WILLINGNESS-TO-PAY FOR IMPROVED SANITATION AMONG RURAL COMMUNITIES IN KABAROLE DISTRICT

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Abstract

This paper presents the findings on household WTP for improved household-level toilet facilities and associated factors from a sample survey based on Contingent Valuation Method (CVM) in rural communities in Rwimi Town Council Kabalore district. A total of 621 (95%) of the targeted 650 households participated in this survey. Data were collected through a research –administered questionnaire on WTP, reasons for willingness to pay, ownership type, payment mode and factors associated with WTP. Information on social-demographics, income and household heads' awareness level of sanitation versus disease were also collected. The results were that there was high WTP in this population with 66% willing to pay for improved sanitary toilets among households who do not own any. The main factors associated with WTP included education of household head, number of children in the household, knowledge of sanitation linkage to disease prevention and having an adult daughter at home. Community awareness about the link between poor sanitation and disease should continue to be actively promoted.

Keywords: contingent valuation method, social demographics, linkage, income

1. Introduction

In developing countries, less than half of the population uses improved sanitation (WHO/UNICEF report, 2010). In general the world is off-track to the achievement of universal access to improved sanitation and clean water by 2015. In Uganda, over 50% do not have access to improved sanitation; in particular over 80% of households in rural areas do not have access to improved toilet facilities (UBOS, 2007).

Poor sanitation and unclean water are associated with diarrheal diseases, exposure to chemical contaminants and vector-borne diseases such as malaria. Majority of the disease burden in Uganda is associated with poor hygiene (UBOS, 2007). Households without proper toilet facilities are more exposed to the risk of diseases like dysentery, diarrhea, cholera, and typhoid fever than those with improved sanitation facilities. In rural areas of rwimi town council, the access to improved sanitation is not expected to be any better.There are many government programmes, notably WASH (Water, Sanitation and Hygiene) programme, and NGOs programmes (under the umbrella

name of UWASNET) that have aimed to improve access to adequate sanitation and clean water in Uganda (MWE report, 2006). Despite these efforts, sanitation remains inadequate especially in the rural areas. The financial resources have also placed a limit on how fast these interventions are implemented. The models being used in delivering these interventions are principally collective-action models. The philosophy is that through awareness-building activities, demand for improved sanitary latrines will increase and people's knowledge and attitudes will change positively (Whittington et al, 1993).

An alternative model is the Willingness-to-Pay (WTP) or Willingness-to-Accept model which could potentially provide information about attitudinal change, improve sense of ownership and also provide another source of revenue, have not been tried.

The WTP studies have widely been used to formulate policies, assess demand, and estimate project benefits in the water and sanitation sectors. They have provided valuable information for different specific countries leading to better informed decisions on design of water supply (Gunatilake et al. 2006). Some authors have noted that WTP is influenced by economic characteristics, socio-demographic characteristics and the characteristics of the good itself (Whittington et al., 1990; Gunatilake et al. 2006)This report presents the findings on household WTP for improved household-level toilet facilities and associated factors from a sample survey based on contingent valuation method (CVM) in rural communities in Kabarole district.

2. Methods:

Measurement of WTP and Contingent Valuation Method

Services such as improved sanitation and water supply are not generally traded in markets and information on market demand or competitive market prices are often unavailable to value benefits (FAO, 2000). The CVM creates a hypothetical market for such products or services and seeks to elicit the value that people attach to them by asking them how much they would be prepared to pay to obtain the benefits of such products or services. The method is said to capture both the use and non-use value attached to the product or service (Carson et al, 2001). With this method, researchers can design surveys to elicit references for goods with attributes that are not currently available in the market (Whittington et al, 1993).

In this survey, the WTP for improved toilet facilities at household level was elicited using double-bounded binary-choice questions based on market bidding. The starting value or bid was US $6. The money could be paid once or in installments over 3months. If the respondent stated a "yes" to paying the $6, he/she was asked about WTP a higher fee of $12 (double the bid). If the respondent said "no" to pay $6, he/she was asked about WTP a lower fee of $3 (halving the bid). The starting value was guided by the expected half of the cost of erecting a ventilated structure and

building a slab on the pit (a pit was supposed to be dug by the house hold). There are 4 sets of binary outcomes from this evaluation i.e yes-yes, yes-no, no-yes and no-no.

Study setting and sampling:

The survey was conducted in rural communities in Kabarole excluding the parish where the town council falls. Respondents were the house hold heads i.e. main income earners and the decision-makers of the households. A two-stage stratified cluster sample was used. With the information from the district headquarters about the sanitation levels in different parishes, parishes were stratified into 4 strata (low, moderate, average, and above average). Villages in each stratum were listed with their approximate sizes from respective LC III councils. A probability proportional-to-number of households in a village sampling scheme was used to draw the villages. Within the selected villages a systematic sample of households was taken. Households with improved toilet facilities were excluded. A new random start of the systematic sample was taken whenever such a household was chanced on. Proportional sample size allocation was used for strata allocation.

The target sample size was 650 based on expected WTP of 40% for initial bid, 5% level of significance, 5% admissible error, 80% assumed response rate and assumed design effect of 1.4

Data collection and management:

Data were collected through a researcher administered questionnaire on WTP, reasons for willingness to pay, ownership type, payment mode and factors associated with WTP. Data were also collected on household socio-demographics, income and household heads' awareness level of sanitation versus disease. Data were double entered in MsAccess.

Data analysis:

Frequencies and proportions were used as summary statistics for different variables. Two approaches to inference were possible. Analysis could have been done with bidding game taken into consideration as is a standard in economic evaluations leading to a double-bounded logistic or probit model. However, in the current report we used an ordinary logistic model by classifying the 4 sets of responses into 2 categories. A "yes-yes", "yes-no" and "no-yes" were classified as a "yes" while "no-no" was classified as a "no".

$$WTP=\begin{cases}1 \text{ for yes-yes}\\ 1 \text{ for yes-no}\\ 1 \text{ for no-yes}\\ 0 \text{ for no-no}\end{cases}$$

The rationale for this classification is that going below $3 in ascertaining WTP will be unreasonably low for an improved toilet facility and reflects unwillingness by the household. Though not efficient as compared to double-bounded logistic model, an

ordinary logistic model would be sufficient to answer our objectives.

The WTP was computed as a proportion while factors associated with WTP were explored through a logistic regression. The associations between the potential determinants of WTP were examined using odds ratios and their 95% CI. Initially, univariable (unadjusted) associations were examined. Only factors for which the association attained a statistical significance ($P<0.10$) were considered for multivariable logistic regression model. All such factors were included in a multivariable model, and retained according to purposeful selection algorithm of Hosmer and Lemeshow (2000). Factors remaining significant at $P<0.10$ were retained in the final model. A 5% level of significance will be used in result interpretation.

Logit (Pr [WTP=IIX]) $=\beta 0+\beta 1x1i+\ldots\ldots+\beta kxki$

Where Xki are factors and β are coefficients to be estimated and exp (β) are odds ratios associated with Xk.

The multivariable model was checked for goodness of fit. Data were analyzed in Stata11 (StataCorp, College Station, Texas, USA).

3. Results

Sample characteristics/descriptive statistics

A total of 621 (95%) of the targeted 650 households participated in the survey. Majority of the household heads were married (78%), male (81%) and had no formal education (58%) (Table1). More than 70% of the household interviewed had at least 3 children aged 15 years and below and only 20% had an adult unmarried daughter at home. Of the 621 respondents, only 29% were not definitely sure that poor sanitation can cause disease and only 39% had been sensitized about improved sanitation (Table 1). Average monthly income was estimated as$201.3 (95% CI: 33-511).

Willingness to pay for improved toilet facilities

About 83% of the households were happy to pay at least $3 for improved sanitary latrine of which majority (78%) preferred to have their own latrine as opposed to communal ownership (Table 2). Indeed even on first bid, WTP was high (66%). Most (62%) were willing to pay in installments over 3 months. Health was one of the main reasons for willingness and perhaps reflecting the link to disease. Reasons stated for unwillingness among the 17% included, have no source of money (63%), believes that current facility is ok (34%) and others (3%). In general, only about 10% of 621 respondents would not pay because they have no source of money.

Factors associated with willingness to pay:

At univariable level, factors associated with willingness to pay included higher level of education, higher income level, higher number of children aged less than 15 years,

being knowledgeable that poor sanitation is associated with diseases, and having an adult unmarried daughter at home. These same factors remained independently associated with WTP in the multivariable model (Table 3).Household heads with secondary school education were 90% more likely to be willing to pay than those who had no formal education (OR=0.10; 95%CI: 0.03-0.28). The likelihood to be unwilling to pay decreased with education level (p-value for trend=0.000). Similarly, there was a decreasing trend of unwillingness to pay with increasing number of children aged less than 15 years (p-trend=0.000). For example, a household with 5 or 6 children was only 27% unlikely to pay compared to a household with only 2 or less children (OR=0.27; 95%CI: 0.14-0.54). Household heads with an adult daughter at home were about 50% more likely to pay.

4. Discussion:

There is high WTP in this population with 66% willing to pay for $6 for improved sanitary toilets among households who do not own any. Main reason for sanitary toilets was health reflecting how the communities were aware of disease-poor sanitation linkage. Including those who are willing to pay $3, as high as 85% being willing to pay provides information about how households highly value the sanitary toilets.The main factors associated with WTP include education of household head, number of children in the household, knowledge of sanitation linkage to disease prevention and having an adult daughter at home. Education is associated with knowledge about sanitation and disease prevention, ease of change of attitude and also with higher income. These factors favour use of sanitary facilities and enable acquisition. Young children are prone diarrheal and tract infection diseases and households with poor toilet facilities, these infections are highly likely (MWE report, 2006; WHO report, 2010). Parents understand the link of hygiene and environmental cleanliness to their children's health. The more the number of children in a household the more the challenge of handling these contagious infections. This could explain why parents with more children are more willing to pay for sanitary toilets.

5. Conclusions

Many (90%) are able to pay for improved sanitary toilets in this community. High WTP shows a positive attitude towards sanitary toilets and will promote a sense of ownership. The model should be used in this community to help improve the sanitary toilets more easily and quickly.

Community awareness about the link between poor sanitation and disease should continue to be actively promoted.

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