WILLINGNESS TO PAY FOR IMPROVED WATER SUPPLY DUE TO SPRING PROTECTION IN EMUHAYA DISRICT, KENYA

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ABSTRACT
This study investigated willingness to pay for improved water services due to spring protection in Emuhaya District. Semi- structured questionnaires were used to generate qualitative and empirical data on 200 randomly selected respondents using protected and unprotected springs from Emuhaya District of Vihiga County. Contigent valuation method was used for valuation of environmental benefits. Logit model was then adopted to evaluate factors influencing WTP. Findings showed that upto 93% of respondents were willing to pay inorder to receive satisfactory spring protection services with a mean WTP of Ksh 111. Moreover, the regression results showed that support, membership to group, farm size and time were significant in explaining the variations in the WTP for spring protection. It can be concluded from the study that there was interest among households involved in using springs to participate in the spring protection which implied that they acknowledged importance of water for it is the main natural resource that is vital for improving life. Therefore there was a recommendation on conscious efforts being made to involve the community in the whole planning process of spring protection and cost recovery. In addition, further studies on impact of time saved due to spring protection on agricultural productivity.

Key Words: Willingness to pay, contingent valuation, spring protection, environment, Emuhaya

1. INTRODUCTION

Maintainence and protection of water supply systems for communities that access water from natural sources such as rivers, streams, ponds and springs has received increased concern. Though some few rural communities in Africa have been able to improve their water supplies, most of them have not because they consider water from natural sources free. Hanemann (2005) argued that water has an economic value only when its supply is scarce relative to demand and whenever its available in unlimited suppy its free in economic sense. Nevertheless water has traditionally been regarded as a “free” good instead of a scarce good in water economics. Hence people neglect the value of water because they can obtain it freely, it has no price, not scarce, its a common property and is not traded in a market.

Kenya surface water coverage is only 2%, a water scarce category of 647m^3 per capita against the global benchmark of 1000m^3 (KWAHO, 2009) which is further exacerbated by pollution, over exploitation and degradation of catchments areas, rapidly growing demand for water for most uses and mismanagement through unsustainable water and land use policies, laws and institutions (GOK, 2006). This water crisis leads to a growing demand over limited water endowment which in turn generates competition and causes conflict over water supply hence adversely affecting the poor and communities without adequate representation in allocation of decision making (GOK, 2006).

Kenya has embedded its water sector reforms into overall poverty reducing strategies in the vision 2030 (Sattler, 2010). Moreover, there is a link between water and poverty which is clearly spelt in the Poverty Reduction Strategy Paper (PRSP) and MDGs where the specific targets rely on the improvement in water sector (Sattler, 2010). PRSP recognizes that water is a basic need and important catalyst both for economic and social development (GOK, 2006). Similarly, achieving MDG target on safe water and sanitation will enhance achieving other MDG targets on gender equity, reduced poverty, improved child attendance to school, and reduced waterborne diseases which are major causes of child mortality and other MDGs. Therefore, the major focus is on the fight against poverty and seeks to “halve by 2015 the proportion of people without sustainable access to safe drinking water and sanitation becomes important target (Sattler, 2010).

Investigations have shown that when springs are properly developed, maintained and treated, they can be can be a reliable source of clean, low-cost, high-quality drinking water (Weigmann et al, 1999). They therefore represent an increasingly valuable supply of water, particularly during droughts and in those areas where other sources of drinking water are not readily available. Naturally occurring springs are important sources of drinking water in rural western Kenya as they contribute to 72% of all water collection trips (Kremer, 2009)

1.1 Economic valuation of environmental goods

Since explicit markets for improvement in environment fail to exist, valuation of environmental products like the facilities for safe drinking water faces critical problems. However emergence of non market valuation has applied the same notion of economic valuation that deals with valuation in monetary terms to items that are not sold in the market (Hanemann, 2005). Use of non-market valuation applies to positive as well as negative environmental impacts of water projects hence valuation can play a key role in decisions to preserve or not.

Contigent valuation Method is used for measuring WTP for social projects and is well accepted and widely used in many different circumstances in developing countries (Mehrara et al, 2009). It has an advantage over the others because apart from placing a value on use value its remains the only technique capable of placing a value on commodities that have a large non-use component of value (Alberini and Longo, 2006; Gunatilake, 2007). Willingness to pay on the other hand is considered to be the appropriate measure of the value which a person derives from a particular good, corresponding to the correct monetary welfare measure (Day and Maurato, 2000). It forces people to take into account the fact that they are being asked to sacrifice some of their limited income to secure the good, and must thus weigh-up the value of what is being offered to them against alternative uses of that income (Day and Maurato, 2000). Some studies on WTP are described below.

Fujita et al (2005) conducted a study on WTP and affordability to pay (ATP) for water and sanitation. They estimated WTP through a CVM questionnaire survey, while ATP was computed with reference to available data including the household survey data in the area. The study found out that WTP was approximately twice of the current average payment level and ATP was in the range from 10% -20% lower to 20% higher than the current average payment level. The implication of this result was that although the beneficiaries' valuation on the improvement of the water and sanitation services was high, the room for increasing the tariff level for financing a portion of the project cost would be small due to their limited payment capacity.

Kaliba et al (2003) examined WTP for improved domestic water supply in rural areas of central Tanzania. Using multinomial logit functions they found that interaction between the water quality variable and proposed bids were important in making choices with reference to the type of improvement desired. In addition they also found that respondents who wanted to increase water supply in Dodoma region were willing to pay 32 Tsh above the existing tariff of 20 Tsh/bucket. In the Singida region, the analogous amount was 91 Tsh per household per year above the existing user fee of 508 Tsh per household per year. The research concluded that project sustainability from a financial viewpoint is largely determined by the degree to which it continues to deliver its intended benefits over a long period of time

Adekunle et al (2006) also conducted an empirical analysis of WTP for environmental service of trees by corporate organization. They focussed on payment for ecosystem/environmental services (PES) of the forest as a useful tool in mitigating forest degradation as well as incentives to forest service providers. Using contigent valuation surveys they derived monetary valuation for the environmental services of urban forest trees in University of Agriculture, Abeokuta (UNAAB) urban environment. The researchers found that 77% of the respondents were willing to pay various amounts ranging from N5 – N1000 monthly. The study therefore concluded that the sampled respondent valued the environmental services of the forest especially the shade provided for them during their meetings to the extent that they are willing to contribute towards the continued existence of trees and by implication the forests in the University environment.

Lastly, Kremer et al (2009) studied the impact of source water quality improvements achieved via spring protection in rural Kenya using a randomized evaluation. The study utilized travel cost method (revealed preference) to estimate WTP values. They found out that spring protection led to large improvements in source water quality as measured by the fecal indicator bacteria *E. coli*. They also found out that the average willingness to pay for the moderate gains in home water quality due to spring protection was at least US$3.27 per household per year.

The current study objective was to assess factors and willingness to pay for spring protection. The main objective of evaluating spring protection from an economic perspective was to enable policy makers identify the best management practice.

2. METHODOLOGY

2.1 Study area

Emuhaya district lies in the Vihiga county of Western Kenya and located on the fringes of the Rift Valley in the Lake Victoria basin. It is sub-divided into two administrative divisions (Luanda and Emuhaya). The climate in the area is equatorial with bimodal pattern of rainfall fairly distributed all over the year and with mean annual precipitation of about 1900 mm which peaks in April and June for long rains and September and November for short rains (Kipsat et al, 2001).

The altitude range is 1300 m and 1500 m above sea level, generally sloping from west to east with undulating terrain characterized by occasional hills and valleys ,with streams flowing from North East to the South East, draining into Lake Victoria. This undulating terrain makes it possible for occurence of springs in the area because most of springs in many situations occur on rocky, hillsides and seepage slopes (Bunyore Community Development Organization, 2010).

The district has a population of 300,000 inhabitants with a high population density of 1350 persons per square km and a birth rate of 3.5% p.a . hence being rated among the highest district in the country according to 2009 population projections (Bunyore Community Development Organization, 2010). This has led to serious fragmentation of agricultural land into uneconomical units and greatly environmental degradation.

2.1.1 Water resources in the study area

The study area has fair surface and ground water resources due to adequate and fairly distributed rainfall. It has two major rivers (Esalwa and Jordan) that traverse across the constituency. However, only about 20% of the total population has access to potable water source for drinking within a kilometer. It has also been observed that springs are the main sources of water in the area and most are inadequately maintained and protected (Bunyore Community Development Organization, 2010) . In general, Emuhaya constituency faces water problems due to lack of deliberate efforts to invest in the development of available water resources such as sinking of shallow wells and the protection of springs. This condition is exacerbated by low health standards and poor sanitation.

Small-scale water supply projects are currently operational in the study area and managed at the village level and financing for such water projects is divided among the beneficiaries, the government and donors (Kaliba et al, 2003). Initial protection cost are provided by NGOs whose fund pays for the purchase of locally procured materials, employ technical and management back-up staff , training courses and running costs while the communities who are beneficiaries raise funds to cover operational and maintenance costs and further contribute time, labor and local materials (Shikanga Simon, personal communication, May 24, 2012). In addition, the community participate in the management through formulation of village water committees that oversee and manage the utilities on behalf of community members and formulate by laws which is of greater emphasis. Women participate almost in all stages of project development and management.

2.2 Theoretical framework

The theoretical framework in this study captures the environmental benefits based on classical theory of consumer choice where by an individual is assumed to demand goods that maximizes his utility subject to his income. Random utility maximization (RUM) is a concept that provides a link between the statistical model of observed data and an economic model of utility maximization. In valuation problem, the individual considers an environmental improvement (in this case, spring protection project) from Q^0 to Q^1, ($Q^1 > Q^0$). This is an improvement so that $v(Q^1, y, \varepsilon) \geq v(Q^0, y, \varepsilon)$.

This will cause a positive improvement in an individual utility**.** When respondent is then offered with the cost of improvement and asked if he would be willing to pay for that price. Under the assumption of utility maximization, respondents in DC accepts or rejects a bid amount for the change in the level of provision of a good depending on which choice would have the highest utility. Response of the respondent is yes if

$V(Q1, y- A, \varepsilon) \geq v(Q0, y, \varepsilon)$ …………………………………………………………………………. (1)

And no if

$V(Q1, y- A, \varepsilon) < v(Q^0, y, \varepsilon)$ ……………………………………………………………………….. (2)

Thus the probability that the respondent answers affirmatively is

$Pr\{yes\} = Pr\{v(Q^1, y- A, \varepsilon) \geq v(Q^0, y, \varepsilon)\}$ …………………………………………………… (3)

This can be expressed as compensating surplus that satisfies

$V(Q^1, y- CSU, \varepsilon) = v(Q^0, y, \varepsilon)$ ……………………………………………………………………… (4)

$CSU = CSU(Q^0, Q^1, y, \varepsilon)$ ……………………………………………………………………………….. (5)

Is the respondent maximum willingness to pay for the change from Q^0 to Q^1

The respondent answers yes if the cost is less than his WTP and no if otherwise. Then

$Pr\{yes\} = Pr\{CSU((Q^0, Q^1, y, \varepsilon) \geq A\}$ ……………………………………………………… (6)

2.3 Elicitation method

This study adopted the dichotomous choice referendum format and single bound dichotomous choice format in particular. Valuation question was posed by asking respondents a referendum question which inquired if they were willing or not to vote for improvement in spring protection/management which would require a management fee. The respondents responded “yes” if they were willing to pay for the service and “no” if otherwise. Respondents had to make decisions about a given price similar to the way they decide or not to buy a certain product in the supermarket. This format is incentive compartible in the sense that it is in respondents strategic interest to acceppt the bid if his WTP is greater than or equal to the price asked and reject if otherwise (Bateman et al, 2002). However, this method provides only limited information about the willingness to pay.

The payment used in the study was voluntary contribution in terms of money because the service being valued pertains to the resource use benefits of the households. a conservation program on water resources that paid attention to providing solutions to water problems through establishment of a maintenance/management fund which would finance protection activities to be done by community members was utilized. In addition, a hypothetical market was formulated and described to survey respondents before the elicitation of WTP values. This was done because elicited WTP values of a non-marketed good/service are “contingent upon” the hypothetical scenario in the survey (Gunatilake et al, 2007).

2.4 Data sources, survey design and administration

This study used primary data which was collected by interviewing a representative sample of randomly selected households in Emuhaya. Data for the broad objective of assessing willingness to pay was collected through a semi-structured questionnaire that was careful designed to capture information required based on previous studies on impacts and CVM questionnaire.

The final questionnaire was administered through face to face interviews to respondents who were randomly sampled. The study site was purposively sampled based on high existence of spring as the main sources of water. The population relevant for the study was individuals whose source of water is spring. Sampling unit was households using springs and only one person was interviewed from each household. The individual respondents were selected systematically at interval of 10 to ensure a total sample of 200, considering population densities and distribution of springs. A respondent was picked from every 10th household considering the starting point from an arbitrary point (main road and spring were the common features used).

2.5 Sampling Procedure

Stratified sampling was used where the communities in Emuhaya district were divided into two stratas (households with protected springs versus those with unprotected springs) then systematic random sampling was used to select 200 households to be interviewed.

2.6 Methods of analyzing environmental benefits

Survey data was entered in Ms Access and later transferred to SPSS version 19 for analysis. Data was then analyzed using various descriptive and econometric procedures that include Ms Excel, SPSS and STATA.

2.6.1 Determinants that influence willingness to pay

2.6.1.1 Discrete choice model

To determine the socio-economic variables that influence WTP the study adopted a logit econometric model as commonly and previously used in environmental studies by Lindberg et al (1997), Ahtiainen (2007) and Mehrara et al (2009). The method was chosen to analyze household's decision for paying for improved water services and to see if the independent variables will have a significant influence on the consumer WTP higher for improved water services.

$$WTPi = X_i \beta + \varepsilon \quad \ldots\ldots\ldots (7)$$

Simplified as $WTP = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_{4+e}$

Where

β_i is a parameters to be estimated (a vector with corresponding estimated variable coefficients, ε_i is the error vector consisting of unobservable random variables, x_{i} = represents the ith explanatory variable (vector of observed characteristics of demand, socio-demographic, attitudinal, behavioral variables.

3. RESULTS AND DISCUSSIONS

3.1 Household socio-economic and demographic results

Results showed that 22.5% of those interviewed were male and 77.5% were female.

The respondents' age ranged from 18- 93 with an average age of 46.42 and was categorized into four groups. In terms of distribution 27.5 % of respondents were in the age bracket of 18-35 years old. Another 22% were between 36- 45, 36.5% between 46- 65 while 13.5% had over 65 years.

Majority of respondents were aged between 18-65 years. This group constitutes the productive age group of the population and the implication is that other productive activities will probably be abandoned for fetching water, which will subsequently lead to less productivity, reduced earning power, hunger and possibly poverty (Admassu et al, 2003).

Majority of respondents (81%) were engaged in farming, while 9%, 2%, 0.5% and 8% were involved in small scale trade /business, teachers, civil service and other activities respectively. This indicated the employment status of the respondents where only 3% of the respondents were engaged in formal employment.

Results also revealed that the average land holding of the respondents was 1.53 acres. This value is consistent with the Kenya Integrated Household Budget (KIHB, 2005) that gives the average land size as 1.5 acres (Government of Kenya, 2005). However, this value is below the FAO recommendations that give an average land holding of 3.6 acres per household for subsistence food purposes (FAO, 1999). This indicated scarcity of land that can be attributed to fragmentation of land that is mainly due to high population densities.

Family size ranged between 1- 15 with average number of people living in the household as 5.3. In terms of education most of the respondents (67.5%) had completed or had some primary education. Some 8.5% had not attained any formal education, while 1.5% had completed nursery. At least 21% of respondents had some secondary education, and a small percentage (1%) had completed college/university education. Education level of respondents was generally low The total monthly incomes for these households showed an extremely skewed distribution with about 53.5% of respondent earning below Kshs 2,000 per month from both formal and informal activities, while 47.5 % earned above Kshs 2,000 per month.

In conclusion, these findings indicate that households in the study area have little income and this is mainly due to the fact that the main source of income is generated from non formal employment (mostly farming) which is limited by the small uneconomical land holdings. High population densities has led to continuous tilling of the land which in turn has lead to exhaustion and decline in land productivity, land fragmentation and land degradation.

Around 76 % of households interviewed in the study area fetch their water from protected springs while the rest fetch from unprotected springs. Distance to the water collection point (spring) ranged from 50 m (very near) to 2000 m and an average of 317m from the respondents households.

3.2 Independent sample test for household characteristics

To determine the socio-economic variables that were statistically significant between household with protected springs and those with unprotected springs, an independent sample t-test was run. The results are presented in Table 1. Six variables: household size, membership to water user group, membership fee, and time spent fetching water, water quantity and training were found to be statistically different between the two groups. The results showed that households with unprotected springs had slightly more number of people living in the household than those with protected springs. These results were statistically significant at 10%. The results also indicated that mean membership to water user group was higher in households with protected springs than in households with unprotected springs. These results were statistically significant at 1% level. Mean group membership fee for households with protected springs was higher (Ksh 83) than that of their counterparts with unprotected springs (Ksh 11) and this was statistically significant at 1%. Average time spent in fetching water per day was higher in households with unprotected springs than in household with protected springs. These results were also significant at 1% level. Water consumption per day for households with protected springs was also higher on average than for the households with unprotected springs and this was statistically significant at 1%. Training on the use of water facility is an integral part in spring protection, therefore it can be inferred that household using protected spring for their water collection activities went through the training exercise unlike their counterparts who did not because their springs are not protected. Results found out that training was highly significant (1%). Munyua (2009) also conducted an independent t test to determine the social- economic variables that were statistically significant. These findings show that households with protected springs have more benefits than those using unprotected springs.

3.3 Willingness to pay

Majority of respondents 93% were willing to pay to receive satisfactory spring protection services while only 7% were not willing to pay anything. The mean willingness to pay for maintenance of springs to both households with protected and that with unprotected springs was Ksh 111.25 with a standard deviation of 58.55. The WTP value was encouraging due to the fact that a higher % of our respondents earned an income of not more than Ksh 5,000 per month. Some 6.5% of respondents were not willing to pay anything, while 23.5% were willing to pay Ksh 50, 27.5% were willing to pay Ksh100, 26.0 and 16.5% were willing to pay Ksh150 and Ksh 200 per month respectively. Average willingness to pay for households with unprotected springs was slightly higher than for those with protected springs at Ksh 116.67 and 109.54 respectively.

The percentage of people not willing to pay was slightly lower than that of study conducted by Moffat (2008) where 15.2% of respondents expressed reservations because they regarded water services as an entitlement to them that should be provided by the government. Not willing to pay in this case was attributed to the fact that people are getting water as a social service/entitlement. However, due to the problem of sustainability of services, it is vital that people view water as an economic good and establishment of a fund to improve the reliability of supply is necessary. In consistency with other studies, households in this study appear to be more likely to be WTP. Adekunle also found out that 77% of the respondents were willing to pay (WTP) various amounts ranging from N5 – N1000 monthly. (Mehrara, 2009) also revealed that 69.2% of the respondents were willing to pay a bid to get drinking tap water connections.

Respondents' willingness to pay implied that they acknowledged importance of water for it is the main natural resource that is vital for improving life and fundamental to healthy and productive society (GOK, 2006).

3.3.1 Reasons for willingness to pay

Results indicated that the main reason for paying/ motivation factor was that most respondents really needed improved water services (84%) and 28.5% were concerned about the health risks of existing water supply system. Some 4.0% cited other reasons among them environmental issues.

3.3.2 Factors affecting households willingness to pay

The WTP for spring protection was regressed on respondent's age, education, household size, source of support and distance to the spring, membership to water user group, farm size, income and time. Table 2 presents the estimated coefficients. The Pseudo R^2 was 0.230, implying that the listed variables jointly explained 23.0% of the total factors that affect WTP. In a related study on WTP, Munyua (2009) found R^2 to be 0.40 which is slightly higher than this. P values indicated that four variables; support, membership to group, farm size and time were significant in explaining the variations in the WTP for spring protection (Table 2).

The following specific inferences were drawn from the Table 2. First WTP was determined by the source of support in spring protection for there was significance at 10%. Results indicated that farm size influenced WTP and there was a direct relationship between the two at 5%. The positive sign suggested that households with a larger farm were found to be more willing to pay. This could be attributed to the fact that those with large farm sizes may be using water for some irrigation purposes. The coefficient of farm size can be interpreted as follow, holding everything else constant; a unit increase in farm size will result in P1.235 increase in WTP.

Membership to water user group, a dummy variable was found to influence WTP negatively at 10%. According to the model, this variable explains WTP in that households belonging to water user group were less willing to pay. This might be attributed to the fact that those belonging to the group had already contributed some amount of money towards developmental activities hence less willing to pay unlike their counterparts who have never contributed.

Results also showed that time used in fetching water per day influenced WTP negatively at 10%. This implied that households who spent more time in fetching water were not willing to pay. This was an interesting result but the reasons for this are still unclear. The estimation coefficient of time used for fetching water suggests that a unit increase in time would reduce WTP by P 1.188.

Average distance walked to the spring, income, education and household size which were expected to have significant influence on WTP were found to be insignificant. Age was found to have the expected negative sign even though it was insignificant. According to this model, the variable did not explain WTP. The negative sign was expected to imply that the older the person the less he/ she was willing to pay for improved water supply. Education level had the negative sign and was not significant in explaining WTP. This is contrary to expectations. Distance to the spring site had a negative sign and was also insignificant in explaining WTP. The variable did not explain WTP and this was also contrary to expectation. Household size which was also expected to be significant was found to be insignificant with a positive sign.

Some of the variables in this study were not consistent with findings in other studies (Mehrara et al, 2009) study indicated that WTP for connections increased with the difficulty of drinking water provision. This implied that the longer it took to collect water (more distance, more number of trips to collect water and time takes to reach tank), the more the consumers were willing to pay for connections.

Even though income was shown to be insignificant, it was highly expected to have a positive significant influence on WTP. There has been mixed results in the previous studies. Mehrara et al (2009), Adekunle et al (2006), Samdin and Aziz (2010) and Ahtiainen (2007) found the level of income being significant and having a positive influence on environmental WTP**.** Chen and Chern (2002) found out that income had a significant and negative effect on WTP while Adesope et al (2010) found out that income had no significant effect on WTP.

However, Fujita et al (2005) study on WTP was consistent with the result of this study. The results found out that the lower the current water usage volume or the shorter the water availability time, the higher the WTP. They therefore considered that water supply volume restricted by limited water availability time resulted in the higher WTP. The analysis of the social determinants of the willingness to pay can also be used to give insights concerning other issues such as designing health policy and tariff construction (Abou-Ali and Carlsson, 2004).

4. CONCLUSION

Most respondents were willing to pay for the improvement of springs and their maintenance. The mean WTP was with respondents in unprotected springs willing to pay slightly higher than those with protected springs mainly because the water situation in their springs was worse and they had not paid anything before.

Results revealed that source of support, membership to water user group; farm size and time used for collecting water per day were some of the factors that influenced WTP. While support and farm size influenced WTP positively, membership to water user group and time influenced WTP negatively. However, the study found out that income had no significant effect on WTP. Those using less time to collect water might be willing to pay than those using more time because they value time and may have engaged themselves in other productive activities. Empirically, it was found that there is interest among households involved in using springs to participate in the spring protection.

5. RECOMMENDATIONS

From the findings it is clear that the community play an important role in water supply because they are the major beneficiaries. Therefore conscious efforts should be made to involve the community in the whole planning process of spring protection and cost recovery because they are the ones who know the problems they face and which springs should be protected. In addition further studies should be done in order to quantify impact of time saved as a result of spring protection on agricultural productivity.

APPENDICES

Table 1; **Independent sample t-test for household/group characteristics**

Variable	Protected (n=152)		Unprotected (n= 48)		Whole sample (n=200)			
	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev	t- value	Sig (2tailed)
Age (years)	46.65	15.893	48.50	16.926	46.34	16.150	-1.031	0.306
Education level	2.01	0.822	2.15	0.618	2.05	0.778	-1.91	0.236
Household size	5.12	2.026	5.88	2.795	5.30	2.257	-1.737	0.087*
Income (Kshs)	1.885	1.050	1.71	0.874	1.84	1.011	1.095	0.276
Distance to spring (metres)	1.095	221.818	350.42	323.848	317.30	249.906	-0.870	0.388
Membership to water user group	0.74	0.442	0.25	0.438	0.62	0.487	6.0704	0.000***
Group membership fee (Kshs)	83.24	180.356	11.46	36.084	66.35	161.380	4.623	0.000***
Time spent fetching water per day(mins)	2.20	0.623	3.08	0.679	2.42	0.739	-7.914	0.000***
Average water quantity per day (20 litre jerrican)	3.30	0.862	2.85	0.875	3.20	0.884	3.107	0.003***
Training on use of water facility(dummy variable)	0.42	0.496	0.00	0.00	0.32	0.468	10.505	0.000***

Asterisks denote statistical significance * at 0.1, ** at 0.05 and *** at 0.01, Degrees of freedom (df) 198.
Source: (Authors survey, 2011)

Table 2: Logit regression analysis for the WTP

	Dependent variable			**WTP**
Explanatory Variable s	coefficient	Std. error	Z	P>|Z|
Age	-0.011	0.027	-0.41	0.685
Education	-0.064	0.482	-0.13	0.894
Household size	0.158	0.199	0.79	0.428
Support	0.539	0.292	1.85	0.065*
Distance	-0.001	0.002	-0.73	0.468
Membership to group	-2.266	1.352	-1.68	0.094*
Farm size	1.235	0.608	2.03	0.042**
Income	-0.171	0.429	-0.40	0.690
Time	-1.188	0.645	-1.84	0.066*
Constant	5.998	3.518	1.70	0.088*

R^2 =0.230 n= 150 asterisks denote statistical significance * at 0.1 and ** at 0.05.
Source: (Authors survey, 2011)

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