WILLINGNESS TO PAY (WTP) BY CONTINGENT VALUATION METHOD (CASE STUDY: WASTE MANAGEMENT SERVICES)

by Marselina .

WILLINGNESS TO PAY (WTP) BY CONTINGENT VALUATION METHOD (CASE STUDY: WASTE MANAGEMENT SERVICES)

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ABSTRACT: There are difficulties to get the optimal price of public goods. This study aims to estimate an optimal price of waste management service by using the household's WTP with the Contingent Valuation Method and to investigate the relationship between the characteristic of respondents with their WTP. Using a purposive random sampling technique, 200 households in Bandar Lampung City are selected. Questioners are designed with 8 options of waste management services with some more reasonable tariff. In principle, households as beneficiaries will pay what they bid so they must bid less than their true WTP if they want to obtain surplus from the transaction. The result indicates that household's WTP for waste management services is 200% higher than before if services are upgraded such waste is picked up every day in the morning. Other results indicate that the level of education, number of family, job, income, knowledge, and satisfaction of respondents to waste management services are positively correlated with their WTP. The government should review the tariff policy of waste management service to obtain an optimal price.

1. INTRODUCTION

Recently, waste management is becoming an important issue in the environment in Indonesia. This problem is getting worse along with the population growth and the bad attitude of households disposing of their rubbish without being responsible. This habit is driven by the low charge of waste management service which is set by the government. As a public good, waste management services is a nonmarket because no one can express their preference. The tariff cannot be determined by the market mechanism. So that way, this tariff does not reflect the actual cost, includes environment damaging.

Based on local regulation in Bandar Lampung city, one of Indonesia provinces, the average of the tariff of waste management service is between is 20,000 IDR to 30.000 IDR per month this tariff is designed and set on the rule by local government every 4 years after discussed and agreed by legislative members.   Local government and legislative members have no enough information about how to calculate the tariff of public service comprehensively.   Based on the rule's explanation, the tariff only covers operational costs such as fuel prices for a waste transport vehicle, labor, and vehicle maintenance and has not yet taken into consideration of environmental damage. According to [10], the tariff must also include the cost of recycling and composting. This low tariff encourages people to easily dispose of waste regardless of environmental damage and this attitude will undermine environmental conditions.

Based on this background, it is needed to have a technique for estimating of tariff that also encourages environmental awareness. One of the methods to estimate it is the Willingness to Pay (WTP). Economists, psychologists, and marketing researchers rely on measures of consumers' willingness to pay (WTP) in estimating demand for private and public goods and in designing optimal price schedules [22] and customers pay what they bid (s) so they must bid less than their true WTP if they want to obtain surplus from the transaction.

WTP is a technique to know the willingness of individuals to pay for public goods benefit in which the price of it cannot be determined by market mechanism because of the lack of information or preferences. WTP is an individual valuation technique on natural resources in order to improve the quality of the environment. Using WTP to avoid the problem of free-riders in the determination of tariffs for public goods services [3].

WTP is based on the user's perception of s of the public service. To get user perception, it can be used the Contingent Valuation Method (CVM). CVM is a method of measuring someone's preference [8]. CVM is measuring WTP by eliciting stated user preferences through direct surveys. The user is directly asked about their WTP by using open-ended questions [17]. In these surveys, household or beneficiaries are offered some alternative services or condition with varying attributes. WTP is inferred indirectly from their ranking or ratings of these alternative services. CVM   is can be applied to determine the price of

tourism services, apartment tariffs, utilizing wildlife, environmental quality.

In Indonesia, there is still miss interpretation, in which all the public service and procurement services including waste management services are government duties and it should be free of charge. In order to have a common point in determining the tariff, it should involve the participation of the household. Households as beneficiaries do not care about waste management [1]. According to [18], the participation of households in waste management services can be indirect participation, namely the involvement of households in financial matters. This participation in waste management is reflected by making payment of user tariff for garbage. According [14] one form of participation waste management can be seen from the willingness to pay for the improvement of waste management facilities so that cleanliness and environmental quality can be maintained.

Public participation is essential and may lead to enormous benefits for sustainability development [5, 22] also agree that waste management services are facilitated by the government but managed by the community which requires active community involvement. Involvement, participation and some characteristic of household determine their choices in WTP. Some characteristics of the household such as education level, gender, age, lines of class, race, ethnicity, house type, house distance, income and service quality, awareness, perception and household satisfaction level toward the benefits of public goods in correlating with WTP [4, 13]. Effects on WTP is high when they are interactions with each other. Age tends to increase income and higher income has higher opportunities to get high education and high education tends to increase their awareness of the environment [16]. The more aged, the more knowledge and experience of environmental benefits and the more concern for the environment. This relationship increases the WTP. Family members will add family members' information about environmental issues because, in Indonesia, environmental issues become the curriculum taught in schools.

Community awareness of the environment is influenced by the level of education and knowledge about the environment [7]. According to [17] household concerning will affect WTP and it increases along with improving the quality of services. Survey also conducted using WTP, it is found that having children may change people's individual environmental attitudes and behavior, and the results indicate that having a new child is associated with a small decrease in the frequency of a few environmental behaviors [13]. Income inequalities can influence environmental degradation. Inequalities may affect the overall extent of environmental quality so that the higher

income the higher WTP. High level of awareness and knowledge and positive attitude will increase environmental protection [2].

2. OBJECTIVES

This study aims (1) to calculate the willingness to pay off household to waste management service in order to get the tariff which is resulting which can arouse the awareness of households to be more responsible, (2) to investigate the relationship between respondent's characteristic with their WTP. This study is expected to provide inputs to the government's policy of setting, in particular, the of waste management services.

3. BACKGROUND

WTP is an individual valuation technique on natural resources in order to improve the quality of the environment. Some experts also define WTP is the maximum price beneficiaries willing to pay for a given quantity of product or services [21]. WTP as a way of calculating the ability of each individual on an aggregate basis to pay in order to improve environmental conditions to conform to desired standards. Economic valuation is an attempt to provide a quantitative value to goods and services produced by natural resources and environment regardless of whether the market value is available or not [17] and. CVM is done by asking directly to benefit about the value of benefits of public goods includes resources and environment. Asking 120 respondents in Semarang Barat, [12] found that almost 85% of respondents are willing to pay a higher tariff. He also found that the level of education and family income has a positive effect on the size of WTP. This result also supported by [11] that the average WTP of consumers on waste treatment services is higher than the tariffs paid. The average of household WTP in Tampan Pekanbaru is IDR 10.330 per month [23]. WTP can be increased by improving service quality [3].

Contingent Valuation Method (CVM) is a method for valuing natural resources and the environment. This approach is done to measure the economic value of goods that cannot be determined because of the nonmarket price. According to [7] CVM is a technique to analyze the valuation function that can provide qualitative information that is difficult to identify using other conventional valuation techniques. CVM is done because the household is unable to express its preference for economic. CVM can be also practiced in some objects. WTP can be applied for tourism hunting

services, dumping tariffs. WTP technique also applied to control pollution through countermeasures against water pollution in coastal areas of Christians and Fjord - Norway.

4. METHODOLOGY

This research is a field study with a survey technique. Data were obtained from questionnaires given to households located in densely populated housing with the highest volume of waste. The Context of questions may enhance respondents' consciousness about the environment and bump up the value of their WTP [12]. Determination 200 household respondent used purposive sampling technique. In Sukabumi district whose waste is managed by the city waste management service of Bandar Lampung, Indonesia value of waste management service. One way to know benefit from public goods is to use CVM s by asking the ability of household pay for waste management service.

It begins by designing a questionnaire that describes some of the preferred bids from the improved conditions of waste management services at a reasonable tariff that follows.

Table 1 Scenarios, services and tariff (IDR)

Scenarios	Services	Tariff/day
Scenario A	Garbage is managed 2x a week, in the afternoon with a garbage car	166
Scenario B (starting point)	Garbage is managed 3x a week, in the afternoon with a garbage car	222
Scenario C	Garbage is managed 3x a week, in the morning, with a garbage cart	277
Scenario D	Garbage is managed 4x a week. morning with a garbage truck	333
Scenario E	Garbage is managed 4x a week. morning with a garbage truck	388
Scenario F	Garbage is managed 5x a week, early morning with a garbage truck	444
Scenario G	Garbage is managed 6x a week, morning with a garbage truck	500
Scenario H	Garbage is managed 7x a week, morning with a garbage truck	555

The initial conditions of service and of management services at the study sites are taken as start points. Start point condition of waste management service is managed 3 times a week in the afternoon, with garbage cart, with tariff IDR 20.000 /month. The average waste per day disposed of every household in the study site was 3 plastics or 90 plastic/ month. It means the value of waste management during this per pack of garbage IDR 222.22 / plastic. Then 8 scenarios of waste management services were created by raising the per stage of service IDR 10.000/stage, in which IDR 10.000 is considered on household ability. The designed questioner asked for respondent. If most respondents answer one scenario selected, then this scenario is the actual WTP desired.

4.1 Hypothesis Development

Meanwhile, to obtain the second objective of the relationship between the characteristics of the respondent with the WTP he selected, the correlation and crosstab analysis techniques are used. The respondent's characteristic consists of 6 elements, namely the number of family members, the level of education, the type of work, the level of income, the level of service satisfaction and the level of knowledge of the dangers of unmanaged solid waste. The hypothesis developed as follows:

Ha (1): Numbers of Family is a significant and positive correlation with WTP.
Ha (2): Level of education has a positive correlation.
Ha (3): The type of work of respondents has a positive relationship with WTP.
Ha (4): Level of income level has a positive relationship with WTP.
Ha (5): The level of satisfaction of respondents has a positive relationship with WTP.
Ha (6): The level of knowledge has positive Relationship with the WTP.

5. RESULT

With a purposive sampling technique, 200 respondents were selected, who met the research criteria. The criteria are those who have been enjoying the waste management service for approximately more than 3 years. Of the 200 respondents then grouped into 3 classes, namely poor households with an average monthly income of less than USD $ 150, obtained as much as 35%, middle class between USD 150 to $ 350 obtained as much as 47%, while the rich group is able to have income > USD 350 was

obtained by 18% or 36 households. The poor have an average level of education less than junior high school and work in the informal sector. These poor have an average family size of 6-7 people, while the rich have an average of fewer than 4 people.

Table 2 Descriptive of respondents

	Poor < $150	Middle 51 < x < $ 350	Rich > $351
Family member :			
6-7 person	60 %	15%	20%
4-5 person	30%	65%	23%
< 4 person	10%	20%	57%
Level of Education	Under Secondary School	High School and Associate Degree	Higher than Associate Degree
Type of Work:			
Informal	80%	0%	0%
Civil Servant	5%	80%	20%
Entrepreneur	0%	20%	70%
Level of Income	35 %	47%	18 %

200 respondent fill the questioner and based on the survey, respondents are dominantly chosen scenario G, by 37 %. They desired the waste management services working every day or 7 times a week, managed in the morning by a garbage truck and they agree to pay normal charged as IDR 555 per plastic or IDR 50.000 per month. If it compares with their paid, this WTP increase more than 200% than they paid before. While 10% of respondents stated that they are still willing to pay IDR 222.22 per plastic or like the initial condition, where the waste is managed 3 times a week with IDR 222 with the expense of already many, waste management is the duty of the government, not the household. A total of 19% of respondents are willing to pay IDR 388.00 per plastic or scenario D that is garbage managed four times a week, managed in the morning by a garbage truck. The rest or 36% of respondents chose to spread among scenarios A, B, C, E, F. The result of the respondent's choice is shown in Table 2 below.

Table 3 WTP of waste management services Per plastic

	WTP	Percent
Valid	166	3.0
	222	10.0
	277	13.0
	333	7.0
	388	19.0
	444	2.0
	500	9.0
	555	37.0

Thus, the actual WTP is that they are willing to pay for waste management services IDR 50,000 a month or 200%, provided that the quality of waste management services is improved. This result is higher than what [21] found in WTP of water supply in Nigeria. The desired service is garbage managed by the government every day, especially in the morning, so that the garbage does not have time to decompose and make air pollution in the afternoon and afternoon so that the house and the surrounding environment to be beautiful. It's mean that the WTP of the community can be pushed to increase if their satisfaction of public services is increased.

5.1 Correlation Between the Characteristics of Respondent with Their WTP

Relationship of some characteristics of respondents with WTP used Pearson Product Moment Test. Characteristics of respondents consist of 6 elements, namely the number of family members, the amount of income, the level of education, the type of work, the level of satisfaction on waste management services and the level of knowledge of respondents about the importance of processing waste and maintaining the environment. Of the six characteristics of the household respondents, only the type of work has no correlation with WTP, while five characteristics have a positive correlation.

There is a positive correlation between the number of family member and WTP, with a coefficient correlation of 59.3%. The more the number of families, the more WTP. This awareness is also supported by education. The result finds that there is a positive correlation between the level of education with WTP, with coefficient correlation equal to 78,6%. The higher level of education that has been taken has influenced the respondents' mindset of environmental quality so that their WTP increases. With higher levels of education, respondents tend to better understand the effect

of waste on the environment. Higher knowledge raises awareness for a healthy environment. Level of income is also correlated with WTP with 73.3%. It means that if the household has more income, the family will produce more garbage. The result of the test as follows.

Table 4. Correlation Between Characteristics of Respondents with Their WTP

Characteristic Respondent	coefficient	Sign
The of family member	0,593	0,000*
Level Education	0,786	0,000*
Type of Work	0,155	0,125
Level of Income	0,733	0.000*
Level of Satisfaction	0,740	0.000*
Level of Knowledge	0,568	0.000*

*) sign on 95%

Respondents' income, age, and duration of school determine WTP of waste management service [6]. Feitosa [6] recommend that communities be encouraged to participate in waste management to safeguard the environment, economics, institutions, and social sustainability. Type of work is not a significant correlation with WTP. This finding is also supported by consumption theory by Keynes, in which the current consumption depends on the disposable income of the household. Consumer income will affect consumer decisions in consuming certain goods or services. The higher the income, the higher the ability to buy goods or services. The higher income will increase demand for better environmental quality. Others finding, that there is a positive correlation between the satisfaction levels of waste management services with WTP. Level of satisfaction of respondents to waste management services in Sukabumi, Bandar Lampung with WTP for example, provision of public goods and services will provide benefits for households. The provision of public goods and services will be optimal if the satisfaction obtained by households is similar to the dissatisfaction that households get by taxes [2]. The increase in the services provided is expected to have an impact on the satisfaction of households in Sukabumi households will increase WTP. The satisfaction of the household increase due to the increase in the quality of waste management service. The household will pay higher for the services. Hagos [10] shows that more services that should be provided and enhanced by the government include collection services, waste is disposed of properly, and recycling and composting features are added, more WTP increase. Management service in Kampala City, Uganda can be improved by improving the quality of waste services [3].

The knowledge level of the respondents about the impact on the environment is correlated with the WTP with a coefficient correlation of 56.8%. The more knowledge about environmental, the higher their WTP. Respondents who have good knowledge about the benefits and damage of the environment, they will tend to be more likely to be willing to pay [15]. Finger [6] shows that experience is positively correlated with environmental awareness. People who have environmental experiences are willing to pay higher. Respondents have more knowledge respondents will do activities that are not environmentally damaging and are likely to be willing to make conservation efforts environment. Tansatrisna [21] also shows that gender, a frequency of water, education, household size, income, quality of water and connection charges were the factors influencing residents' willingness to pay.

6. CONCLUSIONS

WTP of the household for waste management services increased up to 200 % when the service is increased. There is a positive correlation between a characteristic of respondents such level of education, the level of satisfaction, type of work, income, level of satisfaction, and knowledge of respondents to their WTP in waste management services. Local government needs to review the local regulation concerning WTP and better services with an optimal price.

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