International Journal of Sciences: Basic and Applied Research (IJSBAR)

ISSN 2307-4531
(Print & Online)

http://gssrr.org/index.php?journal=JournalOfBasicAndApplied

Selection of Simple Healthy Latrine Technology, Study Case Gubeng District, Surabaya, Indonesia

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Abstract

Indonesia is one of the emerging countries still have problems regarding sanitation, particularly the behavior of Open Defecation (OD). Indonesia should be able to achieve 100% access to clean water sources are safe and proper sanitation facilities, in accordance with the target on universal access in 2019. The behavior of OD is not only done by people who live in rural areas, but also in major cities such as the city of Surabaya. One of the Districts who still behave OD Gubeng is located near the central city of Surabaya. Based on reports from Health center of Mojo and Pucang Sewu, there are 486 families who behave OD. This study aims to assess the option/choice of sanitation technology in accordance with the environmental and social conditions. The scope of this research includes location research is in Gubeng District, Option technology of latrine reference from research study Ministry of Health and Ministry of Public work Indonesia. Methods of data collection research conducted with questionnaires, interviews and field observations. Once the required data is collected, and then do the data processing that generates data on the environmental and social conditions associated with sanitation behavior. From the results of processing such data, and then do the selection of appropriate sanitation technology options to be applied and recommended to the public so that people can quickly establish a healthy latrine and leaving the OD behavior. Conditions in Gubeng is predominantly low income (below standard income in Surabaya), giving rise to economic problems.

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Besides the environmental conditions in which the distribution of the houses that behaves OD is near a river or drainage channels, making it easier for people to behave OD. Options/sanitation technology options that can be recommended is the sanitation technology that is cheap, safe and comfortable. In some of the literature and the results of field observations, there are an option sanitation technologies appropriate to the problems in Gubeng, namely toilet options 3-1 type which in terms of price only cost about Rp 1,500,000. In addition, the depth of 3-1-type septic tank is 1.5 m, which means a more robust and potentially eroded by streams or drainage.

Keywords: Open Defecation; Surabaya; Technology; Toilet; sanitation.

1. Introduction

Problems regarding sanitation in Indonesia, especially about the behavior of OD should be completed by the end of 2014 based on the targets in the National Medium-Term Development Plan (RPJMN) 2010-2014 [1]. The Millennium Development Goal's (MDG's) is "lose up to 50% of the population who have less access to drinking water and adequate sanitation" also expires at the end of 2015 [2]. RPJMN 2014-2019 targeting that by the end of 2019, Indonesia had to reach Universal Access (UA). That is, by 2019 the Indonesian people living in urban and rural areas already have 100% access to safe drinking water and proper sanitation facilities.

Data obtained until June 2016, out of 514 district/municipalities in Indonesia there are five District / City already declare as District / Municipal Open Defecation Free (ODF) is Grobogan, Pacitan, Ngawi, Magetan and Madiun, In response to these problems, the mayor of Surabaya, issued a circular on accelerating the achievement of the MDG's, with the first points of the declaration of ODF. Surabaya City has 31 districts, 163 villages, and 62 health clinics [3]. Of the 163 existing village, only 30 villages were declared itself a village ODF.

Many of the residents of the city of Surabaya who had defecate in not free area, but they do not realize that the drain water closet (WC) they flow directly to the drain water drainage/water body without shelter feces in the form of a septic tank or *cubluk* [4]. This is a problem that is quite challenging, especially for the government of the city of Surabaya. Based on data from the Environment Agency Surabaya [5] in 2012 recorded 9,129 households located in Surabaya do not have shelter feces (cesspool / *cubluk*).

The study area studied is Gubeng, Surabaya. In addition to visits from Gubeng location adjacent to the administrative center of Surabaya, Gubeng a district that there are health facilities Hospital Dr. Soetomo, so that the necessary conditions of a healthy environment and clean to prevent the seeds the disease that is not nested in the neighborhood residents. Gubeng has six villages namely Airlangga, Mojo, Gubeng, Kertajaya, Pucang Sewu and Baratajaya. Gubeng consists of 2 health centers, Mojo health center that serves Airlangga, Mojo, and Gubeng, and Pucang Sewu health center that serves Kertajaya, Pucang Sewu and Baratajaya. From 6 urban villages, only one village that has declare as ODF village is Village Baratajaya. In this study will be the identification of the factors inhibiting some people are still behaving OD, then the selection of technology options right healthy latrines to be applied. So that people can quickly establish a healthy latrine simple and leave the OD behavior.

2. Materials and Methods

Primary data in this study using questionnaires, interviews with residents and observation study site. While the collection of secondary data obtained through the relevant agencies sanitation, books, journals, government regulations, the internet and so forth. The data has been collected and analyzed using the standards and guidelines that have been determined. In this study, a study was conducted on the social aspects of economic and environmental aspects. After the analysis we found, then the result can be used as a sanitation technology options in Gubeng.

2.1 Primary Data Collection

Primary data is data obtained directly from observation activities (observation) and the distribution of questionnaires. Observation activities or field observations conducted to see and document the existing conditions of sanitation in the community. The interviews are intended to get deeper information about the condition of the existing sanitation through community leaders in the area of research. While the activities of the questionnaire as a medium for seeking information related to social conditions. Field observations or observations made in the area of research is in Gubeng Surabaya. It observed when conducting field observations is that if it can be used as a location to build a shelter feces, and other environmental conditions such as the distance between houses, soil conditions, and sources of clean water residents. The results of observations or these field observations in the form of a map of the location of the house, documentation in the form of photographs.

Questionnaires deployment requires a number of the sample in accordance with the calculation formula Slovin namely:

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

Which is:

n = number of samples

N = the number of population

e = margin of error tolerance (0.1 to 0.01)

Determination of the number of samples in this study using the value of e = 0.1, which means the results of the data collection has a valid level of 90% of research [6]. The calculation method for the number of questionnaire respondents is as follows,

• The total number of OD-behaved community for OD questionnaire = 486 Family Head (FH)

• The number of sample questionnaires OD = (486 / (1+ (486x (0.12))) = 82.935 ≈ 83 respondents.

• Furthermore, to determine the number of samples or the respondent each village using systematic random sampling method, where the total population of each village used as a percent value, then the result of the calculation formula slovin multiplied by the percentage value of each village and the results were used as a sample / respondents. Sample calculations for determining the number of samples / respondents:

❖ The calculation for Airlangga Village

Number of households OD in Ex. Airlangga = 55 FH

✓ The percentage of households OD in Ex. Airlangga = Number of households OD Ex. Airlangga / Total FH OD x 100%

= 55 FH / 486 FH x 100% = 11%

So that the number of respondents to the questionnaire OD in Ex. Airlangga

OD FH = Percentage of Exo. Airlangga x Number of Samples Total to Questionnaires OD

= 11% x 83 respondents = 9.39 ≈ 10 respondents.

To be more detail, the calculation result can be seen in Tabel 1:

Table 1: The Number of Research Respondent

No	Village	Total (FH)	OD FH	Percentage of OD FH	Number of OD Respondents
1	Airlangga	6.683	55	11%	10
2	Mojo	14.183	85	17%	15
3	Gubeng	4.732	50	10%	8
4	kertajaya	7.860	267	55%	45
5	Pucang Sewu	4.630	29	6%	5
6	Baratajaya	5.143	0	0%	0
Total		43.231	486		83

2.2 Secondary Data Collection

Secondary data needed include:

• administrative and topographic map of Gubeng

• Population data contained in the Central Statistics Agency (BPS) in Surabaya

• Data related to sanitation and health center in Mojo and Pucang Sewu

2.3 Data Analysis Methods

Methods of data analysis was done after getting primary and secondary data is expected. Analysis of this data is intended to examine the factors that make people behave OD and sanitation technology option plan that works for field conditions and also the willingness and ability of citizens in Gubeng in development activities in order to create healthy latrines Village of ODF in Surabaya. Methods of data analysis done in stages starting from the stage of identifying problems and constraints in the implementation of sanitation, followed by the selection of sanitation technology options that are likely to be accepted by society as an option in the construction of latrines.

3. Results

Based on field observations in the study site with the help of volunteer mothers each village environment, produced a map image associated home / FH is still behave OD in each village. The map of the distribution of home / FH behave OD to the Village Kertajaya can be seen in Figure 1, while Figure distribution map home / FH behave OD for Mojo district is shown in Figure 2, Figure 3 for the Village of Airlangga, Figure 4 for the Village Gubeng and Figure 5 for the Village Pucang Sewu.

Still based on observations in the field, which indicates that most of the houses were in Gubeng used as business premises such as shops, salon, hardware store, cafe (internet cafe), workshops, and many more like that shown in Figure 6.

Figure 1: Distribution Of Home / Family Head Behave OD in the Village Kertajaya

Figure 2: Distribution of home/ Family head behave OD in the village Mojo

Figure 3: Distribution of home/ Family head behave OD in the village Airlangga

Figure 4: Distribution of home/ Family head behave OD in the village gubeng

Figure 5: Distribution of home/ Family head behave OD in the village Pucang Sewu

Figure 6: Businesses Belonging to citizen in gubeng district

Environmental conditions become one of the factors that constrain the community in terms of healthy latrines in Gubeng. Environmental conditions may include prone region largely stagnant water or flooding during the rainy season, and the area traversed by the river / water body. Conditions river / gutter in Gubeng buffer area shown in Figure 7.

Figure 7: Conditions river/ gutter in Gubeng District

From the results of the questionnaire, it is known that the majority of respondents were self-employed jobs/ employers where there will be 41%. Works as odd is positioned second is 29%, private sector employee jobs as much as 27%, pensioners 2% and civil servants 1%. Results of mapping the type of work that still behaves OD society can be seen in Figure 8. As for the respondent's income are most numerous in the range of income of Rp 500,001 - Rp 1 million that is 30%. Revenue / income of Rp 1.000.001 - Rp 1,500,000 were 21% and households with an average income of less than Rp 500,000 as much as 20%, followed by income of Rp 1,500,001 - Rp 2,000,000 as much as 17% and are earning over Rp 2.000.001 as much as 12%. Results of mapping the range of community income that behave OD can be seen in Figure 9.

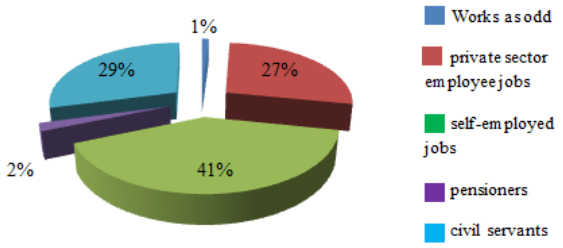

Figure 8: Mapping The Type Of Work That Still Behaves OD Society

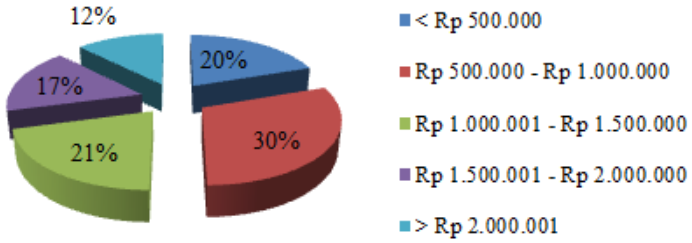

Figure 9: Mapping The Range Of Community Income That Behave OD

Community sanitation behavior in the research area also considered such as where the direction of the drain pipe feces flowing if the home does not have a septic tank. As many as 18% of respondents knew that the direction of the toilet discharge them heading into the drainage channel / trench front or back of their house, while the other 82% know that the direction of the toilet discharge them to the river. Diagram showing the percentage of respondents bidets direction can be seen in Figure 10.

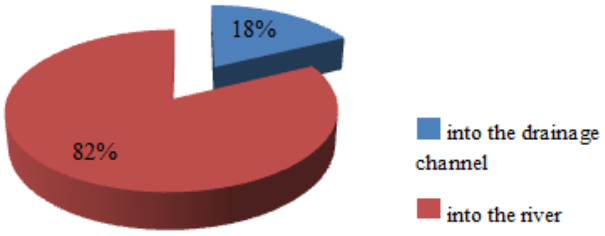

Figure 10: Respondents Bidets Direction

The willingness of society in terms of building latrines could be attributed to the respondents' knowledge of the importance of maintaining the health of the environment. If someone has never described the environmental sanitation especially the health of the environment, how can they judge that their neighborhoods could be said to be healthy environment [7]. As many as 53% of respondents stated that they are interested to establish a healthy latrine, but still uncertain for the near term as it relates to financial problems and the land on which to build cubluk or the septic tank. Some 25% of respondents stated that to date the questionnaires they were not interested in building latrines because not think that building a shared pit or a septic tank is a matter of urgent or important and urgent, while 20% said not at all interested in building a septic tank. Diagram of the respondents' willingness to build latrines can be seen in Figure 11.

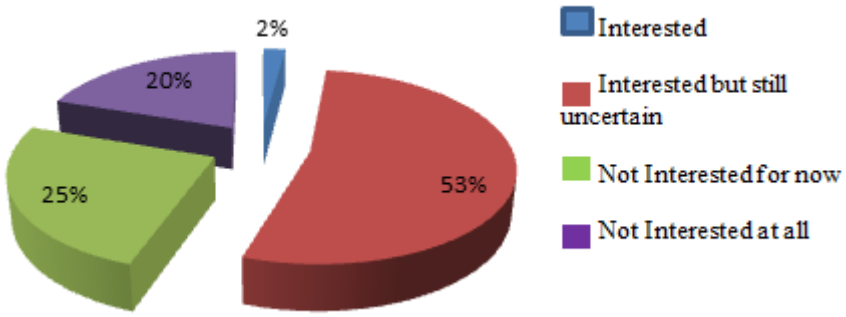

Figure 11: Respondents' Willingness To Build Latrines

Interviews conducted not only *to RT / RW* but also randomly to the public, in which the question is based on the current environment. Based on the interview with one of the cadres of the environment, it is known that public figures in one of the villages that is respected by the people and served as Chairman of the *Rukun Warga (RW)* still behave OD. The community leaders in an interview admitted that his house does not have a septic tank because it is constrained lack of vacant land that could be used as a construction of a septic tank.

Contrary to the respondents in Mojo Village, in which respondents admitted they channel the waste water especially from the closet to the river / gutter for river / gutter that had running water continuously. In addition, some respondents said that the river / gutter is a facility that can be used. Therefore, when the water from the river / gutter is still running smoothly, there is no harm or garbage dump wastewater directly into rivers / gutter.

4. Discussion

Environmental sanitation behavior and the willingness of the community in terms of building a septic tank in Gubeng influenced by knowledge of environmental sanitation, because knowledge is the dominant factor that is essential for the formation of a person's actions [8]. When one's knowledge about the importance of maintaining the health of the environment is considered less, then there will be no action or behavior changes are made to realize what they know is good to do.

Regarding the ability of communities in the development of a septic tank, it is linked to economic factors

derived from the respondent's income. As it is known, that the majority of people's incomes in Gubeng is a under income range Surabaya, making residents are categorized as low-income communities. Income is closely related to economic ability, so the higher your earnings, the higher its economic capabilities so that the higher the individual's ability and opportunity can pay [9]. The ability of the community in the construction of a septic tank was also influenced by their knowledge of environmental health. According to Amanda [10], respondents who have a good knowledge about the importance of protecting the environment from things that pollute it will tend to the greater opportunities for respondents willing to pay for activities that do not damage and pollute the environment and tend to be willing to make the effort to preserve the environment.

In this social aspect, there are two factors that constrain people still behave OD namely economic factor and a factor of knowledge. Efforts should be made to increase public awareness include holding counseling or health-related environmental triggers that can be held by the District / Sub / NGOs and in cooperation with the local health center. But it's good if the activity or triggering extension is modified to fit the characteristics of the local residents.

Conformity modification or extension can be negotiated with cadres triggered the environment or local community leaders because they are an element closest to the targeted community. In this activity or triggering the extension, can also be inserted on the choice of technology and financing options, such as installment program planned by the health center Mojo and Pucang Sewu, so other than residents gain knowledge, they can also simultaneously received one option people consider solutions that can encourage people to change their behavior.

4.1 Selection of Sanitation Technology

Selection of sanitation technology, especially domestic waste water treatment according Wulandari [11], there are several criteria, among others:

1. Land needed is not too large.

2. The cost of operation is low.

3. The management easy.

4. Maintenance is easy and simple.

5. The low energy consumption.

In the selection of domestic waste water sanitation technologies according to the book Sanitation Affordable Options for Specific Areas [12] need to pay attention to the low cost of development, ease of development and availability of materials on site planning. In addition to the above criteria, the most decisive criteria is of public decisions in environmental planning, the social aspect.

The population density in Gubeng reached 182.524 inhabitants / ha. The density for each village in the region Gubeng can be seen in Table 2. Population density categories according to Reference Books More Sanitary Systems and Technology [13], among others:

1. Rural, is areas / villages with population density <25 / ha.

2. Peri-urban, is areas / villages with a population density of 25-100 persons / ha.

3. Urban-low, is areas / villages with a population density of 101-175 people / ha.

4. Urban-medium, is areas / villages with a population density of 176-250 people / ha.

5. Urban-high, is areas / villages with a population density of> 250 / ha.

Table 2: Population Density Each Village

No	Village	Total Population	An area (ha)	Population Density(person/ha)	Category overcrowding
1	Baratajaya	16.275	76	214,14	Urban-medium
2	Pucang Sewu	14.573	94	155,03	Urban-low
3	Kertajaya	25.463	130	195,87	Urban-medium
4	Gubeng	14.781	110	134,37	Urban-low
5	Airlangga	20.685	162	127,69	Urban-low
6	Mojo	44.751	176	254,27	Urban-high

Based on the above data, it can be said that the population density in the region Gubeng is the start of a low-to-Urban Category Urban-high. Based on Minimum Service Standards (SPM), sanitary with centralized technology should have been run in all the areas that have a population density of over 300 people / ha. Another thing with PP No.16 / 2005 on SPAM said that the area with a population density between 200-250 persons / ha should consider the use of centralized sanitation systems. So the population density category are directed to use centralized sanitation systems are Urban and Urban-medium-high. Sub directed to use centralized sanitation systems based on the population density is Baratajaya, Kertajaya and Mojo.

Another criterion to consider is the technical criteria. Utilization and availability of land today is important because it will affect the plan layout and construction. In urban areas with densely populated conditions, wide roads and public access is usually limited. Therefore, when using a centralized system, the planting of the house connection pipe (SR) and the development of communal WWTP is difficult because there is no land. Whereas when using the local system, truck access feces also does not allow that people usually use the services of bear feces, is services that drain the septic tank manually using hoes and transported to the sludge trucks using the

tool shoulder.

Tutorial about sanitation technology selection must consider many aspects, one of which is the social aspect. Although in theory the choice of technology in the region Gubeng sanitation leads to using a centralized sanitation systems, is not easy to realize. The social conditions of the community should support the choice of technology that will be applied to their environment, because community participation is needed in terms of maintenance and operational system to be implemented. The system of centralized sanitation technology has become the ultimate goal of sanitary wastewater management system that is expected by the City of Surabaya, yet to be implemented in the region in the near future Gubeng not allowed. In order to implement a centralized system, the public must be introduced in advance of these technologies by providing extension or focus group discussion (FGD). Diversity of thought residents will make their pro and cons of the technology choice centralized system, so it needs a long time period to equalize citizens thinking about.

Construction of sanitary technology with centralized system has been applied in Mojo, which built WWTP serves 40 households contained at 1 RW. However, during an interview with the citizens who are served by the WWTP, the residents said that many issues, ranging from the seepage in the closet until the non-functioning toilet which the discharge leads to the WWTP, and many residents who eventually discontinue or shut their sewer leading to the WWTP and choose to build a simple septic tank. Based on these experiences, many people who originally wanted to connect sewerage them to the WWTP, became reluctant and prefer to remain behave of OD or build a simple septic tank. While the technology of local communal sanitation systems such as toilets are also widely applied in Gubeng. However, based on interviews, it is known that share toilet in Gubeng is not used daily by local residents. That is because people are more comfortable to engage in the bath washing and toilet facilities in their homes, so they build a bathroom in the house.

Alternative options other sanitation technology is a communal septic tank. Communal septic tanks are septic tanks, which are used by two or more homes, which are located adjacent. This alternative is one alternative that is possible to be constructed, and in accordance with the distribution house that behaves of OD shown in Figure1 to Figure 5 for each village. In the map image can be seen that the house behaves of OD spread does not focus on one single site, one location there are 2 to 10 families and there are also hundreds of FH. Based on the results of the questionnaire, in which respondents were questioned about the desire to build a latrine bottom along with the closest neighbors. All respondents answered they would not, for various reasons, such as fear if there are obstacles in maintenance will make the conflict, and prefer privacy in the bottom to make the toilet alone.

Based on observations and questionnaires to assess the feasibility of healthy latrines built by some residents in Gubeng, it can be said that people in Gubeng are familiar with the local sanitation technologies, is septic tanks. So as to accelerate realize Surabaya become the City of ODF, can plan local waste water treatment system (on-site). If all citizens own waste water treatment system in accordance with the environmental requirements and become the region ODF, then the wastewater system management technology can begin planned to be increased from the local system into a centralized system in accordance with the urban areas.

In this plan, the technology being considered is for the container stool. Where it has been explained earlier that the conditions in Gubeng, all residents have bidets swan neck but the discharge pipe flows directly into water bodies / river / gutter. Feces container types that have been known resident was the septic tank, but there is an oblong / beams and there are circular / tube. Both of these septic tanks have the same functionality that accommodate and process the sludge that goes into, but which differ container on any shape and volume.

Economic conditions of residents in the area Gubeng also affect the selection of the local system of sanitation technology, because by the Ministry of Health, the construction of individual sanitation facilities is expected to involve the community in the form of services and also the cost of development, aid can only be material. Here is the constraints of society in Gubeng could be the reason the decision is sanitation technology.

1. Knowledge of citizens to sanitation or environmental health is still lacking, so the selection of sanitation technology is expected to already known by the residents so that residents can quickly recognize and decided to build the technology.

2. The average income of citizens who behave OD under UMK, so the selection of sanitation technology should have a reasonable price in terms of construction, operation and maintenance.

3. The area of land that is in your houses OD behaved very limited, so the selection of sanitation technology must consider the needs of land that is not too large.

4. Distribution of homes that behaves of OD mostly located along the river and in areas that are frequently flooded, so the selection of sanitation technology should pay attention to sanitary building structure to be stable, comfortable and safe for use by the residents.

Based on the above constraints, several options that can be recommended feces container is a container-type circular stools / tube issued by the Ministry of Health [14]. Container stool circular / tube is the incorporation of technology from *cubluk* and septic tanks, which form follows *cubluk* generally circular / tube, so that the land needed less, and the walls implement a system of septic tanks in general are waterproof, so it does not pollute soil and groundwater. Septic tanks are considered to have four types, namely:

1. Type 3-3-1

This type consists of two septic tanks with a height of 1.5 m (equal to the number 3 buis concrete with a high of 0.5 meters each stacked) and one with a high absorption of 0.5 m, all three use a diameter of 80 cm. This type requires land ± 2.4 m x 0.8 m or 1.92 m2.

2. Type 2-2-1

This type consists of two septic tanks with a height of 1 m (equal to the number 2 buis concrete piled 0.5 m) with a diameter of 80 cm and a height of 0.5 m catchment and a diameter of 80 cm. This type requires land ± 2.4 m x 0.8 m or 1.92 m2.

3. Type 3-1

This type consists of one septic tank 1.5 m high with a diameter of 80 cm and 1 absorption height of 0.5 m with a diameter of 80 cm. This type requires land ± 1.6 m x 0.8 m or 1.3 m2.

4. Type 2-1

This type consists of one septic tank 1 m high with a diameter of 80 cm and a catchment of 0.5 m with a diameter of 80 cm. This type requires land ± 1.6 m x 0.8 m or 1.3 m2.

The images for each type of latrine can be seen in Figure 12.

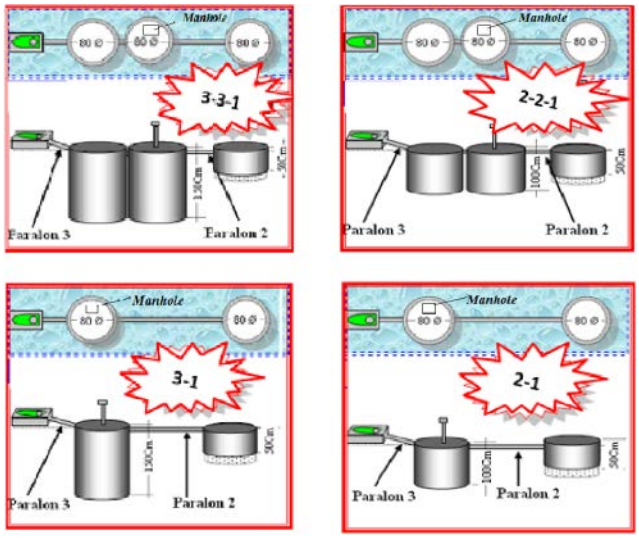

Figure 12: Type Of Latrine

Based on economic criteria, type 3-3-1 and 2-2-1 have greater development costs when compared to Type 3-1 and 2-1, because the 3-3-1 and the 2-2-1 type of excavation work ground and casting the walls and covered the septic tank and leach done 2 times, while for type 3-1 and 2-1 only type 1 times. So the choice of sanitation technology can be selected between Type 3-1 or 2-1 type.

The capacity of the septic tank to be selected will affect the long period of dewatering, so before the election will be calculated the capacity of the septic tank for sanitation technology type and type 3-1 2-1. Capacity calculation is to determine the maximum usage period of the septic tank is planned. Previous note that the number of human sludge per year is 30 liters/ person. year [15].

Septic Tank Capacity Calculation Type 3-1

• Assume one house there are 5 people

• The volume of sludge per year (one house)

= 5 x 30 liter / person.year = 150 liters / year = 0,15 m3

• Concrete Buis Diameter = 80 cm = 0.8 m

• Height / depth of the septic tank (h) = 150 cm = 1.5 m, however the maximum height of sludge is 2/3 of the depth of the septic tank (Soedjono and his colleagues 2010) so that height is used 150 x (2/3) = 100 cm = 1 m

• Volume Cesspool types 3-1

= 3.14 x r2 x (h effective)

= 3.14 x (0.4) 2 x (1)

= 0.5024 m3

• Septic Tank Capacity Type 3-1

= 0.5024 m3 / 0.15 m3

= 3,349 years = 3 years 4 months

Septic Tank Capacity Calculation Type 2-1

• Height / depth of the septic tank (h) = 100 cm = 1 m, however the maximum height of sludge is 2/3 of the depth of the septic tank (Soedjono and his colleagues 2010) so that the heights are used 100 x (2/3) = 66.67 cm = 0.6667 m

• Volume Cesspool types 2-1

= 3.14 x r2 x (h effective)

= 3.14 x (0.4) 2 x (0.6667)

= 0.3349 m3

• Septic Tank Capacity Type 2-1

= 0.3349 m3 / 0.15 m3

= 2.2328 years = 2 years and 3 months

Based on the calculation capacity of the septic tank and also the frequency of draining, both types of sanitation technologies eligible under SNI 03-2398-2002 is septic tank emptying period is 2-5 years. But for the 3-1 type of sanitation technology, the purification longer period so it can be more affordable in the financing aspects of

operations and maintenance.

Region has a structure riverbanks prone land subsidence or landslides due to eroded flow of water, so that the buildings in the surrounding areas should have a structure that is strong and stable. Plus the condition of the area in Gubeng often stagnant water, the construction of buildings to be constructed to be watertight. The deeper structure of the building it will be more stable building thereon. 3-1 sanitation technology type has a depth of 1.5 m while the 2-1 type has a depth of 1 m. So that the structure of the building for 3-1 sanitation technology type can be said to be more stable when compared with the 2-1 type of sanitation technology for more depth in type 3-1.

From the analysis of the obstacles that occur in the community and connected with the recommended type of sanitation technology, sanitation technology options 3-1 type is appropriate sanitation technology options with the condition of the people in Gubeng and can answer the constraints that exist. For more details regarding the choice of technology can be seen in Figure 4.27 and the Figure 4.28. The image can be seen on floor plan and image pieces of technology options 3-1 types of healthy latrines. The image is regenerated with modifications merger between SNI 032398-2002 directives and also the direction of the Ministry of Health so that it can be a solution in the community as tailored to the needs of society so there is no calculation in the making of the picture. The length of PVC pipe connecting toilets with septic tanks and septic tanks with leach is not absolute because it adapted to the site conditions of manufacture.

5. Conclusions and Recommendation

5.1 Conclusions

Factors behind some residents in Gubeng still OD behave and not build healthy latrines are factors Estate, Financial Factor / Factor Economy and Knowledge of environmental sanitation. Based on the analysis of social and environmental aspects, have the option of healthy latrines 3-1 type, which uses a septic tank system with a tubular shape and is equipped with infiltration wells.

5.2 Recommendations

Advice on research related to the participation of stakeholders, is expected to listen to the aspirations of the community and the facilitator of the public who wish to leave the habit of behaving OD. So that people do not feel compelled without any clear solutions regarding their current constraints related to the development of healthy latrines.

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