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IRANIAN FAREMERS' WILLINGNESS TO IMPROVE WATER QUALITY IN THE ZAYANDE RIVER

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ABSTRACT

The Zayande River is the largest on the central plateau of Iran and is contaminated by heavy metals from industries and fertilizers and pesticides from agriculture. We measure farmers' willingness to accept (WTA) a payment to install riparian buffer strips that could curtail pollution. Environmental valuation studies are rare in Iran and, more specifically, policy makers have no economic research like that provided here to help them create effective policies to address the problem. Precautions are taken in administering a survey to account for unique difficulties associated with contingent valuation methods when applied in a developing setting. For example, the WTA questions were asked in the context of a nutrient trading program payment vehicle since it is both a private and public source of funding; recent research shows that farmers in Pakistan are sensitive to the source. Farmers willing to participate would accept 835,300 Rials ($22.58). Almost 40% said they would not participate for the following reasons: they were unfamiliar with these plans, concerned about instability in polices, or uncertain about the future.

INTRODUCATION

Excessive water pollution persists in many regions of the world despite well-known negative effects on drinking water, households, recreation, wildlife, fishing, transportation and commerce. Some of the most serious problems can be found in developing countries. For example, the Zayande River is one of the most polluted sites in the central part of Iran due to industrial, municipal and agricultural activates' runoff from adjacent areas (Sanayei *et al*., 2009). One of the greatest sources of pollution is non-point sediments, nutrients and chemicals from farms. Many policy solutions have been proposed that either provide incentives to encourage environmentally beneficial activities or that levy charges designed to discourage environmentally harmful activities. In many cases, the results of these efforts have been effective (lockhart and Hutton, 1995 and Broussard III *et al*., 2012). However, in others, these policies have been ineffective or even non-existent. In Iran, for example, there is a lack of systematic water pollution reduction policies or organized laws for water degradation prevention, insufficient infrastructure for water quality management, overused fertilizers and pesticides, industrial waste and lack of attractive private incentives to improve people's interest in water quality improvement (Sotudeh Bidokhti, 2010). Little is known about how much producers would ask in return for applying conservation measures in places like Iran. However, a growing number of studies have attempted to estimate values like these using the contingent valuation method (CVM) (Whittington, 1998; Pradeep Chaudhry *et al*. 2007; Foreit, Fleischman Foreit, 2003). CVM provides a format that may be effectively used to estimate unknown nonmarket values (Amigues *et al*., 2002), but is only beginning to be used in developing countries (Whittington, 1998).

In Iran for example, studies are emerging in forestry (Amirnejad *et al*., 2006; Piri, *et al*., 2010; Nakhaei *et al*., 2012; Maleknia *et al*., 2013), national parks (Amirnejad, 2007), recreational parks (Hayati *et al*., 2010), drinking water connection and irrigation water (Tahami Pour and Kavoosi Kalashami, 2012; Amirnejad *et al*., 2009; Jamali Jaghdani *et al*., 2012) and air pollution (Shahnoushi *et al*., 2010; Karimzadegan *et al*., 2008). The purpose of this study is to determine how much Iranian farmers would be willing to accept (WTA) in payment to install riparian buffer (Appendix 1) zones close to the Zayande River. We use a standard Heckman model (Heckman, 1979) to identify the factors that affect adoption and to identify those factors that affect the price that farmers require in order to cooperate. To provide a better understanding of how these farmers might really react,

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we also document and discuss reasons why some farmers would not be willing to cooperate. In addition to providing insight about how much it would take to encourage Iranian farmers to adopt conservation systems, this study is a contribution to a growing literature on using CVM in developing nations. Farmers are unfamiliar with payments for conservation and CVM surveys. Therefore, we head advice from Whittington (2002) about how to administer a CVM study effectively in a developing nation. To shed further light on the validity of our results, we also compare WTA in our study to other similar studies.

MATERIALS AND METHODS

The Zayande River Basin

Iran is a highly water stressed country. Average annual precipitation is 252 mm (less than one third of the world's related average of 860 mm) and average water consumption is 1700 m^3/capita. The Zayande River is the largest river on the central plateau of Iran, Isfahan Province. Zayande River is a major source of water for the people of central Iran, mainly in Isfahan and Yazd provinces. The Zayande passes through the middle of the Isfahan city, with several new and old beautiful bridges built over it. The oldest, Shahrestan, built in 5th century AD, is still in used as a pedestrian crossing in the Sharestan village.

Being a water scarce country, Iran cannot afford to lose water from this river to environmental degradation. About 80% of the Zayande's extracted water is used for agriculture, 10% for human consumption (drinking and domestic needs of a population of 4.5 million), 7% for industry (steel companies and Isfahan's petrochemical, refinery and power plants) and 3% for other uses. Therefore agriculture is the most significant consumer of Zayande water and one of the most important polluters as well (Allahdadian, Khoshakhlagh, 2013). Agriculture uses almost 4400 million m^3 of ground and underground water from the Zayande River annually. However, it contributes about 100,000 tons of fertilizers and 450 tons of pesticides every year (Rahmani, Maaman Posh, 2006).

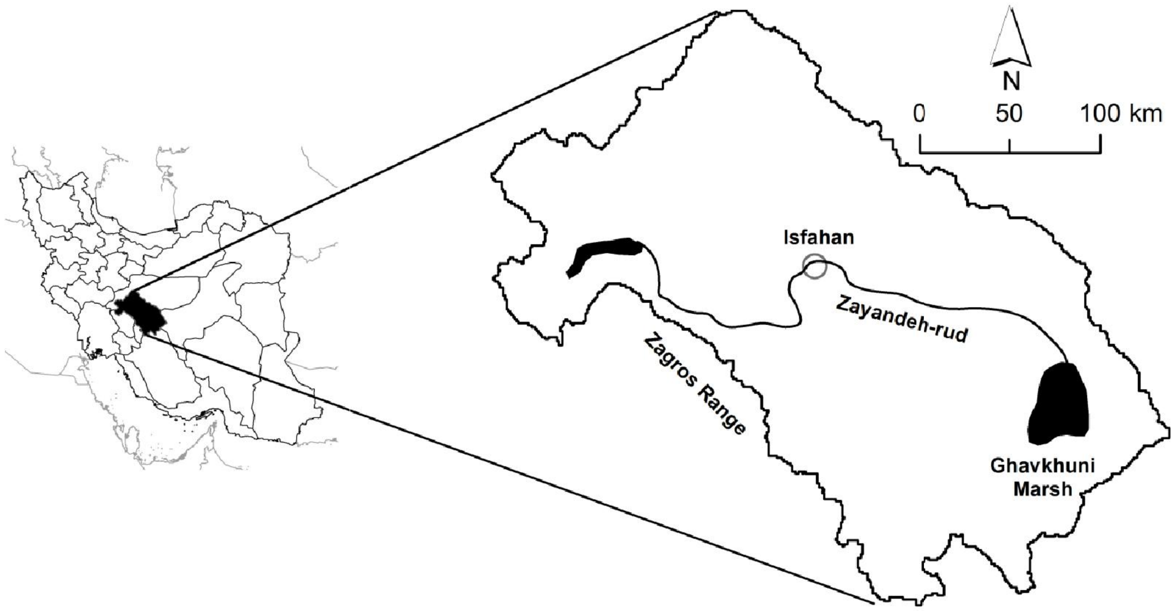

Figure 1. Zayande River basin

The Zayande River basin (Figure 1) has an area of 41,500 square kilometers (16,000 sq mi), altitude from 3,974 meters (13,038 ft) to 1,466 meters (4,810 ft), and an average rainfall of 130 millimeters (5 in). There are 2,700 square kilometers (1,000 sq mi) of irrigated land in the Zayande River basin, with water derived from the nine main hydraulic units of the river, plus wells, qanat[1] and springs in lateral valleys. The Factors affecting water resource quality in that area include: non-uniform precipitation distribution, fast population growth, urbanization development, low efficiency irrigation systems and inadequate treatment of industrial discharges.

Contingent Valuation Method

The importance of this study is to provide information about how farmers value water quality and best management practices (BMP) in the Zayande River watershed in Iran. This information can be a start on building effective policy solutions. There is just one paper on farmers' WTA a payment to improve water quality in Iran by Baghestani and Zibaee (2010). That study focused on decreasing the usage of underground water in for Ramjard plain, Fars province. In that study farmers were asked "if the government will pay you for

[1] A qanat is one of a series of well-like vertical shafts, connected by gently sloping tunnels. They create a reliable supply of water for human settlements and irrigation in hot, arid and semi-arid climates. The qanat technology is known to have been developed by the Persian people sometime in the early 1st millennium BC and spread from there slowly west- and eastward.

each m^3 deceasing in underground water usage as rewards, will you accept it or not?". The authors did not compute WTA, but reported that 78.2% of farmers agreed to accept this hypothetical level of a government payment in order to cooperate in a conservation program. The contingent valuation method (CVM) is used to address the objectives of this study. This technique involves soliciting responses to hypothetical questions regarding the value that people place on environmental goods. Pagiola (1996) stressed that CVM can, in principle, be used to value any environmental benefit, since it is not limited to deducing preferences from available data. Where actual market data are lacking, CVM seeks to discover how people would value certain environmental changes by questioning a sample of the population concerned. The most common question asked in CVM is the maximum amount people would be willing to pay (WTP) or willing to accept (WTA) for specific change to occur (Freeman, 1993; and Carson, 2001).

Dupraz *et al*. (2003) found that CVM is a useful method to declare the behaviours of farmers who are faced with participation in an agri-environmental scheme. Literature shows that, while using this method for evaluating water quality conservation program is very common in the US and developed countries, researchers in developing countries are not very familiar with its environmental and ecological application. Whittington (1998 and 2002) outlined four specific concerns for using this method in developing countries: 1-explaining what the study is about to government officials and interviewers. 2-understanding and interpreting respondents' answers (don't be too abstract). 3-cultural differences and 4- how honest should one be about the institutional regime contemplated for delivering the "hypothetical" goods or services?.

Survey

The data source employed in this analysis was from a survey that was done in person with 85 farmers whose farms were close to the Zayande River. In the first step, a water quality trading program was explained to farmers; they were told that industries around the Zayande River would be the buyers of credits that farmers produce through qualifying riparian buffer BMPs. A water quality trading program was selected because it is administered by both public and private entities. Whittington warned that the institutional regime that will deliver the hypothetical goods can be an important factor in a survey; recent research in Pakistan confirms that farmers' preferences change depending on whether a program is offered by the private sector or government (Shah, 2013). Using a program that is both public and private is expected to reduce bias based on the source of program management. The survey questionnaire used a two-step approach. Farmers were first asked if they would like to participate by installing a buffer zone at least 15 meters wide on their farms. If they were interested in installing buffer zone, they were asked how much money they would accept for installing buffer zones using dichotomous choice. The dichotomous choice (DC) survey questions were explained to farmers as follows:

A new opportunity may be available through the Zayande River, which is called the nutrient trading program (water quality program). Farmers will be able to create and sell credits based on certain conservation practices. One of the practices is riparian buffers, which are vegetated areas next to water, such as creeks and streams. These buffers, with grass, trees and other vegetation, prevent or reduce nonpoint source pollution, provide bank stabilization and habitat for aquatic and wildlife. Your payment for credits could range from a fraction of your actual cost to more than it actually costs you to install the buffers. To qualify for a payment, land owners who have agricultural lands would have to agree to the following:

- that is at least 15 meter wide,
- plant 320 trees per acre (first option),
- A minimum of five years of vegetative monitoring with annual monitoring reports (second option)

Farmers that agreed to participate were also asked about their experience and expertise about the cost of buffer zone installation. This question was asked because we did not have detailed information that would allow us to ask a closed ended question about WTA. Farmers were then asked the following question:

Experience shows that it would cost about 500,000-600,000 Rials/meter to install permanent buffers along streams. Given that developers could pay for part, all, or more than your costs with the nutrient trading program, how much would you be willing to accept to install riparian buffers?

The reason why the open format was used in this question was to avoid the appearance of offering suggestions. If suggested values were perceived as being 'too low', owners would be upset and suspect the political organization of mischief (Amigues *et al*., 2002). On the other hand, suggesting large values would have meant that the study and programs proposed were not credible, or it might have encouraged high WTA estimates. Famers also were asked about their future plans for their land in order to understand the power of their tendency to keep using BMP on their farms, as follows:

What are your future plans for your land? What do you think this area will look like 20 years from now? Why?

Responses to the open-ended WTA questions yielded a continuous variable; however, responses were also censored since some respondents did not indicate a willingness to accept for installing buffer zones. Thus, the survey data had a number of zero values for the WTA, indicating unwillingness to install buffer zones. Therefore, the second step in the survey was to ask farmers about their reasons for refusal to participate in this program. Finally, we asked several questions about socio-economic characteristics such as age, education, household expenditure (as a proxy of Income), household number as well as land size and usage. These variables are commonly found to affect WTA (Hoag *et al*., 2012).

Heckman Selection Model

The last step of CVM is to conduct an econometric analysis to check the relationship between the WTA and the influencing factors. This study adopts a Heckman selection analysis process in which WTA is estimated conditionally on participation in a water quality program. The first step involves estimation of a Probit on whether the farmers participate in this scheme. In the second stage an OLS approach is adopted to explain how much the farmers would accept if they participate. The second step is corrected for selectivity bias by use of Inverse Mills Ratio (IMR) derived from the Probit estimates. Whether the farmers participate or not is the precondition for them to express their WTA. Therefore, in the second stage, the sample is non-randomly selected. Only those with positive value for the first question are selected (Loomis *et al*., 1996).

In the Heckman selection model, the selection/Probit equation can be represented as:

$$Y_i^* = \beta_0 + \sum_{j=1}^{k} \beta_j x_{ij} + \varepsilon_i$$

Where ε_i is error term and $\varepsilon_i \sim N(0,1)$. Then Y_i can be viewed as an indicator for whether this latent variable is positive:

$Y_i = 1 \; if \; Y_i^* > 0$ which means farmer i will participate in water quality trading program and $Y_i = 0$, otherwise.

x_{ij} denotes a set of explanatory variables j (j=1,….,k) for farmer i. ε is the error term which is assumed to be normal distribution.

$$\Pr\left(D > 0 \mid x\right) = \Pr\left(D = 1 \mid x\right) = \phi(\beta x)$$

Here the conditional distribution is a truncated normal distribution; $\phi(.)$ is a standard normal continuous random variable (CDF). The outcome equation is to analyse the factors influencing farmers' WTP if they participate in this scheme. The final step is calculating the inverse mills ratio from Probit model estimations. In the second stage, the outcome equation is estimated by OLS, where the equation includes both the original x and the constructed value of the inverse mills ratio as follows:

$$WTA_i = \beta x_i + \theta \hat{\lambda}_i(x_i \, \beta_i) + e_i$$

By including the IMR ($\hat{\lambda}$), the coefficients on x represent consistent estimates of the population WTA. The standard t-test of the null, that $\theta = 0$, is a test of the null so that there is no selection bias conditional on the assumptions of model.

RESULTS

Summary statistics for the survey are reported in Table 1. Most farmers, 94%, were male with a mean age of 40.4 years and 10 grades in education. They farm an average 7.5 hectares and live a 3.2 kilometres from the river. Agriculture is the main source of income for about two-thirds of the farmers and over 30% have a source of off-farm income. Almost 40% report having experienced some sort of failure with conservation efforts that they have tried in the past. Fully 90% are aware that the Zayande is polluted, with a severity rate of 2.95 on a 3.0 scale. Most of interviewed farmers believe that industry is the main source of water pollution, which decreases their motivation to participate in water quality trading program. Nevertheless, over 60% of farmers desire to participate in the nutrient credit trading program. Of those that provided a WTA, 95% preferred to install buffers with grass or other vegetation, rather than trees. The mean WTA was 835,300 Rials ($22.58) compared to average household expenses of 6,790,000 Rials ($183.55). Therefore, on average, credit producers demanded a payment equal to 12.3% of their annual household expenses. The amount of WTA expressed by farmers is consistent with other studies, which place an average value of farmers' WTA or WTP for improving water quality at an average $34.14 (Table 2).

Table 1. Summary Statistics of Iranian Farmers Interviewed

Variables	Mean	Max	Min	S.E.
Accept (acceptance/rejection of participating in this program. Accept=1, Reject=0)	62	1	0	0.49
Age (years)	40.4	65	25	8.7
Farm area (Hectares)	7.5	25	0.3	5.88
Buffer (kind of buffer zone, with tree=2, with other vegetation=1)	1.4	2	1	0.49
Distance (the distance between farm and river branches, Kilometres)	3.24	10	0	2.43
Education (year)	10.2	16	5	3.3
Household expenditures (Rials)	6,578,824	3,000,000	10,000,000	2,280,300
ConsFail (Have they ever had a failed experience implementing a conservation practice? Yes=1, no=0)	0.38	1	0	0.5
Help (Did they have access to technical help for conservation practices (yes=1, no=0))	0.15	1	0	0.35
Main Income (Is Agriculture the main income for interviewed farmer (yes=1, no=0))	0.68	1	0	0.47
PolInfo (Were they aware of pollution in the Zayande River (yes=1, no=0))	0.90	1	0	0.29
PolLevel (Perceived severity of water pollution (serious=3, medium=2, weak=1))	2.95	3	1	0.3
Living (Duration of residency (years))	34	56	0	13.15
Other income (do farmers have another income? Yes=1, no=0)	0.31	1	0	0.46
Rent (Plan to Rent their farms in future (Yes=1, no=0))	0.16	1	0	0.37
PolSector (Responsible sector for water pollution (industry=2, agriculture=1))	1.81	2	1	0.39
Subsidy (Receiving subsidy for conservation practices yet (yes=1, no=0))	0.035	1	0	0.18
Gender (female=1, male=0)	0.94	1	0	0.23
Full /part time (full time=1, part time=0)	1.37	2	1	0.49
WTA for this program (Rials)	835,294	2,000,000	1,000,000	703,927

The Heckman model was estimated using Stata and Matlab Software. The selection model involves a two-step procedure: a Probit model is estimated to predict the probability of positive versus zero participation, and then an ordinary least squares (OLS) equation is estimated on the total WTA for farmers who want to participate in this program with the addition of a truncation variable. The truncation variable is calculated from the first stage Probit and is called the Inverse Mills ratio (Greene, 1992).

Table 2. WTA or WTP in Different Countries for Water Quality Improvement

Title	Country	Year	WTP/WTA	WTP/WTA amount
Property Owner' Willingness to Pay for Water Quality Improvement (Two Central Minnesota Watersheds)	USA	2011	WTP	$30
Willingness to Pay for Water Quality Improvements: The Case of Precision Application Technology	USA	2002	WTP	$48.46
Valuation of In-Stream Water Quality Improvement via Fuzzy Contingent Valuation Method	USA	2005	WTP	$93 (swimmable level)
Evaluating Consumers' Willingness to Pay for Improved Potable Water Quality and Quantity	Greece	2008	WTP	€10.64 ($14)
Economic Valuation of Coastal Water Quality and Protest Responses: A Case Study in Mitilini Greece	Greece	2008	WTP	€26.86 ($35.2)
Measuring the Value of Water Quality Improvement in Lake Tai, China	China	2011	WTP	141CYN ($22.94)
Valuing Water Quality Improvement in China: A Case Study of Lake Puzhehei in Yunnan Province	China	2011	WTP	81.22CYN ($13.22)
An Application of Contingent Valuation and Decision Tree Analysis to Water Quality Improvement	Randers Fjord (Denmark)	2007	WTA	€12.46 ($16.32)

The advantage of this model to is that it separates the effective factors on accepting participation in a program from effective factors on WTA. Results from the first stage of Heckman (Probit model) express factors effective in the probability of joining this program and results from the second stage of this method (OLS) show factors effective in the amount of WTA that farmers ask. Tables 3 and 4 contain results from the first and second stages of Heckman model, respectively. In the Probit model, stage 1, marginal effects depend on estimated parameters and values of the explanatory variables. Hence, reported marginal effects are calculated at the means of the explanatory variables.

Table 3. Probit Regression Results (First Stage of Heckman Model)

Variable	Coefficient	z-Statistic	Prob.	Marginal Effect
Constant	-11.03	-0.002	0.9985	-2.22
Gender	8.20	0.001	0.9989	0.256
ConsFail	-0.06	-3.28^{**}	0.000	-0.025
Expense	$2.86*10^{-6}$	9.37^{**}	0.000	$0.3*10^{-7}$
Area	0.06	5.86^{**}	0.000	0.001
Living	2.94	8.98^{**}	0.000	$6.1*10^{-8}$
Education	0.19	1.73^{*}	0.001	0.001
Subsidy	0.04	7.04^{**}	0.000	0.002
Rent	-1.47	-9.40^{**}	0.000	-0.68
Log likelihood		-374.95		
LR statistic (8 df)		376.03		

** Statistical significance at the 1% level * Statistical significance at the 5% level

Table 4. Selection OLS Regression Results (Second Stage of Heckman Model)

Variable	Coefficient	t-Statistic
Area	4469.23	6.63^{**}
Buffer	-21278.78	-4.25^{**}
Sector	267.3	0.23
PolInfo	30749.14	1.86^{*}
Expense	0.2813	1.84^{*}
Lambda	-20918.04	-0.38
$R^2 = 0.64$	DW static=1.98	

** Statistical significance at the 1% level * Statistical significance at the 5% level

Independent variables on adoption are gender, whether farmers' have experienced a failed conservation effort in the past, household expenditure, farm size, years of residency, education, receiving payment from the trading program and future plans to rent their farms (dummy variable). Independent variables in the second stage are farm size, type of buffer, years of residency, household expenditure, farmers' pollution information (dummy variable), and future plans to rent their farms and receiving a payment. As shown in Tables 3 and 4, household expenditure and farm size are effective variables on both participation and the amount a farmer is WTA. Farm size and household expenditure are positive and significant across both models indicating larger farm owners are more interested in participating in this program than small farmers. Also, when the expenditure of a farmer's household is high, they have more tendencies to ask for money for participating. The Probit adoption model results show that, by increasing education or the subsidy, farmers are more interested in participating in water quality programs. Farmers that had experienced a failed conservation effort or that planned to rent out their farms in the future were less likely to participate. Gender is not a significant variable for participation in this program; probably because of our sample was 94% male. Table 4 shows the result of the OLS regression. We had two kinds of farmers who are interested in installing buffers, those that wanted to plant trees (buffer variable recorded in data set =1) and those that wanted to install buffers with a minimum of five years of vegetation (buffer variable recorded in data set =2). The coefficient of the buffer variable shows that the WTA for farmers who prefer to install buffers with trees is 21,278.78 Rials higher than those who prefer to install buffers with other vegetation.

Having information is another important factor for willingness to accept in return for installing a buffer. Farmers that were informed about pollution in the river asked for 30,749.14 Rials more than those that were not. This result might suggest that farmers ask for more when they know that other river users have a high demand. However, only 10% of farmers did not know that the river was polluted, so this result should be viewed with some scepticism. Also when farmers think industry is polluting the Zayande River, they ask more money. They believed agriculture is carrying the burden of industry to compensate environmental and ecological problems of water pollution. The likelihood ratio statistic (LR) in table 3 with 8 degrees of freedom is 376.033, which means that the estimated regression model is significant at 1% level. The inverse Mill's ratio (Lambda) is not significant, which shows that there is no variables selection bias as we have formulated the selection equation and this confirms using Heckman two-stage method.

Table 5. Reasons for Unwillingness to Accept of Participating in Installing Buffer Zones

Reason		Frequency*
Lack of Information	I don't know about the payment vehicle	9
	I do not think that the consequences on the environment are important	2
Social Problem	I do not think the water trading program works	5
	Industry is responsible for water pollution	8
	There is no guarantee that other farmers accept this scheme	17
	I do not have faith in the government to effectively manage this project	6
Economic Problem	I want to sell my land and start a new business because of agricultural profit is low	15
	money depreciation is so fast and inflation is so high	19

*farmers expressed different reasons for refusing to participate in this program

Non-Participants

Perhaps the most important part of this study was investigating why some farmers in developing countries don't want to participate in conservative programs. A review of the responses reveals that it is because of farmers' unfamiliarity with these schemes, unstable polices or an obscure future. Of all respondents, 38% did not accept the scenario and were not willing to accept any amount of money. The high percentage of refusal is not rare in contingent valuation studies (e.g. Alberini *et al*., 2005; Dziegielewska and Mendelsohn, 2005; Kenyon, 2001; Halvorsen, 1996). Specifically, individuals who refused to pay declared (Table 5): "I do not have faith in the government to effectively manage this project", "I don't know about the payment vehicle", "I do not think the water trading program works", "I do not think that the consequences on the environment are important", "I want to sell my land and start a new business", "money depreciation is fast and inflation is high", "the amount of money they will offer will not cover opportunity costs later", and that "industry is responsible for decreasing water pollutions". Table 5 shows that economic problems are the most important reason for unwillingness to participate in these programs.

Because of unstable economic conditions, many farmers are not interested in participating in these types of programs; they are not sure about what will happen after participation. Many were not sure that the amount paid by the government would cover their opportunity cost even in the next year. Table 5 also shows that social capital is very deeply connected to several issues such as environmental management and policy (Dev *et al*., 2003; Cramb, 2005; Pretty, 2003, 2007). Social trust and institutional trust are the most important elements of social capital. Social trust influences individuals' behaviour due to their perception that other members of their community will act in a similar manner aiming on the protection of the common good (Pretty, 2003). Also trust in institutions (e.g. the government) is important due to their involvement in environmental management. Thus, the tendency of individuals to trust institutions is connected with the perception for the efficiency of environmental management (Kim, 2005; Beierle and Cayford, 2002).

DISCUSSION

The present study aimed to estimate farmers' willingness to accept a payment for the improvement of water quality and investigate the influence of social capital parameters on this valuation in unstable economic conditions found in developing countries. According to empirical results, farmers are willing to accept, on average, 835,300 Rials per month for the improvement of water quality by installing buffer zones around their farms. Results of this study are divided into two parts. First is an investigation of factors that affect a farmer's participation and second is exploring explanatory variables for the amount of money that farmers would ask for to install buffer zones. Several parameters were investigated. Specifically, farm size and household expenditures are significant explanatory variables that reveal larger farmers have a higher tendency for participation. Bad experience about participating in conservation programs will affect future farmers' reactions significantly. Perhaps the most interesting part of this study revolves around reasons that farmers reject the program. Social and institutional trust is very low and economic conditions are concerning enough that nearly 40% of the farmers would not participate. In conclusion, conservation programs will not be successful until economic conditions improve and a strong band of trust between the government and environmental programs is established. The amount of social trust between the government and people is one of the main differences between developing and developed countries. In developed countries people can trust to government and other institutions.

REFERENCES

Alberini, A., Rosato, P., Longo, A. and Zanatta, V. 2005. Information and willingness to pay in a contingent valuation study: The value of S. Erasmo in the lagoon of Venice. *Journal of Environmental Planning and Management*; 48: 155-175.

Allahdadian, L. and Khoshakhlagh. R. 2013. Economic water reallocation in the Zayande Rood basin (Iran) among different uses via designed software. *International Journal of Academic Research in Economics and Management Sciences*; 2(6): 1-19.

Amigues, Jean-P., Boulatoff, C., Desaigues, B., Gauthier, C. and Keith, J, E. 2002. The benefits and costs of riparian analysis habitat preservation: a willingness to accept/willingness to pay contingent valuation approach. *Ecological Economics*; 43: 17-31.

Amirnejad, H. 2007. Willingness to pay for Golestan national park. *Agricultural Economics Journal*; 3(1): 175-188.

Amirnejad, H., Khalilian, S. and Assareh, M.H. 2006. The preservation and use values determination of Sisangan forest park, Nowshahr by using individual's willingness to pay. *Pajouhesh & Sazandegi*; 72: 15-24. (in Persian).

Amirnejad, H., Pakdin, J. and Mehrara, M. 2009. Willingness to pay for drinking water connections: The case of Larestan, Iran. *Journal of Academic Research in Economics* (JARE); 2: 191-203.

Baghestani, M. and Zibaei, M. 2010. Measuring willingness of farmers to pay for groundwater in Ramjerd district: application of contingent valuation method. *J. Econ. Agric. Dev*. 24(3): 310–322. (in Persian).

Baumol, W. J. and Oates, W. E. 1979. Economics, environmental policy, and the quality of life. Englewood Cliffs, N.J.: Prentice-Hall.

Beierle, T.C. and Cayford, J. 2002. Democracy in practice. Public participation in environmental decisions. Resources for the future, Washington, DC.

Bouzaher, A. and Shogren, J. 1997. Modelling nonpoint source pollution in an integrated system. *Natural Resource Management and Policy*; 9: 7-42.

Broussard III, W.P.; Eugene Turner, R. and Westra, J.V. 2012. Do federal farm policies influence surface water quality?. *Agriculture, Ecosystem and Environment*; 158: 103-109.

Buckley, C., Hynes, S. and Mechan, S. 2012. Supply of an ecosystem service—Farmers' willingness to adopt riparian buffer zones in agricultural catchments. *Environmental Science & Policy*; 24: 101 – 109.

Carson, R. 2000. Contingent valuation: a user's guide. Environmental Science and Technology; 34: 1413–1418.

Carson, R.T., Flores, N.E. and Meade, N.F. 2001. Contingent valuation: controversies and evidence. *Environmental and Resource Economics*; 19: 173–210.

Cramb, R.A. 2005. Social capital and soil conservation: evidence from the Philippines. *The Australian Journal of Agricultural and Resource Economics*; 49: 211–226.

Dev, O.P., Yadav, N.P., Springate-Baginski, O. and Soussan, J. 2003. Impacts of community forestry on livelihoods in the Middle Hills of Nepal. *Journal of Forest and Livelihood*; 3(1): 64–77.

Dupraz, P., Vermersch, D., Henry De Frahan, B. and Delvaux, L. 2003. The environmental supply of farm households: a flexible willingness to accept model. *Environmental and Resource Economics;* 25: 171–189.

Dziegielewska, D.A.P. and Mendelsohn, R. 2005. Valuing air quality in Poland. *Environmental and Resource Economics*; 30: 131–163.

Esmaili, A. and Ghazali, S. 2009. Investigation of Kor river's preservation value with willingness to pay method, Fars province. Eghtesad Keshavarzi; 3(3): 107-120. (in Persian).

Foreit, J. R. and Fleischman Foreit, K. G. 2003. The reliability and validity of willingness to pay: surveys for reproductive health pricing decisions in developing countries. *Health Policy*; 63(1): 37–47.

Freeman, A. Myrick, III. 1993. The measurement of environmental and resource values. theory and methods. Washington, DC: Resource for the Future.

Greene, W. 1992. Econometric. Analysis, Macmillan, New York.

Halvorsen, B. 1996. Ordering effects in contingent valuation surveys, willingness to pay for reduced health damage from air pollution. *Environmental and Resource Economics*; 8: 485-499.

Hayati, B., Ehdani, M., Ghahraman Zadeh, M., Raheli, H. and Taghi Zade, M. 2010. Important factors of visitors' willingness to pay for Tabriz Eel Goli and Mashrote parks: Heckman method. *Journal of Agricultural Economics and Development*; 24(1): 91-98. (in Persian).

Heckman, J.J. 1979. Sample selection bias as a specification error. *Econometrica*; 47(1): 153-161.

Hoag, D., Luloff, A.and D. Osmond. 2012. Socio-economic analysis from the NIFA-CEAP projects. In How to Build Better Agricultural Conservation Programs to Protect Water Quality: The NIFA-CEAP Experience, Osmond, Deanna, Don Meals, Dana Hoag and Mazdak Arabi (editors). Soil and Water Conservation Society, Ankeny, Iowa

Humphreys, J. 2008. Nutrient issues on Irish farms and solutions to lower losses. *International Journal of Dairy Technology*; 61: 37–42.

Jamali Jaghdani, T., Brümmer, B. and Barkmann, J. 2012. Comparison of methods for the valuation of irrigation water: Case study Qazvin, Iran. Irrigation and Drainage; 61(3): 375-385.

Karimzadegan, H., Rahmatian, M., Farhud, D.D. and Yunesian, M. 2008. Economic valuation of air pollution health impacts in the Tehran area, Iran. *Iranian Journal of Public Health*; 37(1): 20-30.

Kenyon, E. 2001. The use of economic and participatory approaches to assess forest development: a case study in the Ettrick valley. *Forest Policy and Economics*; 3: 69–80.

Kim, J.Y. 2005. Bowling together isn't a cure-all: the relationship between social capital and political trust in South Korea. *International Political Science Review*; 26: 193–213.

Lockhart, J.A. and Hutton, M.R. 1995. Tax policy for recycling and water quality: an analysis of programs from other states. Washington State Institute for Public Policy.

Loomis, J., Roach, B. and Ward, F. 1995. Testing transferability of recreation demand models across regions: A study of Corps of Engineer reservoirs. *Water Resources Research*; 31(3): 721–730.

Maleknia, R., Moghaddam, M. N., Geraili, S., Azizi, F. and Ahang, S.R. 2013. Willing to pay in urban forests, finance support from public case study, Shorab Urban Forest in Khoram Abad, Iran. R*esearch Journal of Applied Sciences, Engineering and Technology*; 5(21): 5119-5121. (in Persian).

Mander, U., Kuusemets, V., Lohmus, K. and Mauring, T. 1997. Efficiency and dimensioning of riparian buffer zones in agricultural catchments. *Ecological Engineering*; 8(4): 299-324.

Nakhaei, N., Mortazavi, S. A., Amirnejad, H. and Navazi, M.A. 2012. Estimation of the recreational value of Nour Forest Park using individual's willingness to pay. Journal of Forest and Wood Products (JFWP), *Iranian Journal of Natural Resources*; 65(2): 245-259. (in Persian).

Pagiola, S. 1996. Economic analysis of investment in cultural heritage: insights from environmental economics. World Bank, Washington mimeo.

Piri, M., Mosannan Mozafari, M. and Javdan, E. 2010. Estimating the individual's willingness to pay for forest existence value (Case study: Arasbaran Forest). Journal of Forest and Wood Products (JFWP), *Iranian Journal of Natural Resources*; 62(4): 343-357. (in Persian).

Polyakov, V., Fares, A. and Ryder., M.H. 2005. Precision riparian buffers for the control of nonpoint source pollutant loading into surface water: A review. *Environ. Rev*.; 13: 129–144.

Polyzou, E., Jones, N., Evangelinos, K.I. and Halvadakis. C.P. 2011. Willingness to pay for drinking water quality improvement and the influence of social capital. *The Journal of Socio-Economics*; 40: 74–80.

Pradeep Chaudhry, P., Singh, B. and Tewari, V. P. 2007. Non-market economic valuation in developing countries: Role of participant observation method in CVM analysis. *Journal of Forest Economics*; 13(4): 259–275.

Pretty, J. 2003. Social capital and the collective management of resources. *Science*; 302: 1912-1914.

Pretty, J. and Ward, H. 2001. Social capital and the environment. *World Development*; 29: 209–227.

Pretty, J. (Ed.). 2007. Sustainable agriculture and food. Volumes I-IV. Earthscan.

Rahmani, H. and Maaman Posh, A.R. 2006. Effect of agricultural activity on Zayande Rood river's water quality. Second Conference; Water Resources Management, Isfahan, Iran. (in Persian).

Ribaudo, M.O., Heimlich, R., Claassen, R. and Peters, M. 2001. Least cost management of nonpoint source pollution: source reduction versus interception strategies for controlling nitrogen loss in the Mississippi Basin. *Ecological Economics*; 37: 183–197.

Sanayei, Y., Ismail, N. and Talebi, S.M. 2009. Determination of Heavy Metals in Zayandeh Rood River, Isfahan-Iran. *World Applied Sciences Journal*; 6(9): 1209-1214.

Shah, S. A. 2013. Valuation of Freshwater Resources and Sustainable Management in Poverty Dominated Areas. Unpublished Doctoral Dissertation, Colorado State University.

Shahnoushi, N., Yazdan bakhsh, S., Ashktorab, N., Motallebi, M. and Tabaraee, M. 2010. Estimation of willingness to pay for air quality improvements (case study: Mashhad, Iran). 5th International Conference Social Responsibility and Current Challenges. Maribor, Slovenia.

Skye, J. 2013. Effects of water pollution. http://greenliving. lovetoknow.com/Effects_of_Water_Pollution

Sotudeh Bidokhti, A.M. 2010. Quality preservation of water resources and environment http://treatmentprocess. mihanblog.com/post/108.

Tahami Pour, M. and Kavoosi Kalashami, M. 2012. Applying CVM for economic valuation of drinking water in Rasht, Iran. *International Journal of Agricultural Management and Development*; 2(3): 209-214.

Welsch, D.J. 1991. Riparian Forest Buffers: Function and Design for Protection and Enhancement of Water Resources. Forest Resource management, Northeastern Area, State and Private Forestry USDA Forest service, Radnor, Pennsylvania.

Whittington. D. 1998. Administrating contingent valuation surveys in developing countries. *World Development*; 26: 21-30.

Whittington. D. 2002. Improving the performance of contingent valuation studies in developing countries. *Environmental and Resource Economics*; 22: 323-367.

Wossink, G.A.A. and Van Wenum, J.H. 2003. Biodiversity conservation by farmers: analysis of actual and contingent participation. *European Review of Agricultural Economics*; 30(4): 461-485.

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