

Community Preparation for Domestic Wastewater Management Development in Jakarta

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Abstract:- This The high population of Jakarta causes the high production of domestic wastewater. Domestic wastewater consists of black water and grey water from bathing, washing and toilet facilities from households is a major contributor to the high level of water pollution in Jakarta. For this reason, the Government of DKI Jakarta Province together with the Central Government are currently developing a domestic wastewater management system. Factors affecting the success of the wastewater management development program are identified such as infrastructure, institutions and community preparedness and support. The Government of DKI Jakarta Province has planned the construction of 14 Domestic Wastewater Treatment Zones and institutional strengthening of supervisor and controller, regulator, and operator. Besides that, it is necessary to build community preparedness in accepting the concept of polluter pays principle, which requires pollutants to bear the costs of preventing and controlling pollution caused, including the willingness to pay for domestic wastewater services. The survey results show that people who know and are very aware of domestic wastewater treatment plants that only reach 11%, only those who are willing to pay for domestic wastewater services are 56% and the community's willingness to pay is in the range of Rp.44,049.53 to Rp.57,200.47. This survey shows that domestic wastewater management is not well understood by the community. Therefore, strategies to prepare the community are imperative to the success of wastewater management.

Keywords:- Domestic Wastewater; Polluter Pays Principle; Willingness to Pay.

I. INTRODUCTION

A. Background

Jakarta as the Capital of the Republic of Indonesia with a land area of 662.33 KM² and inhabited by 10,467,630 inhabitants who increased due to commuter activities from Bogor, Depok, Tangerang and Bekasi (BPS, 2019), is one of Indonesia's metropolitan cities that grows very rapidly. This rapid development of the city has an impact and pressure on the carrying capacity of Jakarta's water environment, both groundwater and surface water due to domestic wastewater generated by the activities of its people. Based on a study conducted by the Japan International Cooperation Agency (JICA) in 2012, the resulting wastewater was estimated at 200 liters/person/day, which consisted of household wastewater in the amount of 150 liters/person/day and non-

household households as big as 50 liters/person/day. Thus, based on the existing population, currently it is estimated that every day Jakarta produces 2,093,526 M³ domestic wastewater, which consists of household domestic wastewater 1,570,144 M³ or 75% and non-household waste water from offices, regions commercial and industrial as much as 523,381 M³ or 25%, so it can be said that domestic wastewater in the form of dirty water from bathing, washing and toilet facilities from households is the main contributor to the occurrence of water pollution in Jakarta.

The management of domestic wastewater in Jakarta has so far been carried out conventionally by disposing directly into rivers or canals or using septic tanks without using special technology for treatment. Fraction of the community has tried to process it, but the quality of the results is still not reliable, let alone to the point of re-utilization. This condition certainly has the potential to have an impact on the high level of water pollution that occurs in Jakarta. Based on data cited from the Regional Environment Status of DKI Jakarta Province in 2015, the level of river water pollution shows a very high number, because only 1% of river water is of a quality that is in accordance with quality standards, while the rest is in the mild polluted status of 16% , medium polluted 39% and heavily polluted 44%. The level of water pollution that occurs in swamp water shows only 4% of swamp water quality is in accordance with quality standards, while others are in the status of 58% mildly polluted, 25% moderately polluted and 13% heavily polluted. Regarding the level of well water pollution, 42% of the quality is in accordance with the quality standard, while others are in the status of 37% mildly polluted, 19% moderately polluted and 2% heavily polluted. Based on these conditions the use of river and swamp water for drinking and cooking purposes for the people of Jakarta cannot be done. While the use of well water is still possible, especially in locations that have not yet received piped clean water services by PAM Jaya.

In an effort to develop domestic wastewater treatment in Jakarta, in addition to the zero zone that has been built in the Setiabudi area, through the Waste Water Management Master Plan in DKI Jakarta, JICA (2012) is recommended to build 14 zones of domestic wastewater treatment development spread across Jakarta areas others up to 2050 are divided into short-term, medium-term and long-term development plans. For the implementation of the Wastewater Management Master Plan in DKI Jakarta, the Governor of DKI Jakarta Province Regulation No. 41 of 2016 concerning the Master Plan for the Development of Infrastructure and Facilities for Domestic Wastewater

Management, as a guideline for the development of infrastructure and facilities for domestic wastewater management, aims to improve access to facilities sustainable management of domestic wastewater in Jakarta divided into domestic wastewater treatment of centralized systems and

local systems and their implementation accelerated until 2030. The development zone development plan in the 2017-2022 Medium Term Regional Development Plan is as Table 1. Whereas priority targets are planned to be developed in zones 1, 2, 4, 5, 6 and 8, as Figure 1.

Zona No.	Site No.	Location of WWTP (Alternative)	Area (Ha)
0	0	Kali Krukut	Plan
1	1	Waduk Setiabudi	Existing
2	2	Waduk Pluit (priority)	4
3	3	Muara Angke (priority)	0,8
4	4	Hutan Kota Srenseng	4,0
5	5	Transfer ke IPAL Zona 10 (priority)	1,6
6	6	Hutan Kota Waduk Sunter (priority)	4,6
7	7	Duri Kosambi (priority)	8,2
8	8	Kamal-Pegadungan	3,9
9	9	Rencana Waduk Marunda (priority)	6,0
10	10	Rencana Situ Rawa Rorotan	2,9
11	11	Pulo Gadung	8,7
12	12	Taman Bendi	3,0
13	13	Rencana Waduk Ulujami	5,9
14	14	Kebun Binatang Ragunan	3,1
15	15	Rencana Waduk Kampung Dukuh	5,7
16	16	Rencana Waduk RW 05 Ceger	3,6
Total			65,1

Table 1:-Location of WWTP Zone Development Plan
Source: Medium Term Regional Development Plan 2017-2022

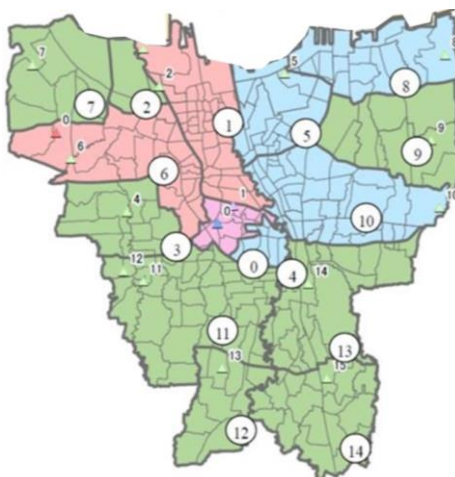


Fig 1:-Development of WWTP Zone Priorities
Source: Medium Term Regional Development Plan 2017-2022

Setiawaty et.al. (2013) states that the factors that influence the sustainability of domestic wastewater management are (a) technology selection, such as system durability, spare parts availability, operational ease and adaptability; (b) financing, such as investment costs, operational and maintenance costs; (c) the environment, such as protection of raw water sources, efficiency of raw water sources, and minimization of wastewater; (d) institutions, such as regulations and legal sanctions for waste water management and environmental protection; and (e) social culture, such as willingness to pay, local capacity, community acceptance, and in accordance with local culture. This factor can also be said to be a success factor for the development of a wastewater management program

which, if simplified, provides the infrastructure for domestic wastewater treatment, the existence of a management institution and the readiness of the community to accept a domestic wastewater management development program. At present, infrastructure will be built in 6 priority zones according to the Medium Term Regional Development Plan 2017-2022. Institutional management of wastewater is available, both (a) regulation in the form of Governor Regulation of DKI Jakarta Province Number 41 Year 2016 concerning the Master Plan for the Development of Infrastructure and Facilities for Domestic Wastewater Management, (b) guidance and supervisors namely the Environment Agency, (c) regulators that is Water Resources Agency and (d) operator, ie Jakarta Wastewater Company

(PD PAL Jaya). However, for the community's readiness, no program has been planned to increase the community's readiness to accept the concept of domestic wastewater treatment that requires operations, both for connection installation and payment for domestic wastewater treatment services. This can be seen diagrammatically in Figure 2.

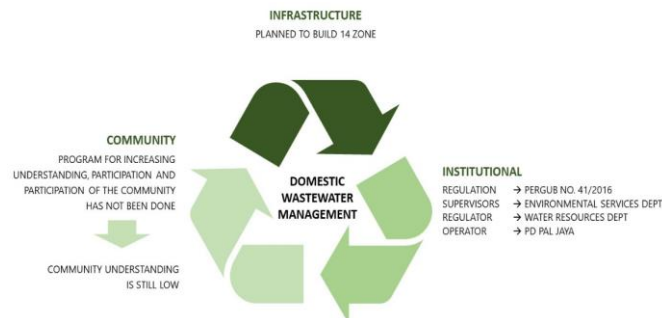


Fig 2:-Factors influencing the success of a domestic wastewater management development program

Another obstacle is related to willingness to pay, in contrast to the service for waste that can be felt directly if the impact is not managed, the problem faced by domestic wastewater management is that so far these costs have never been incurred by the community especially the lower middle class who dominate the structure population. The community has been disposing of its domestic wastewater directly into water bodies or absorbing it directly into the ground without incurring costs. Efforts to develop domestic wastewater treatment facilities are always constrained by the low participation and resistance of the community towards the construction of WWTPs in their areas. Often the development program for wastewater treatment plants has been rejected by the community around the construction site. This happens because so far no environmental education has been given, such as when they dispose of domestic wastewater both black water and gray water in an uncontrolled manner, besides requiring large costs to process it, it will also cause environmental pollution impacts which in turn will cause environmental damage that endangers their lives, so that the polluter pays principle needs to be applied, namely the concept which in essence requires polluters to bear the burden or costs of preventing and controlling pollution caused (Muhdar, 2009) So that for everyone who commits pollution and environmental damage must be responsible for tackling environmental pollution and damage it does. In addition, understanding that when people use clean water for their domestic activities, it will produce wastewater also needs to be socialized.

B. Objectives and Benefits

So that efforts to develop domestic wastewater treatment infrastructure in Jakarta can proceed as planned, research is needed to find out how people's perceptions and willingness to pay for domestic wastewater management. This research is expected to provide benefits as: (1) references for the Central Government and Government of DKI Jakarta Province in developing domestic wastewater management, (b) the basis for all Government of DKI Jakarta Province agencies, especially the Human Resources

Development Agency, the Environment Agency and Office of Water Resources Agency, can devise appropriate strategies and take a role in building public awareness in order to implement polluter pays principal so that the community can receive well and participate in the development program for domestic wastewater management, (3) the basis for determining service rates domestic wastewater, (4) Government of DKI Jakarta Province support for the achievement of the Goal 6 Sustainable Development Goals (SDGs) targets for ensuring the availability and management of sustainable clean water and sanitation for all.

II. RESEARCH METHOD

This research was conducted in the mainland area of Jakarta which includes five administrative city areas, Central Jakarta, North Jakarta, West Jakarta, South Jakarta and East Jakarta. The time for conducting research is from December 2019 to January 2020.

The data used in this study are primary data. Data was obtained through filling out a questionnaire conducted in December 2019 randomly to all citizens of Jakarta. Data collected from respondents include respondent characteristics, respondents understanding of domestic wastewater and respondent's willingness to pay. The determination of the number of respondents is done by using the Slovin approach, which is commonly used in research with large populations, to get a representative sample and can represent the population (Sevilla et.al. 2007). The calculation of the number of respondents is calculated by the Slovin approach as follows.

$$n = \frac{N}{1 + Ne^2}$$

Where:

n = Number of respondents

N = Population

e = error

With Jakarta population of 10,467,630 people (BPS, 2019), this study was designed with a 95% confidence level or an error rate of 5%, so that the respondents determined were 400 respondents.

The analysis in this study uses a descriptive statistical approach and non-parametric statistics. Contingent valuation method is used in this study as an approach commonly used to determine the value or price of a commodity that does not have a market such as environmental services (Putri, 2013). This shows that to determine the willingness to pay for domestic wastewater treatment services can use the contingent valuation method. Through a direct survey by asking the public, willingness to pay for domestic wastewater treatment services is calculated using the Turnbull method. Fauzi (2013) said that the Turnbull method is a non-parametric approach to calculating the value of losses and economic values. This approach relies on the "yes" and "no"

distribution of respondents to the auction question response. If the respondent answers "no" to the value of the auction offered, then the maximum value of willingness to pay will be lower than the value of the auction. Conversely, if the respondent answers "yes" then the willingness to pay will be greater or at least equal to the value of the auction offered.

By knowing the distribution of respondents answering "no" (F_j), we can determine the lower bound and the average value of willingness to pay. The lower bound value of willingness to pay can be calculated using the following formula:

$$E(WTP) = \sum_{j=0}^M B_j(F_{j+1} - F_j) = \sum_{j=0}^M B_j f_j^*$$

Where:

E (WTP) = Expected Willingness to Pay

B = The amount of the auction

F = Respondents who answered "no"

f_j^* = $F_{j+1} - F_j$

$$V\{E_{LB}(WTP)\} = \sum_{j=1}^M \frac{F_j(1 - F_j^*)}{T_j^*} (B_j - B_{j+1})^2$$

Where:

V { $E_{LB}(WTP)$ } = Variant willingness to pay

B = The amount of the auction

F = Respondents who answered "no"

T = Number of samples

$$SE = \sqrt{V\{E_{LB}(WTP)\}}$$

Where:

SE = Standard Error

V{ $E_{LB}(WTP)$ } = Variant

So with a confidence interval of 95% the range of willingness to pay can be calculated based on the equation:

$$WTP = E(WTP) \pm Z_{\alpha/2} \cdot SE$$

To conduct an analysis of strategies to improve people's understanding of wastewater management, the SWOT method is used as a tool that can be used to formulate strategies based on logic that can maximize strengths and opportunities, but simultaneously minimize weaknesses and threats (Rangkuti, 2015).

III. THEORETICAL FRAMEWORK

Based on the Regulation of the Minister of Environment of the Republic of Indonesia Number: P.68/Menlhk/Setjen/Kum.1/8/2016 concerning Wastewater Quality Standards, which is meant by wastewater is residual water from a result of business or

activities and domestic wastewater is waste water that comes from the activities of everyday human life related to the use of water. Domestic wastewater in general consists of black water and gray water. Blackwater consists of a mixture of feces, urine, toilet paper, and rinse water (Knerr et al. 2011). Gray water is non-industrial waste generated from domestic processes such as washing dishes, washing clothes and bathing, and has a composition of 55% to 75% of domestic wastewater (Shaikh et al. 2015).

In environmental management, Polluter pays principal is an important principle. This principle was developed through the recommendation of the Organization for Economic Cooperation and Development (OECD) in 1972 which basically states that this principle requires pollutants to bear all costs required for all efforts taken by the government to maintain environmental quality remain at acceptable conditions (Muhdar, 2009). In other words, it can be said that the costs required to treat domestic wastewater so that the quality of polluted water can again meet the quality standards before being discharged into rivers or canals. Law Number 32 of 2009 concerning Environmental Protection and Management in article 87 paragraph 1, regulates that any person responsible for a business or activity that commits an illegal act in the form of environmental pollution or damage that causes harm to others or the environment life must pay compensation or take certain actions. This is the realization of the existing principle in environmental law which is also referred to as polluter pay, so it can be said that the formulation of this provision is part of the polluter pays principle, which not only involves the preventive aspects, but can also be associated with repressive aspects (Darma and Redi, 2018).

The high number and population growth of Jakarta causes the high production of domestic wastewater produced. The sustainability of domestic wastewater management in general can be assessed based on several aspects that are ecological, economic, social, technological and institutional aspects (Wirawan et al., 2018). In the economic aspect, society is faced with limited income to meet the necessities of life, so it is very burdensome to have to incur additional costs for treatment of wastewater. Regarding social aspects, the community lacks education and explanations, both through formal and informal education channels on the importance of managing domestic wastewater, resulting in a lack of public understanding of domestic wastewater management. In the technological aspect, there are still people who dispose of their domestic wastewater directly into rivers or canals, while other community groups that mostly use septic tanks do not do regular desludging and maintenance. In the institutional aspect, the role of government is felt to be insufficient and public awareness of domestic wastewater management is also lacking.

The problems that occur with the economic, social, technological and institutional aspects mentioned above have made the efforts to manage domestic wastewater

carried out by the Government of DKI Jakarta Province not optimal, resulting in pressures on ecological aspects characterized by high levels of river or channel water pollution and water wells that have been consumed by the community. Therefore, an effort is needed to improve the understanding of domestic wastewater management to the

community so that the management carried out can be optimal, so that the level of pollution of river or channel water and community well water can be controlled. In detail, the framework for the need for this research can be seen in Figure 3 below.

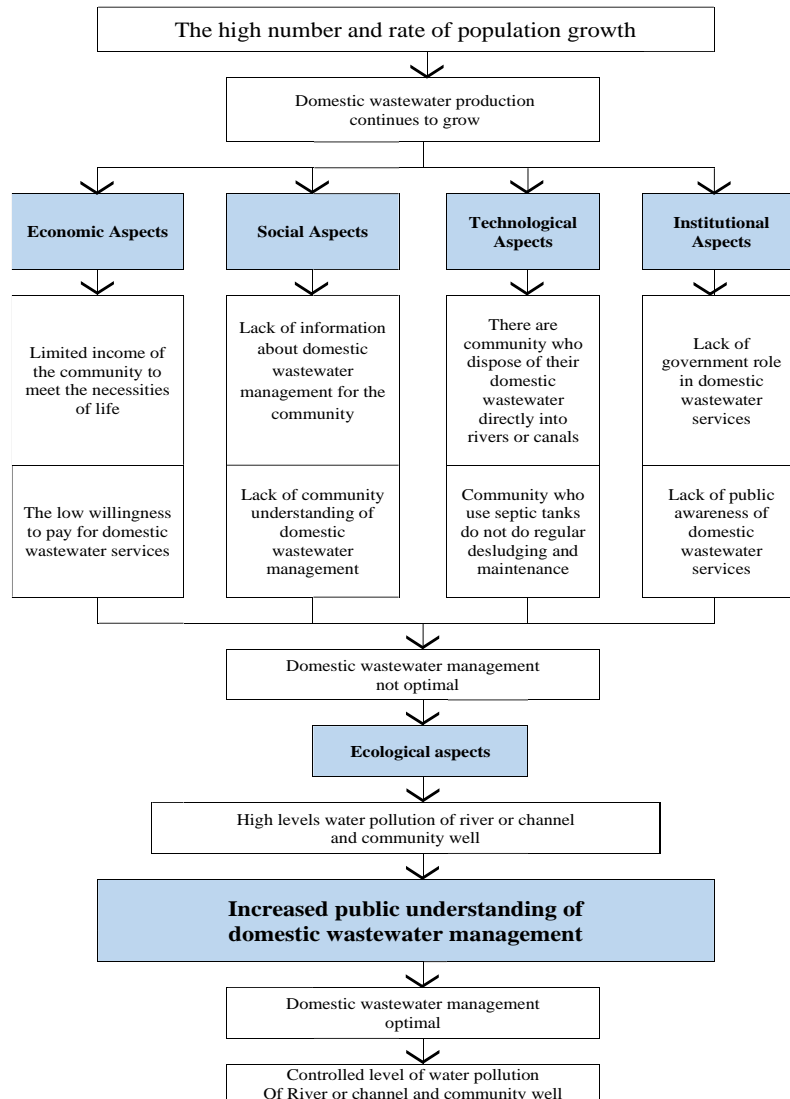


Fig 3:-Research Framework

IV. RESULTS AND DISCUSSION

A. Characteristics of Respondents

In this study, 400 respondents by gender were 67.75% male and 32.25% female. The education level is dominated by high school graduates, which is 45.50%. Respondents with bachelor and diploma education are recorded at 35.50%, respondents with master education level are 14.25%, respondents with education below high school are 2.75%, and doctoral levels are 2.00%.The occupation of respondents were Private Employees are

20.00%, Civil Servants/Military/Police are 17.00%, Entrepreneurs are 18.25%, Housewives are 14.25%, Other Workers are 13.50%, Retired are 8.25 %, Student are 5.5% and Professional are 3.25%. While based on income level, 66.50% of respondents earn below Rp.5 million, 16.50% of respondents earn between Rp.5 million to Rp.10 million, 11.25% of respondents earn above Rp.20 million, 3.00% of respondents earn between Rp.10 million to Rp.15 million and 2.75% of respondents earn between Rp.15 million to Rp.20 million. Complete can be seen in Figure 4.

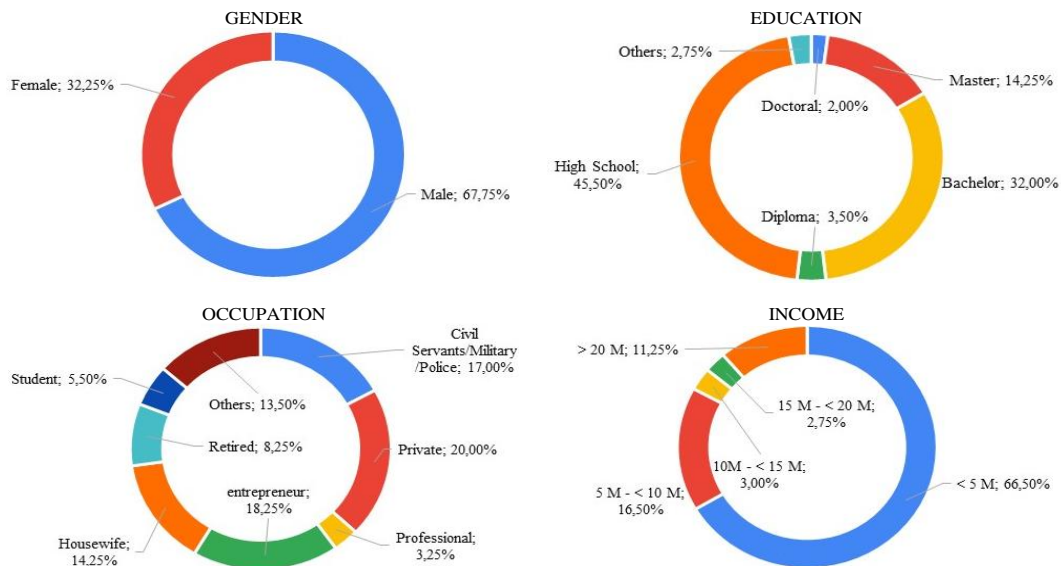


Fig 4:-Characteristics of Respondents

B. Understanding of Respondents

As many as 58.75% of respondents said that they did not know about the domestic Wastewater Treatment Plant (WWTP), 29.25% of respondents knew little, 10.25% of respondents knew and 1.75% of respondents knew very well. In treating wastewater, the majority of respondents, namely 86.50% used a private septic tank, higher than the research of Anugerah et.al. (2014) which said that 79% of the people around Ciliwung River use septic tank. 8.25% of respondents used WWTP, 2.50% of respondents used

communal septic tanks and 2.50% were directly discharged into the river. As many as 79.00% of respondents said they had never received training to improve their understanding of wastewater management, 17.75% of respondents said they were rare and 3.25% of respondents often. Based on this, as much as 99.00% of respondents said need to conduct training programs to increase knowledge about domestic wastewater management to the community by the government. Complete can be seen in Figure 5.

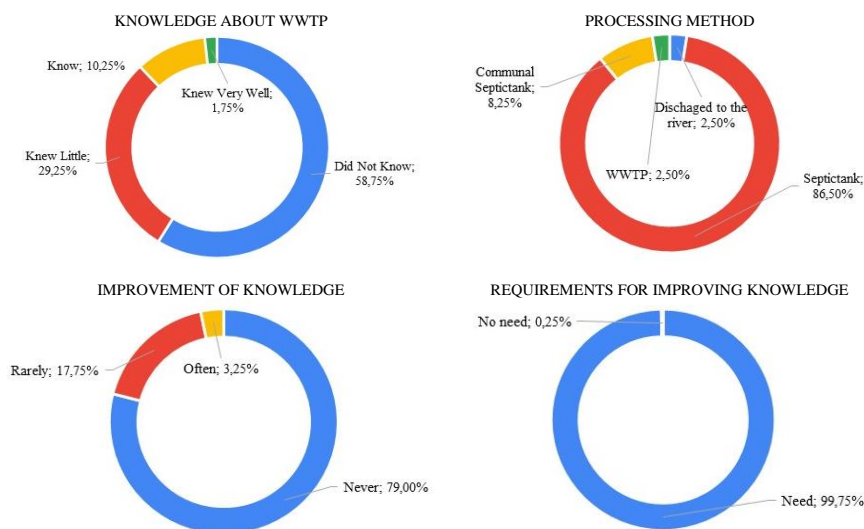


Fig 5:-Understanding of Respondents

C. Management Responsibilities

The role of the government in the management of domestic wastewater said by 23.75% of respondents is very less, 56.75% of respondents said less, 17.00% of respondents said good and 2.50% of respondents said very good. In line with the low role of the government, 33.75%

of respondents said that the community was very less concerned about the management of domestic wastewater and 53.00% of respondents said they did not care, 12.75% of respondents said that the community had a concern and 0.50% of respondents said they were very concerned. Complete can be seen in Figure 5.

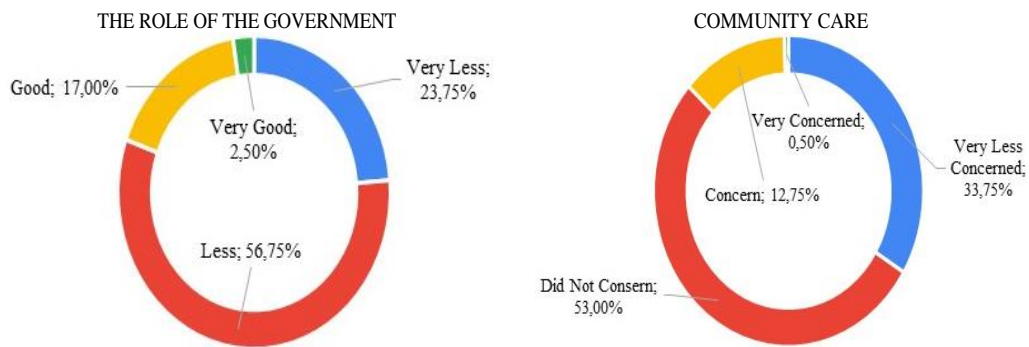


Fig 6:- Management Responsibilities

D. Willingnes To Pay

Based on the answers to the questions in the questionnaire, 81% of respondents stated their willingness to participate in using domestic wastewater services that are being developed by the government, while the remaining 19% of respondents were unwilling. However, for the willingness to pay for wastewater services to be provided, only 56% are willing to pay, while 44% of respondents are not willing with the reason mostly because they have been using private septic tanks. Smaller compared to research Anugerah et.al. (2014) which said that 67% of the community around the Ciliwung River did not agree with the costs for domestic wastewater services.

To calculate the value of willingness to pay from the dichotomous choice contingent valuation method, the Turnbull method is used. The principle of this method is quite simple. If the respondent answers "no" to the value of the auction offered, then the maximum value of willingness to pay will be lower than the value of the auction. Conversely, if the respondent answers "yes", the value of willingness to pay generated will be greater or at least equal to the value of the auction offered (Fauzi, 2013). The results of respondent’s opinions on willingness to pay can be seen in Table 2.

Bid (Rp)	Response “no” (N _j)	Total Response (T _j)	Distribution “no” (F _j)	f* _j (F _j +1-F _j)	EWTP (Rp)	Variant
50.000	17	80	0,2125	0,2125	0	
100.000	66	80	0,8250	0,6125	30.625	5.229.492,18
150.000	77	80	0,9625	0,1375	13.750	4.511.718,75
200.000	79	80	0,9875	0,0250	3.750	1.127.929,68
>200.000	80	80	1,0000	0,0125	2.500	385.742,18
Amount		400			50.625	11.254.882,81
Standard Error						3.354,83

Table 2:-Willingness to pay (WTP) of respondents to domestic wastewater services

Table 2 shows the distribution of respondents who answered no to each auction value. The value of the expected willingness to pay (EWTP) with the Turnbull method is obtained by multiplying the auction value by the value which is a subtraction from the upper and lower intervals of the distribution of respondents who answered "no". The EWTP obtained is Rp.50,625. This is consistent with the results of the study of Watekhi et.al (2011) who said that urban households are willing to pay Rp.50,578 per month for domestic wastewater services.

The variant used to calculate how much our level of confidence in the estimation of the average value of willingness to pay obtained from the above results is

11,254,882.81, so we get a standard error of 3,354.83. At the 95% confidence interval, the willingness to pay value becomes 50,625 ± 1.96 (3,354.83) or 50,625 ± 6,575.47, so that the community's willingness to pay for domestic wastewater services in Jakarta is in the range of Rp.44,049.53 to Rp.57,200.47.

Based on the Decree of the Governor of DKI Jakarta Province No. 991 of 2012 concerning the Determination of Tariffs for the Disposal of Wastewater Services and the Cost of Connecting Wastewater Pipes for the PAL Jaya Regional Company, a tariff for household wastewater disposal services per month per M² of building area is as shown in Table 3 below.

No.	Customer Category	Tariff (Rp/M ²)
1	Household Type A (Electric Power 450 Watt)	131
2	Household Type B (Electric Power 900 Watt)	184
3	Household Type B (Electric Power 1.300 Watt)	236
4	Household Type D (Electric Power > 2,200 Watt)	289

Table 3:-Domestic wastewater service tariffs are based on customer categories

BPS (2019) notes that based on the building area, most Jakarta residents occupy houses with a building area under 100 M², as much as 80.53%, with an area of less than 19 M² of 22.54%, 20 M² to 49 M² of 35.55%, 50M² to 100 M² were 22.44%, 100 M² were 149 M² were 9.79%

and above 149 M² were 9.68%. If it is related to the customer category and the tariff rate based on the Decree of the Governor of DKI Jakarta Province Number 991 Year 2012, it can be seen in Table 4.

Building Size (M ²)	Percentage (%)	Customer Category	Average Building Size (M ²)	Tariff/M ² (Rp)	Fee/ Month (Rp)
< 19	22,54	A	20	131	2.620
(20- 49)	35,55	A	30	131	3.930
(50-99)	22,44	B	75	184	13.800
(100-149)	9,79	C	125	236	29.500
>149	9,68	D	150	289	43.350
200		D	200	289	57.800

Table 4:-Domestic wastewater service tariffs are based on customer categories

Source: Central Bureau of Statistics, processed

The tariff set for domestic wastewater services for households is below the community's willingness to pay which is between Rp.44,049.53 to Rp.57,200.47, except for houses with an area of more than 200 M², which are above Rp.57,800.

Basically 74.75% of respondents agreed that domestic wastewater production depended on clean water that was used daily, while 25.25% disagreed. However, 52% of respondents disagreed if the payment for wastewater services was combined with payments for the use of clean water, while 48% of respondents agreed. To calculate the amount of domestic wastewater production, 54% of respondents propose to be calculated based on the number of household occupants, 31.50% based on the use of clean water, 10.75% based on the area of the house and 3.75% based on the electrical power used.

E. Strategy for Improving Community Understanding

Towards a low level of community understanding, respondents who understood and understood very well only reached 11.00% and respondents who said they had

never received training were 79.00%, 99.75% of respondents said that the government needed to conduct training on domestic wastewater management to the community. It was identified that institutions in Jakarta that have competencies to carry out programs to improve public understanding in domestic wastewater management are the Human Resources Development Agency, the Water Resources Agency, the Environment Agency and the Jakarta Wastewater Company (PD PAL Jaya).

To begin with, it is necessary to provide supplies to the apparatus who will provide training in understanding of sustainable development, particularly in relation to domestic wastewater management. The agency that has the competence to prepare the apparatus implementing the program to increase public understanding in domestic wastewater management is the Human Resources Development Agency. In practice, based on internal strengths and weaknesses of external opportunities and challenges, after an analysis using SWOT that can be seen in Table 5 below.

INTERNAL	STRENGTH	WEAKNESS
	<ol style="list-style-type: none"> 1. Governor's Decree No. 111/2019 concerning Human Resources Development Agency 2. Governor's Decree No. 113/2019 concerning Technical Implementation Unit of Competency Development Center and Public Policy 3. Governor's Decree No. 16/2020 concerning Regional Public Service Board of Technical Implementation Unit of Competency Development Center and Public Policy 4. Teacher Readiness 5. Availability of BPSDM budget 	<ol style="list-style-type: none"> 1. Don't have your own building 2. Do not have a technical instructor 3. There is no curriculum for domestic wastewater management training 4. There is no development training program with an environmental perspective
EXTERNAL	SO STRATEGY	WO STRATEGY
	<p>S(1,2,3,4,5)-O(1,2,3,4)</p> <p>Conduct training to prepare domestic wastewater management facilitators to carry out their duties and functions, Human Resources Development Agency in carrying out the mandate of legislation and the achievement of the Governor's vision and mission.</p> <p>S(4,5)-O(4,6)</p> <p>Carry out academic assistance programs for debriefing facilitator.</p>	<p>W(1)-O(5)</p> <p>Utilizing a building owned by the Government of DKI Jakarta Province that can be used to carry out training</p> <p>W(2,3)-O(6)</p> <p>Empower academics to develop curriculum and become training instructors</p>
THREATS	ST STRATEGY	WT STRATEGY
<ol style="list-style-type: none"> 1. The level of water pollution continues to increase 2. Limited raw water sources 3. Development priorities are not oriented to environmental aspects, they are still economic and social aspects 	<p>S(1,2,3,4,5)-T(1,2)</p> <p>Conduct training of facilitators to monitor river and well water pollution levels</p> <p>S(1,2,3,4,5)-T(3)</p> <p>Carry out training on sustainable development planning that is environmental, economic and social based</p>	<p>S(3)-T(3)</p> <ul style="list-style-type: none"> • Develop an environmentally friendly development training curriculum design • Establish key targets as a facilitator • Conducting environmentally friendly development training for Government of DKI Jakarta Province Apparatus • Promoting the environment

Table 5:-SWOT Analysis of the Role of BPDSM in Domestic Wastewater Management

V. CONCLUSION

Based on the analysis that has been done, it is concluded that in general on the management of domestic wastewater, the knowledge and readiness of the community to support the government's efforts in developing domestic wastewater management is low, because (a) only 11% of the public knows about domestic wastewater treatment plants; (b) only 56% of the public are willing to pay for domestic wastewater treatment services and the community's willingness to pay is low, in

the range of Rp.44,049.53 to Rp.57,200.47 per month, although this value is still higher than the domestic wastewater treatment tariff determined based on the Decree of the Governor of the DKI Jakarta Province Number 991 Year 2012 concerning the Determination of Tariffs for the Disposal of Wastewater Services and the Cost of Connecting Wastewater Installation for the PAL Jaya Regional Company, for customers with an area of land below 200 M².

Training on domestic wastewater management is needed to increase knowledge and willingness to pay the community. In addition, it is hoped that the community will be more ready to accept and participate in the development of domestic wastewater management. This needs to be done considering that currently both the Central Government and the Government of DKI Jakarta Province are developing a centralized domestic wastewater treatment infrastructure, and increasing the capacity of existing regulatory agencies, regulators, and operators.

In order to initiate a program to increase community understanding of domestic wastewater management, the Human Resources Development Agency is an agency that has the competence to prepare the Government of DKI Jakarta Province apparatus to be a facilitator in the Jakarta community understanding improvement program in domestic wastewater management.

VI. REKOMENDATION

In order to ensure the implementation of the development of wastewater management in Jakarta it is recommended that (a) the Government of DKI Jakarta Province needs to prepare programs to increase public understanding of domestic wastewater treatment through formal and informal education, as one form of participation in achieving the Sustainable Development Goals (SDGs) targets to ensure the availability and management of sustainable clean water and sanitation for all, (b) challenges to increase public knowledge about wastewater management is an opportunity for the Regional Public Service Board of Technical Implementation Unit of Competency Development Center and Public Policy of Human Resources Development Agency to be able to take a role in the implementation of programs to increase public understanding of wastewater management, (c) the tariff for wastewater treatment for households needs to be adjusted, not using the parameters of electrical power and area of the house, but using the number of family members and the volume of clean water used.

For the acceleration of the wastewater management development program in DKI Jakarta it is recommended to (a) revise the Decree of the Governor of DKI Jakarta Province No. 991/2012 concerning the Determination of Tariffs for Wastewater Disposal Services and the Cost of Connecting Wastewater Pipes to the PAL Jaya Regional Company, given the tariffs already set no longer in accordance with current economic conditions, (b) revising the Regulation of the Governor of DKI Jakarta Province No.41 Year 2016 concerning the Master Plan for the Development of Infrastructure and Facilities for Domestic Wastewater Management by including a program to improve understanding of domestic wastewater management for the community, preparation of facilitators or extension workers as well as the assignment of the Human Resources Development Agency as the responsible agency answer prepare it.

Strategies that can be used by the Human Resources Development Agency in carrying out their duties: (a) carrying out training to prepare facilitators for domestic wastewater management to carry out the duties and functions of carrying out the mandate of the legislation and achieving the vision and mission of the Governor, (b) carrying out academic assistance programs for debriefing facilitator, (c) conduct training facilitators for monitoring of water pollution, (d) conduct training on sustainable development planning base on environmental, economic and social, (e) conduct training on environmentally sound development for apparatus, (f) compile an environmentally friendly development training curriculum design , (g) setting key targets as a facilitator, (h) promoting the environment, (i) empowering academics to develop curriculum and become a training instructor, (j) utilizing the building owned by Government of DKI Jakarta Province that can be used to carry out training.

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