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A SURVEY ON THE WILLINGNESS TO PAY FOR DOMESTIC WATER SERVICE ATTRIBUTES IN TERENGGANU, MALAYSIA

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Abstract: This study evaluated consumers' willingness to pay for an improved domestic water services in the state of Terengganu. The following issues are among the challenges faced by water supply provider; excessive water consumption, frequent interruptions, urbanization, climate change, as well as rapid social and economic growths. Choice modelling method was applied in analysing the preferences of domestic water services to improve the standard of current water services. Four attributes, namely water quality, water interruption, water pressure, and water prices were examined to improve water supply services. In order to enjoy the water service transformation, respondents were required to trade-off their income and select their preferences from the attributes based on their willingness to pay. Conditional Logit model was estimated to account for heterogeneity in the selected choices of the consumers from the options provided in the water service attributes. A survey was conducted from March until June 2015 on 1200 respondents from every district (cluster) in the state. The survey discovered that reducing the frequency of water interruption is the most important water service attribute to the population. Consumers are willing to pay about RM1.29 to lessen the state's water disruptions. An appropriate water price facilitates the water supply provider to overcome the challenges towards providing a better service. The water services sustainability is essential in providing the population with safe and clean water. A sustainable water service is helping the economic, environmental, and social sustainability of the communities served by the water utilities. Thus, the water provider must focus on long term sustainability in bringing about meaningful transformation in their organizations and service for the public.

Keywords: Choice modelling, Conditional Logit Model, water service, willingness to pay, sustainable water service.

Introduction

In Malaysia, water supply service is typically provided by either local government agency or private organization. Urbanization, large population, industrialization, and the expansion of irrigated agriculture increase the demand and pressure on water resources. Service interruption and aging infrastructure affect the operation and capital investment, for higher costs are incurred in delivering an excellent water service. Good water management improves human health, reduces poverty, and sustains human development. Changing urban metabolism through population growth, urbanization and climate change urge the water supply professionals and other key actors to revamp the water management particularly in urban areas. Given these issues, it is likely that the current problems of water services will increase in the future unless very efficient strategy for expanding water services is developed. Application of effective technologies and upgrading of services are needed as a key component in any strategy aimed at improving water services in developing countries. These require a vast amount of capital to be invested, which later promote a strong economic growth, as well as better health and social equity. The

water industry is also facing increasing costs for it becomes very costly to bring the best water provision to its users. Sufficient investment is needed to execute numerous programs that should not only be borne by water supply providers because the water supply provider has already had to suffer low revenues/losses as a result of low price of water.

The price of water in Terengganu was last revised two decades ago in 1997, whereas population growth is known to be one of the many challenges in the state's water supply management. At the moment, accelerating depletion of water resources occurs as a result of increasing demand of water. The total estimated population of Terengganu is around 1.15 million people in 2015 and it is expected to rise to two million by 2035. Urbanization and economic developments in Terengganu have increased the demand of water in various sectors such as potable water, non-paddy agriculture crops, irrigation, fisheries, and animal husbandry. The highest demand comes from drinking water and it shows that the demand has increased annually in Terengganu. Table 1 tabulates the water demand for various sectors in Terengganu from 2010 until 2015. The motivation of this study is to work out an effective strategy for water supply development especially in Terengganu. Hence, an application of economic valuation in this study is able to recognize which specific attributes that are concerned by consumers in Terengganu to improve water supply services.

Table 1: Water demand for various sectors in Terengganu

Sectors	Water demand million cubic meter per year					Water demand millimetre rainfall per year				
	2010	2020	2030	2040	2050	2010	2020	2030	2040	2050
Drinking water demand	230.7	354.4	399.3	442	481.4	17.7	27.2	30.6	33.9	36.9
Irrigated paddy	464	428	373	351	323	35.6	32.8	28.6	26.9	24.8
Non-paddy crops	184	184	184	185	185	14.1	14.1	14.1	14.2	14.2
Livestock Total	5.1	8.1	12.9	21.4	36.5	0.4	0.6	1.0	1.6	2.8
consumptive demand	883.8	974.5	969.2	999.4	1025.9	67.8	74.7	74.3	76.6	78.7
Fisheries	35.2	42.9	52.3	127.6	155.5	2.7	3.3	4.0	9.8	11.9
Total demand	919	1017.4	1021.5	1127	1181.4	70.5	78.0	78.3	86.4	90.6

Source: National Water Resources Study (2011).

Terengganu lies 400 kilometres from the east of Kuala Lumpur, the capital city of Malaysia. The state is located in the East Coast of Peninsular Malaysia, having many beautiful beaches and marine parks such as Pulau Redang, Pulau Perhentian and Pulau Kapas. Figure 1 presents the map of Terengganu with water treatment plants' location in the districts of the state, namely Kemaman, Dungun, Marang, Kuala Terengganu, Hulu Terengganu, Besut, and Setiu.

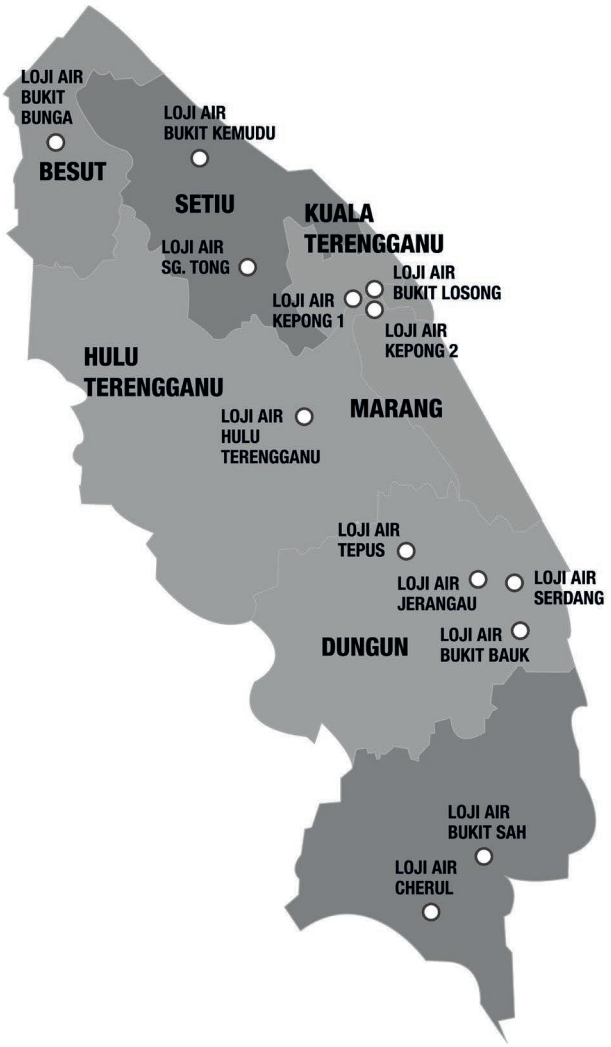

Figure 1: Water treatment plants in Terengganu (Source: Syarikat Air Terengganu Sdn. Bhd., 2014)

Currently, the only water provider in the state is Syarikat Air Terengganu Sdn. Bhd. (SATU). The company's mission is to supply sufficient high quality of clean water and to improve the quality of services in order to fulfil consumer satisfaction. Meanwhile, their corporate vision is towards becoming a leading water supply provider in the country. Two main sources of water supply in Terengganu are from the river extraction and dams. In the year 2012, about 440 million litres of water per day are direct extraction from river and 187 million litres of water per day from storage dams (Malaysian Water Association, 2013). SATU serves 85.2% of water supply for domestic users and 14.8% of water supply for non-domestic users. The statistics from Malaysian Water Association (2015) showed that 99.1% in urban areas and 92.9% in rural areas get accessed to water supply in 2014.

Water price is inexpensive, therefore the water provider is usually unable to gain sufficient revenues to cover the full costs of capital investment, maintenance and operation. In 2015, the state was ranked second lowest in terms of

domestic water prices in Malaysia (MYR0.52/ USD0.13 applies for the first 30m^3). Such low price of water limits the implementation of infrastructure projects to improve the facilities; hence, it demonstrates low value of water supply business although the sources are insufficient and valuable. There are many difficulties in pricing the water as it is a public good and does not have a well-defined market. Water is still very costly and involves high amount of investment. Below cost tariff makes consumers take for granted upon how precious the water sources are. In Malaysia, the average water consumption is very high at 211 litres per capita per day. The World Health Organization (WHO) sets it should be at 160 litres per capita per day. In Terengganu, the consumption is increasing every year and in 2015, it recorded a usage of 216 litres per capita per day compared to 204 litres per capita per day in the year 2013 (Malaysian Water Association, 2015). Similarly, operation and maintenance costs are increasing as these costs are mostly spent on energy cost such as electricity to operate the water treatment plants.

The present study estimated the monetary trade-off between the level of attribute and price, in which it determined the appropriate level of service attributes relative to price. Thus, information was required based on the value that the respondents put on each attribute. Respondents were presented with a set of preferences, and then they chose the best preference for improvement. The marginal willingness to pay was calculated by the differences in the coefficients between the two attribute levels. Households were asked about how much they would pay for a given service level, describing at which level they were willing to contribute to experience a transformation of water provision.

Economic valuation presents the assignment of monetary values to non-marketed assets, where the money value has a particular and precise meaning. Non-marketed goods and services might not be directly sold and bought in the market place because they do not have 'price tag'. Pearce and Ozdemiroglu (2002) stated that goods and services that are positively contributing to the well-being of humans have economic values. The contributions made are estimated by respondents' preferences through their willingness to pay for the goods and services. They are willing to pay high prices if they attain high social values from the services. Previous studies by Hensher *et al.* (2005), MacDonald *et al.* (2005) and Kanyoka *et al.* (2008) focused on an improved water services in developing and developed countries. Other authors such as Mahirah *et al.* (2013) and Mohd *et al.* (2011) used willingness to pay (WTP) approach and conducted Choice Modelling (CM) survey to determine respondents' willingness to pay towards reforming the water services in Malaysia. Nevertheless, the CM method is still being criticized although it offers important information about the value of specific attributes of a proposed program/policy. Blamey (1998) stated that the CM method contains bias in terms of quantity and quality of information offered to the respondents.

Methodology

In order to measure the value that households in Terengganu place on water service, this study examined the amount of money that the households are willing to pay according to three key results of service improvement: (i) increasing water quality; (ii) reducing water supply disruptions; and (iii) increasing water pressure. Better water quality, water supply, and water pressure are not the items that are bought and sold in the markets. Thus, specific non-market valuation techniques were used to estimate their value. The orthogonal design allowed generating 15 water service options. Hence, this study applied CM approach. Respondents were given with a number of choice card sets which described the three proposed improvements in water service policies. With reference to Table 2, this study exhibits a range of impacts that these policies might have on the water quality, water disruptions and water pressure. The choice cards also listed the amount of money that the policy options would cost a household. In this study,

the WTP could indirectly be estimated from the choices, inclusive of water price as one of the attributes. This method aimed to increase the attribute level, for instance, water quality at QUAL1 *(status quo)* to improve the QUAL2 or QUAL3 level.

Table 2: Water service attributes and their levels

Attributes	Levels	Descriptions
Water Quality (QUAL)		
QUAL1	Satisfactory	Connection of water supply at homes is of high quality. It is safe for direct human consumption, odourless, colourless, and tasteless. It also complies with the standard of drinking water quality.
QUAL2	Good	
QUAL3	Very Good	
Water Disruption (DIST)		
DIST1	Always	Reducing the frequency of water supply disruptions at homes.
DIST2	Sometimes	
DIST3	Never	
Water Pressure (PRES)		
PRES1	Low	Condition of water pressure when the water gushes out from the tap water.
PRES2	Moderate	
PRES3	High	
Water Price (PRICE)		
PRICE1	Current Price	Water price describes households' monthly water bills charged by water provider, Syarikat Air Terengganu Sdn. Bhd.
PRICE2	Low (Increased 28% from current price)	
PRICE3	Moderate (Increased 56% from the current price)	
PRICE4	High (Increased 90% from the current price)	

Note: An asterisk ***,** and * represent 1% significance level, 5% significance level and 10% significance level, respectively.

Table 3: Attributes and expectation sign

Attributes	Descriptions	Expected Sign
Water Quality	Connection of water supply at homes is high in quality, safe for direct human consumption, colourless, tasteless, and odourless. It also complies with the standard of drinking water quality.	Positive
Water Disruption	Reducing the frequency of water supply disruptions at homes.	Positive
Water Pressure	Condition of water pressure when the water gushes out from the tap water.	Positive
Water Price	Water price refers to household monthly water bills charged by water provider; Syarikat Air Terengganu Sdn. Bhd, presented as amount increase over the current bill.	Negative

The respondents were then asked to tick the box showing the options they would prefer. Figure 2 demonstrates a choice card which portrays options to choose by respondents.

Attribute	Water Service Option 1	Water Service Option 2	Current Water Service
Frequency of water supply disruption			
	Good	Good	Satisfactory
Increasing water pressure			
	Sometimes	Always	Always
Increasing water pressure Water Price			
	High	Low	Low
Choose your best preference			
	Increases 90%	Increases 28%	Current Price
Choose your best preference		√	

Figure 2: Sample of show card demonstrating a choice set

McFadden (1973) highlighted that the theoretical foundation of CM lies within the random utility theory (RUT). RUT proposes that individuals select their preferred characteristics of goods based on random components that are unique. The theory maintains that the utility U_{ij} of an individual *i* serves as a dependent random variable, attributes of the investigated program and their attribute levels is V_{ij} and unobservable random component is ε_{ij}. The model shows that the utility in which an individual *i* correlates with alternative *j* is as follows (1);

$$U_{ij} = V_{ij} + \varepsilon_{ij} \quad (1)$$

The Conditional Logit (CL) model assumes that the error disturbance has a Type 1 extreme value distribution as in (2);

$$\exp[-\exp(-\varepsilon_{ij})] \quad (2)$$

By employing CL, the probability of selecting an alternative *j* among *n* choices for individual *i* is;

$$\text{Prob}_i(j) = \text{Prob}\,[x'_{ij}\,\beta + \varepsilon_{ij} \geq \max_k \infty_{ci}\,(x'_{ik}\,\beta + \varepsilon_{ik})] = \exp(x'_{ij}\,\beta) \,/\, \sum \infty_{ci} \exp(x'_{ik}\,\beta) \qquad (3)$$

Equation 3 demonstrates the probability that the individual *i* selects *j* is equal to the probability that the utility derived from *j* is larger than the utility derived from any other alternatives (Whittington *et al.,* 1990). The next step is to estimate the choice probability and welfare measure. The ratio of an attribute's coefficient and the price coefficient signifies the marginal implicit price of the attributes as in the Equation 4.

$$\text{Prob}_i(j) = \frac{\frac{\partial V}{\partial x_{c,s}}}{\frac{\partial v}{\partial P_{c,s}}} = \frac{-1\beta_{c,s}}{\beta_{c,s=p}} = -\frac{\beta_{attribute}}{\beta_{monetary}} \qquad (4)$$

Consumer Surplus (CS) was used to estimate the WTP or the marginal values of attributes for a change from current to alternative situation. It could be estimated as follows;

$$CS = -\,1/b_p(V_C - V_N) \qquad (5)$$

Where b_P is the marginal utility of price (monetary value), V_C demonstrate the utility of the current situation, and V_N is the utility of new option.

This survey was conducted from March until June 2015 at eight districts in the state of Terengganu, Malaysia. The households were randomly selected. In order to collect quantitative and qualitative data about the households, a structured questionnaire was distributed to conduct the CM method. Samples of 1,532 households were contacted and 1,200 households agreed to take part in the survey. In addition, information was gathered regarding on the households' perceptions and their opinions about the current water service. They were informed that the water service improvement strategy would depend on the most popular option chosen by the citizens and the results would determine the amount of money that each household must pay for the water service. Besides, each attributes and levels demonstrate different marginal willingness to pay for the improvements of water services in accordance with their preferred selection levels to move from *status quo* (Level 1) to either Level 2 or Level 3. The in-person interview for this section took about 15 to 20 to allow respondents make their decisions.

Results and Discussions

Socio Demographic Characteristics of the Respondents

Table 4 presents the results of the respondents' demographic profiles. The respondents were heads of the households (female, 50.1% and male, 49.9%). The percentages for both genders were about the same. Most of them (34.5%) were between 41 and 50 years old, where the age group mean was 42 years old. The present study found that the participants mostly obtained university/college education (55%) as their highest education level, followed by secondary school (31%), primary school (12%) and no formal education (2%). The results reported that their average monthly income was RM4,182.50. Meanwhile, the household size ranged from one to five members, with a mean of six for the whole sample. A majority of 424 respondents (35.3%) were government servants, private sectors (20.1%), managing businesses (12.5%), and others (32.1%). 94% of them with jobs had one to three family members.

Table 4: Descriptive statistics for respondents, n=1200

Demographic Characteristics	Frequency	Percentage (%)	Mean	Standard Deviation
Gender				
Male	599	49.9		
Female	601	50.1		
Age Group (Years)				
20 – 30	207	17.4		
31 – 40	336	28		
41 – 50	413	34.5	42.13	11.42
51 – 60	185	15.4		
61 – 70	42	3.7		
> 70	17	1.6		
Education Level				
University/College	662	55		
Secondary School	367	31		
Primary School	141	12		
No Formal Education	30	2		
Household Income				
Less than RM2000	312	26		
RM2001 - RM4000	446	37		
RM4001 - RM6000	263	22	RM4182.50	RM4242.80
RM6001 - RM8000	102	9		
RM8001 - RM10,000	58	5		
More than RM10,000	19	2		
Size of Household				
1 - 5	701	58.4		
6 - 10	471	39.3	6.444	3.069
> 10	28	2.4		
Occupation of the Head of Household				
Government sector	424	35.3		
Private sector	241	20.1		
Businessman	150	12.5		
Others	385	32.1		
Working Family Members				
3 members and below	1129	94.0		
4 – 6 members	65	5.5	1.958	1.047
More than 7 members	6	0.5		

Determinants of Households' Willingness to Pay for Water Services

The estimation procedures for CM were employed using econometric software, NLogit Version 5. A CM model was applied to interpret the data collected through the CM. The dependent variable for this model was the choice of a water alternative, whereas the independent variables were presented by the water services attributes. Then, the alternatives to be selected by respondents were in different combination of attribute levels. The model is stated in the Equation 6;

$$\text{Choice of Water Services} = \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \varepsilon \quad (6)$$

Where β_1 until β_7 demonstrate the main attribute coefficients, and X_1 until X_7 demonstrate the main attributes. The Conditional Logit (CL) model includes seven variables, namely QUAL2, QUAL3, DIST2, DIST3, PRES2, PRES3 and PRICE. Table 5 illustrates the estimated willingness to pay from the current condition to an optimal outcome, signifying the estimated benefits in monetary terms regarding the state's water service improvements.

The overall coefficients and signs were as expected and showed positive signs except for *High* (PRES3) in the water pressure attribute (Table 5). All coefficients for attribute levels were significant at 1% level except for *Moderate* (PRES2) water pressure which was significant at 5% level. Next, the highest level of the attribute (PRES3) portrayed a negative relationship towards the dependent variable, and the preferences over water quality attribute levels showed a similar pattern. Also, the conditions of water quality such as colourless, tasteless, and odourless were mostly favoured by the respondents during the interview. In terms of water disruptions, preferences in *Sometimes* and *Never* indicated that the respondents preferred lessening the frequency of water supply interruptions. For water pressure, both *Moderate* and *High* water pressures had effects on the willingness to pay for water services but in different signs, indicating that the respondents were more prone towards *Moderate* water pressure compared to *High* water pressure. This is probably due to *High* water pressure could cause water leakage in plumbing and piping system. Besides, the respondents did not expect that the water services could be improved to the highest level, because at that time, the current water pressure was worsening.

Table 5 demonstrates the estimated coefficients for all variables which were used to measure the outcomes of change in attributes regarding the price that households were willing to pay for service improvements. The result of marginal willingness to pay at the level "good" to "very good" for water quality attribute was at RM1.20. A service improvement in terms of water disruptions from the level of "sometimes" to "never"" was at RM0.11. These values illustrated how much respondents were willing to pay for water service improvements at each level. Meanwhile, the differences in marginal values in water pressure at the level "low" to "moderate" was at RM0.09 and the level "moderate" to "high" was at RM0.92 (negative value). 'Water pressure' attribute exhibited a relatively low values (negative value) compared to other attributes. Surprisingly, households were mostly concerned about water disruptions at their homes as the attribute generated the highest willingness to pay, which was at RM1.29 compared to other attributes. The marginal rates of substitution of water disruption attribute in Level 2 (Sometimes) was the highest which, demonstrating that the consumers were willing to pay for water disruption improvements. However, the main problem in the service was water pressure as the demand was very high in the state. At the moment, there are 12 water plants that cater the needs of 1.15 million population in Terengganu. Similarly, Mahirah *et al.* (2016) posited that respondents chose to improve water interruptions to reduce the frequency of disruptions in Kelantan from moderate level to high level (less water service disruptions); it generated the highest marginal values based on the CM model.

Table 5: Estimated coefficients for households' willingness to pay in Terengganu, Malaysia

Variables	Coefficient	t-value
Water Quality (QUAL)		
Good (QUAL2)	3.7682	7.190***
Very Good (QUAL3)	3.8076	7.573***
Water Disruption (DIST)		
Sometimes (DIST2)	4.0899	9.251***
Never (DIST3)	0.3394	3.984***
Water Pressure (PRES)		
Moderate (PRES2)	0.2881	2.100**
High (PRES3)	-2.9269	-11.384***
Water Price (PRICE)	-3.1706	-4.658***
Marginal Values of the Attributes: (β's coefficients/-β's price)		
Good (QUAL2)	1.18	12.636***
Very Good (QUAL3)	1.20	9.827***
Sometimes (DIST2)	1.29	9.133***
Never (DIST3)	0.11	6.556***
Moderate (PRES2)	0.09	1.932*
High (PRES3)	-0.92	-7.263***

Note: Significance Level: (***) 1% Level, (**) 5% Level, (*) 10% Level.

A study on economic valuation that took place in Kazakhstan signified that water price improvements could be used to identify the proper selection of technologies and service delivery to make rural water projects both sustainable and applicable at a larger scale. Revising water price supported the improvements of their water supply services. However, a study on the willingness to pay in Karachi, Pakistan demonstrated that cost recovery was indeed possible via the increment of tariffs for higher income households. The study recommended imposing cross subsidization among users which will make some users pay more than cost and others poor households pay less. Overall, previous willingness to pay studies revealed the different stories regarding socio demographic of consumers. For instance, cross-subsidy tariffs are imprecise instruments as poor households are least likely to have connections at homes. In those cases, it demonstrated that water prices are important to promote financial and environmental sustainability. The price must cover at least the costs of operation and maintenance in the water service provision. Increasing water price would most likely discourage an excessive water use and a replication of the marginal cost of expanding water supply capacity. An effective water rate structure for cost recovery and its sustainability are important because the water sources are vital in our lives. Human beings require a sustainable water supply to help them achieve a better quality of life in the future.

Conclusion

This study applied CM method in Terengganu and used the utility of stated preference methods to determine households' demand characteristics and their willingness to pay for various aspects of water services. The households had provided valuable information to decision makers according to their willingness to pay in different scenarios of water service improvements. This

study discovered that the water service disruption was mostly concerned by the respondents as the attribute had the highest marginal willingness to pay compared to other attributes. Water provider in the state should take into account an efficient and equitable allocation of water to urban and rural consumers. Furthermore, the survey found that the households were not satisfied with the water services at that time, particularly in terms of water pressure.

This valuation technique offered in-depth information about consumers' preferences and willingness to pay for different attributes of water services. This information is significant for water providers and authorities outline the provision of this service and the corresponding price based on the households' demands. The level and structure of new water price should be carefully designed in order to increase the success rate of this transformation program. This is important to promote and educate communities regarding the importance of water in our lives and encourage water saving practices. Cheaper water price makes households take for granted the valuable natural resources. An appropriate water pricing results in a much better water consumption by consumers. Additionally, reliable and efficient water services are also a vital ingredient for economic growth. Effective management of water services can prominently reduce water losses, improve water billing and increases revenue collection; thus, it will have a substantial effect on water demand.

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References

Blemey, R. K. (1998). Contingent valuation and the activation of environmental norms. *Ecological Economics,* 24(1): 47-72. spade

Hensher, D. A., Shore, N., & Train, K. (2005). Households' willingness to pay for water service attributes. *Environmental & Resource Economics,* 32(4): 509-531.

Kanyoka, P., Farolfi, S., & Morardet, S. (2008). Households' preferences and willingness to pay for multiple use water services in rural areas of South Africa: An analysis based on choice modelling. *Water SA,* 34(6): 715-723.

Mahirah, K., Alias, R., & Khalid, A. R. (2016). Household preferences for improved water services in Kelantan, Malaysia: A choice experiment approach. *Journal of Business and Social Development,* 4(1): 43-54.

Mahirah, K., Khalid, A. R., Alias, R., & Mohd, R. Y. (2013). Improvements in domestic water services in Kelantan: Are people willing to pay? *Journal of Sustainability Science and Management,* 8(2): 61-70.

MacDonald, D. H., Barnes, M., Bennett, J., Morrison, M., & Young, M. D. (2005). Using a Choice Modelling approach for customer service standards in urban water. *Journal of the American Water Resources Association,* 41(3): 719–728.

Malaysian Water Association (2015). Malaysia water industry guide. Kuala Lumpur, Malaysia: Malaysian Water Association.

Malaysian Water Association (2013). *Malaysia water industry guide.* Kuala Lumpur, Malaysia: Malaysian Water Association.

McFadden, D. (1973). Conditional logit analysis of qualitative choice behavior. In P. Zarembka, (Ed.), *Frontiers in Econometrics* (pp. 105-142). New York : Academic Press.

Mohd, R. Y., Alias, R & Zaiton, S. (2011). Willingness to pay for domestic water service improvements in Selangor. *International Business and Management* 2(2): 30-39.

Pearce, D., & Ozdemiroglu, E. (2002). *Economic Valuation with stated preference*

techniques: Summary guide. Department for Transport, Local Government and the Regions, London. 87 pp.

Syarikat Air Terengganu Sdn. Bhd. (2014). *Maklumat Takat Lokasi Intake.* Kuala Terengganu, Malaysia: Syarikat Air Terengganu Sdn. Bhd.

Whittington, D., Davis, J. & McCelland, E. (1990). Implementing a demand-driven approach to community water supply planning: A case study of Lugazi, Uganda. *Water International,* 23(3): 134-145.