and even death.

Different strategies such as the usage of non-chemical fertilizers like compost in agriculture, application of biological methods to combat plant pests/rodents and insects, preventing damage to the habitats of animals and plants such as deforestation and the drying up of marshes and also promote environmental concepts and culture through the medium, education, advertising bill boards and newspaper are effective in order to reduce the adverse effect of environmental pollutions. Nowadays, the need for awareness of people about the environmental problems of the region seems essential since decision-making at the macro level and in all areas especially on environmental issues is not possible without the participation of the people. In a study conducted by Moghaddasi et al (2006) about the knowledge of the Arak residents toward nitrate pollution of their drinking water sources, it was found that only 15 percent of those questioned were aware of health hazard of high concentration of nitrate pollution. This reflects the low level of public awareness toward environmental issues and concepts and shows an urgent need for further research in this area. Therefore, the aim of this study is evaluation of citizens' attitude towards water and soil pollution and the measurement of their different approach regarding to this environmental issue**.**

2. MATERIALS AND METHODS

This research has tried to determine the effective factors in citizens' environmental awareness of water and soil pollution in Mashhad. The present study is a descriptive-analytic one, meant to be applied, using quantitative data collection methods, and it is mainly based on library and field research. Given the lack of precise organizational information and statistics, a questionnaire was developed using the information and indices collected in the library studies, researches, and theoretical writings; its validity was examined and finally proved by university experts and professors. This field research was then done through face-to-face (direct) questionnaire administration following the closed type to collect data. Without any limitations in the level of education, age and gender, the sample in this research includes all the residents living in Khayyam and Tabarsi areas (as the clean and unclean areas in point of water pollution, respectively) in Mashhad. Moreover, 70 farmers from the outskirts of Mashhad (Jagharq, Ferdow,Torghabeh) was selected to assess public awareness about the soil contamination. The independent variables include the area, age, gender and level of education and the dependent one is public awareness of water and soil pollution. One thousand questionnaires, distributed among citizens through random sampling, were filled out in this study. Prior to completing the main questionnaires and in order for studying the issue more closely, 150 ones for water pollution and 70 ones for soil pollution were completed to examine the validity and reliability. In the end, the questionnaires were collected, grouped, and coded, and then different statistical techniques and methods like descriptive analysis (percentage and frequency) and deductive analysis (the multivariable Chi-squared test) along with SPSS and Excel computer programs were used to analyze data and purify or categorize information.

3. RESULTS AND DISCUSSION

3.1. Water pollution

3.1.1. The relationship between the involved factors studied and public awareness of the concept of water pollution

Regarding the results of the statistics and related calculations using the x^2 method, the null hypothesis was not rejected and therefore there is no any significant relationship between the level of education and public awareness of water pollution (the results have not been shown). However, the public awareness was related to level of education and their relationship is significant (Table 1). The majority of the studied people regardless of area, age, gender, or education have high information relative to water pollution which might be due to their constant use and frequent need to water and their perception toward water quality changes like color, odor, flavor and etc.

Table 1.
The relationship between the levels of educations and public awareness of the concept "water pollution"

Group	Feature	Frequency		Statistic X^2
		Yes	No	11.50478
1	Academic	8	26	
2	Diploma	11	40	
3	Associate	0	26	
4	Bachelor	2	24	
5	Masters	0	10	
Sum	147			
Significant level				<0.05

3.1.2. The relationship between the involved factors and public awareness of water pollution sources

The analysis of the sample with the aid of the x^2 test and a reliability coefficient of 95% shows that there is no any significant difference between the involved factors and public awareness of water pollution sources and most of studied people have high information in this regard (the results have not been shown). An analysis in 1382 shows that only 96 million cubic meters of 64.10 million cubic meters per day of generated domestic wastewater enter to the treatment plant. This shows that only 9% of produced domestic wastewater in the country is refined, and approximately 91% is discharged to the absorbing well, rivers and agricultural land without any treatments (Shayegane et al, 2004). Moreover, high awareness of Tabarsi resident as unclean area about considerable effect of municipal and domestic wastewater on water pollution could be due to their objective observation of household waste discharge to the current channel along the area. The existence of public facilities like Water and Wastewater Company of Mashhad and its effect in Khayam area as clean region lead to increment of resident awareness toward the issue.

3.1.3. The relationship between the involved factors and public awareness of the solutions for water pollution

3.1.3.1. Law's effect on eliminating of water pollution

The null hypothesis is rejected according to Tables 2 and 3, so it can be said that based on the significance level of 95%, there is significant relationship between the area and education with public awareness toward existence of laws on water pollution reduction. However, the majority of the studied people regardless of area, age, gender, or education have high information relative to this issue. However, the awareness of laws is important to prevent some abuses. According to the fifth principle of the constitution that provides penalties for offenders and harmless to the environment, there is not any way of making culture in this case and the public information in this area is very limited. Even higher education has not increased the awareness that this represents a weakness of the relevant institutions (Adhami et al., 2013). Therefore, Iranian Department of Environment can assist on development of environmental culture with the help of IRIB, media, education, universities, seminaries and ministry of culture.

Table2.
The relationship between the living area of people and their awareness of existing law in field of water pollution

Group	Feature	Frequency		Statistic X^2
		Yes	No	5.88
1	Khayyam	18	57	
1	Tabarsi	32	43	
Sum	150			
Significant level				<0.05

Table3.
The relationship between the levels of educations and their awareness of existing law in field of water pollution

Group	Feature	Frequency		Statistic X^2
		Yes	No	9.517693
1	Academic	15	19	
2	Diploma	21	30	
3	Associate	11	15	
4	Bachelor	6	20	
5	Masters	0	10	
Sum	147			
Significant level				<0.05

3.1.3.2. The most effective strategy for reducing water pollution

The assessments of the sampled people done through the x^2 test and with a reliability coefficient of 95% show that gender has a significant effect on public awareness of the most effective strategy for reducing water pollution (Table 4). Women's responsibility to improve the quality of life, to participate in making major decisions on development and socioeconomic growth, and to teach environmental issues have made women play a more prominent role than men in bringing up future generations, but women tend to have education and jobs as their main goals due to high costs of living, expectations, and inflation in today's society, unfortunately preventing them from their main and basic role in life. The result is that women, when compared to men, are equally aware of environmental problems (Samadyar & Samadyar, 2011).

Generally, most of the studied people believe that education and culture can be an effective method for water conservation and quality improvement which can act more effectively compared to fine and other methods. If a norm like educating is approved by most people in the society, people will follow it,

but, unlike the present theories, the three norms including odd-even traffic limitations, gasoline rationing, and traffic tickets, set by the government, were not accepted by the public as an effective and practical measure. It can be due to the fact that the creation of such norms in a society is done by the overall structure of the government, and since people do not usually look positively at the performance and plans, and generally the statements of a government, they tend to defy any norm approved by the government even if the proposed norm is correct and acceptable. Also such a norm will not be effective and widely accepted since it has been proposed by a structure which is not so although a norm (Qadimi et al, 2012). The institutionalization of the culture of each community takes time. The culture medium is created with repetition, hints and awareness and population over time will tone the new culture. The minority of the population will not be able to break the norm if any matter is generally available as the acting contrary to social and cultural norms will follow the public reaction.

Table4.

The relationship between gender and their awareness of the most effective strategy for reducing water pollution

Group	Feature	Frequency				Statistic X^2
		Create Culture	Making some trash	Create an environment Stations	Establish fines for offenders	
1	Woman	6	4	13	7	10.6153
2	Man	42	7	37	14	
Sum	150					
Significant level						<0.05

3.1.3.2.1. The most effective cultural strategy for reducing water pollution

The assessments of the sampled people done through the x^2 test and with a reliability coefficient of 95% show that the null hypothesis is not rejected, and there is not a significant relationship between the observed frequencies and the expected one (the results have not been shown). The majority of people was quoted that making the environmental culture is the most effective solution in water pollution reduction. Thus, it becomes clear that most people tend to be aware of the quality of the water they drink and how to improve it in order to be able to reduce the harmful effects of environmental pollution on their health. In this regard, the media like the TV, the radio, the internet and social networks can play an important role in introducing environmental concepts and improving the culture as a contributing factor in reducing water pollution.

The media are so important that a society cannot be imagined without books, newspapers, the TV and the like because communication is the source of culture and aids its perfection (Koen, 1998). The history proves that people acquired no elements of cultural progress when they were scattered and a lack of communication prevented exchanging their learning and experience (Sarokhani, 2001). Hence, the mass media, as a part of the society, are influential in forming people's awareness of social facts. It seems that improving the environmental culture demands more attention to the organizations responsible for socialization such as the media, and as people are more easily affected and taught when they are younger, improving the culture of environmental protection should be planned in a way that sometime in the future each Iranian considers himself an environmental protector (Pourafkary et al, 2011).

3.2. Soil pollution

3.2.1. The relationship between the involved factors studied and public awareness of the concept of soil pollution

The null hypothesis is rejected according to Tables 6 and 5, so it can be said that based on the significance level of 95%, there is significant relationship between the gender and public awareness *of the concept of* soil pollution. However, the public awareness is independent of people's age and education and there is no any significant relationship between them (the results have not been shown). The majority of the studied people regardless of age, gender, or education have low to moderate information relative to soil pollution which might be due to their lack of knowledge and training. Development of organic agriculture in rural areas where the natural food production necessity for survival and human health is based on education and promotion. Therefore, the farmers can pay more attention to modern methods of learning and it might be applied in their professional work, as it is in direct contact with food and human health. Comprehensive and timely information from extension agents and local and regional media to producers and consumers, distribution of organic inputs from agriculture extension and service centers in villages, planning and designing the educational and promotional training courses, Adopt policies encouraging producers gradual elimination of subsidies fertilizer, chemical and plant toxins, targeted agricultural subsidies to natural inputs, efficient use of authorized toxins,

development of biological methods of pests and etc are some of effective ways to spread the culture of production and consumption of cleaner products as well as soil conservation. Therefore, development of organic farming in rural area to protect soil as a component of the environment proved to be through the integration of three factors of research, education and promotion in the development process (Nouroozi and Shahbazi, 2010).

Table5.
The relationship between gender and farmer awareness of the concept soil pollution

Group	Feature	Frequency		Statistic X^2
		Yes	No	
1	Woman	44	6	63.7466
2	Man	16	4	
Sum	70			
Significant level				<0.05

Table 6.
The relationship between gender and farmer awareness of the concept soil pollution

Group	Feature	Frequency			Statistic X^2
		Low	Moderate	High	
1	Woman	2	12	6	9.5624
2	Man	21	25	4	
Sum	70				
Significant level					<0.05

3.2.2. The relationship between the involved factors and public awareness of water pollution sources

3.2.2.1. The effect of plowing on soil erosion and pollution

The analysis of the sample with the aid of the x^2 test and a reliability coefficient of 95% shows that age and education have plays a significant role in public awareness about the role of plowing on soil erosion and pollution (Tables 7 and 8). In other words there is a significant relationship between age and education with public awareness of this issue and young and educated people are more aware of effect tillage (plow) on soil erosion and pollution. With increasing people's age and education, their knowledge of the concepts of environmental pollutants increases and they could be doing better assessment to do or not to do protective behavior. Thus their attitude towards environmental pollutants and concepts have changed and consequently changes in behavior (Qasemi and Karami., 2009). Personal characteristics in agricultural sector are one of the most important factors influencing the attitudes and adoption of agricultural innovations such as organic farming. Thus, it can be recommended that to improve farmers' attitudes toward organic farming and more success in developing organic agriculture should focused on younger and better educated farmers which have a positive attitude and attention on organic farming. Since they able to reduce the cost of development and promotion of organic farming as well as improving the attitude of other farmers who are mostly elderly and also with little education through the development and promotion of organic farming in the region (Qadimi et al., 2012).

Table7.
The relationship between age and farmers awareness of the impact of tillage on soil erosion and pollution

Group	Feature	Frequency		Statistic x^2
		Yes	No	
1	Age 20-40	22	16	8.81
2	Age 40-60	16	16	
Sum	70			
Significant level				<0.05

Table8.
The relationship between education and farmers awareness of the impact of tillage on soil erosion and pollution

Group	Feature	Frequency		Statistic X^2
		Yes	No	
1	Academic	11	14	5.78
2	Diploma	18	14	
3	Associate	11	2	
Sum	70			
Significant level				<0.05

3.2.2.2. The main sources of soil pollution

The assessments of the sampled people done through the x^2 test and with a reliability coefficient of 95% show that the null hypothesis is rejected, and there is a significant relationship between the age and gender with public awareness of soil pollution sources. According to Tables 9 and 10, that men and also older people are more intelligent than women and young farmers in this matter which might be due to their greater access to information. Moreover, farmer's experience in the use of pesticides and herbicides increased with increasing their age. Thus, they have experienced more symptoms of pesticide poisoning and have more information about their adverse effects on water, soil and environment. Therefore, their Attitudes have changed over time relative to the pollutants and their behavior is also influenced (Qasemi and Karami, 2009).

Generally, the majority of the studied people regardless of age, gender, or education have known the role of chemical pesticides on soil pollution more than other sources. Insecticides and pesticides used in agriculture, to protect crops and plants including pest, diseases and weeds. This chemical input has been identified as an essential element in modern agriculture while they are an important source of environmental pollution which negatively affects the health of living organisms including humans. One of the most common occupational hazards related to the use of pesticides is agricultural workers and pesticide poisoning with pesticides, especially in developing countries. In addition, usage of pesticides and herbicides to control pests and protect crops is also associated with environmental pollution (Qasemi and Karami, 2009).

Table 9.
The relationship between gender and farmers awareness on sources of soil pollution

Group	Feature	Frequency				Statistic X^2
		Toxic elements	Chemical pesticides	Waste	Mineral	
1	Woman	1	10	8	1	7.4025
2	Man	9	10	24	7	
Sum	70					
Significant level						<0.05

Table10.
The relationship between age and farmers awareness on sources of soil pollution

Group	Feature	Frequency				Statistic X^2
		Toxic elements	Chemical pesticides	Waste	Mineral	
1	Age20-40	0	2	19	17	**28.9744**
2	Age 40-60	6	11	11	4	
Sum	70					
Significant level						<0.05

3.2.2.3. The role of detergents in soil pollution

Regarding the results of the statistics and related calculations using the x^2 method, the null hypothesis was rejected i.e. there is a significant relationship between the studied factors and public awareness about role of detergents in soil pollution (Tables 11, 12 and 13). The detergents in sewage lead to an increment in soil permeability and make the microorganisms or molecules able to pass through the pore of different soil layers and create microbial groundwater pollution.

3.2.3. The relationship between the involved factors and public awareness of the solutions for soil pollution

3.2.3.1. The government's role in controlling soil pollution

According to the x^2 test, it has been found that there is no significant relationship between the age, gender and education of people with their awareness of the government's role in controlling soil pollution (the results have been shown). The majority of the studied people regardless of their age, gender, or education consider the low impact of government on soil pollution control. Soil and water are the two major pillars for farmers which if it does not get enough attention, virtually doomed to be a farmer. Thus, the government needs more support to agricultural producers and manufacturers who can provide the economic development of the country. This could be happened trough several ways like promoting environmental education via the medium of written audio and video , the system of promotion and vocational training institutions, universities and research institutions, strengthening rural councils and necessary and sufficient authority commensurate with the responsibilities entrusted to elected officials, Institutionalizing sustainable credit and financial resources for rural councils, civil and legal for its usage on construction and development of agriculture and rural development, continually improvement of the knowledge of the technical, economic and social policy-makers, planners and practitioners in agriculture and rural development programs from scientific and technological developments of the day as well as situation in rural communities, consumers and producers of agricultural products (Nouroozi and Shahbazi, 2010)

Table 11.
The relationship between gender and farmers awareness on detergent effect on soil pollution

Group	Feature	Frequency				Statistic X^2
		Increasing solute	PH changes	Increased permeability	As the solvent	
1	Woman	3	11	5	1	8.52
2	Man	14	13	10	13	
Significant level						<0.05

Table 12.
The relationship between age and farmers awareness on detergent effect on soil pollution

Group	Feature	Frequency				Statistic X^2
		Increasing solute	PH changes	Increased permeability	As the solvent	
1	Age 20-40	11	12		9	6.57
2	Age 40-60	8	9		6	
Significant level						<0.05

Table 13.
The relationship between education and farmers awareness on detergent effect on soil pollution

Group	Feature	Frequency				Statistic X^2
		Increasing solute	PH changes	Increased permeability	As the solvent	
1	Academic	5	6	5	9	31.45
2	Diploma	2	2	0	28	
3	Associate	5	6	4	1	
Sum	70					
Significant level						<0.05

CONCLUSION

Nowadays, the need for awareness of people about the environmental problems of the region seems essential since decision-making at the macro level and in all areas especially on environmental issues is not possible without the participation of the people. Therefore, the aim of this study is evaluation of citizens' attitude towards water and soil pollution and the measurement of their different approach regarding to this environmental issue. The results of this study show that most of farmers have little knowledge about soil contamination while residents of Khayam and Tabarsi areas have considerable information about status of their water. Moreover, most of the studied people believe that education and culture can be an effective method for water conservation and quality improvement which can act more effectively compared to fine and other methods. It also was found that education and communication with information sources and communication have effective role in farmer's attitude towards agriculture innovation such as organic farming. This shows the importance of education and agricultural extension system as the trustee training in the field of agriculture. Moreover, most people are disagree with solutions like fine for reduction the amount of offenses derived from environmental pollution while prefer education and culture as the most effective solution for protecting and improving water and soil quality. Farmers are also willingness to mechanized and biological farming due to the lack of their awareness about the adverse effects of soil degradation in the traditional way as well as the high costs of modern agriculture while education and information resources can be partially changed their attitude towards organic farming.

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