Integrative Solutions for the Acceleration of Open Defecation Free (ODF) in Bandung City

Tarlania, Verry Damayanti1, Astri Mutia Ekasari1

1 Urban and Regional Planning, Universitas Islam Bandung, Bandung, Indonesia

Corresponding Author : tarlani@unisba.ac.id

Abstract. One of the goals in the SDGs that a region must achieve is 100% sanitation access. Sanitation is considered to have a significant impact on the quality of public health, both in rural and urban areas. The city of Bandung as a city with a high-density level has a big challenge in resolving sanitation matters. Acceleration efforts are needed to improve sanitation access in the city of Bandung which is still low so that it can realize open defecation free (ODF) for every urban village in the city of Bandung. This paper aims to provide a logical framework in the form of efforts that can be made to increase ODF in the city of Bandung. By collecting secondary data, interviews and FGDs as well as the highest and best use approach, the results show that the most important thing is to encourage the community to realize the need for a septic tank through community based total sanitation triggering (STBM) activities, connecting household wastewater channels to PDAM Sewerage, construction of small and large-scale communal septic tanks / IPAL and construction of “Gendong” pipelines, especially those in riverbank areas.

Keywords : Sanitation, Open Defecation Free, Acceleration, Integrative Solutions

1. Introduction

The UN has agreed through Goals-Number 6 on the SDGs that by 2030, everyone can have access to safe drinking water and proper sanitation without exception [1]. This agreement encourages each country to declare its commitment through laws and regulations. Indonesia through the RPJMD 2015-2019 (Development Planning) has stated a 100-0-100 target to achieve 100% access to drinking water, 0% slum areas and 100% access to sanitation. These three things are related to one another so that they must be resolved thoroughly so that the goals of sustainable development can be realized.

One of the upstream aspects of various diseases is sanitation. Poor sanitation will result in river water pollution which is indicated by the low value of Dissolved Oxygen in water [2]. Water contaminated by feces contains tens of billions of microbes that can cause various diseases, namely diarrhea, typhus and even stunting [3][4]. With good sanitation, 60% of diarrheal diseases can be avoided and even 80% can prevent fatal diseases [5]. Open Defecation Free (ODF) is a condition when every individual in a community is no longer practicing open defecation which has the potential to spread disease [6]. Indonesia's sanitation data shows as of October 2020 it is still in the range of 79.79%. In other words, there are still 8 million families with open defecation status [7].

Bandung city as one of the metropolitan cities in Indonesia has complex problems in handling sanitation. Access to proper sanitation for the city of Bandung as of October 2020 has only reached 68.53% or equivalent to 180,000 families who still defecate openly. The low level of access is mostly caused by slum settlement points, which total 454 points spread over 30 sub-districts in Bandung City with a total slum area of 1,457.45 hectares [8]. Besides, the low level of awareness of some people about the need for latrines has an impact on the low access to sanitation.
This can be seen from the construction of houses without careful planning (self-help) and continues to grow, resulting in many sanitation problems that are increasingly difficult to intervene.

The sanitation growth rate of Bandung City in the last 3 years, 2018-2020, has shown a growth of 1.6%/year [7]. In early 2019, through Beresih Jilid 2 activity initiated by the Forum Bandung Sehat, a joint commitment from all regions was agreed to achieve 100% ODF in Bandung City. From this activity, it is sufficient to increase significantly the increase in sanitation access. Within 6 months, access to sanitation in Bandung City increased by 5% in 2020. The low level of increase in access to sanitation was caused by several problems including limited land controlled by the Bandung City government and road access (physical challenges), the ability to organize it yourself and was not prioritized. (economical challenge), lack of awareness in connecting to existing sewerage channels (social challenge), not optimal coordination function of the Bandung Municipal AMPL Adhok (Institutional challenge) and the limited budget of the Bandung city government (financial challenge) [9].

To realize the ODF commitment in 2020-2021, encouragement from the presidential regulation on healthy cities, as well as realizing the 4th mission of the Bandung City RPJMD 2019-2024 related to the livable city index, unusual ways to complete sanitation in Bandung are needed. An integrated solution is needed and even an out-of-the-box approach to realize Bandung ODF in 2021. This paper aims to provide a logical framework for efforts to accelerate 100% sanitation access (ODF) in Bandung City to identify the factors that cause there are still so many people who are Open Defecation, describe the integrated solution framework and assess the feasibility level of each model form with the highest and best use approach.

2. Method

The approach used in this research is the logical framework approach and the highest and best use. The logical framework approach is carried out by compiling a logical framework by considering various ideas and ideas, concepts, interpretations, events and experience components[10]. Meanwhile, in assessing each idea the highest and best use approach is carried out, especially in assessing the level of optimization of land use for development [11].

Methods of data collection were carried out from primary and secondary data. Secondary data is obtained through agency data in the form of dirty water channel maps, statistical data, Kotaku Profiles (Cities without Slums), Spatial Planning documents and Strategic Development plans in Bandung City and sources from related websites. Meanwhile, the primary data was conducted through semi-interviews with relevant stakeholders, namely the general chairman of Forum Bandung Sehat, the head of the association for sub-districts, the head of the association for village heads, the health department and the housing, settlement, park and land (DPKP3). In addition, several Focus Group Discussions (FGD) were conducted on cross-sector coordination in data transparency and to discuss solutions to problems faced.

The method of analysis in making a logical framework is carried out by classifying the characteristics of family locations that are still open defecation, then followed by classifying possible forms of solutions. Each solution that emerges, it will be linked with the supplier in the form of potential funding from government, private and public agencies. Meanwhile, the highest and best use approach is carried out by assessing each solution with the assessment criteria in the form of legally permissible, physically possible, financially feasible and maximally productive[11].

3. Bandung Sanitation Access

Bandung is one of the cities that has centralized waste management (offsite system), namely IPAL in the Bojongsoang area. Based on (PDAM Bandung, 2020), the total area of the Bojongsoang IPAL is around 85 hectares with aerob management with an average volume of waste that can be treated of 54,207 m³/day from the maximum average handling of 80,835 m³/day. The Bojongsoang IPAL has a more optimal role in accommodating fecal waste in Bandung City, because only 7 out of 151 kelurahan in Bandung have been declared Kelurahan ODF . Kelurahan through which the PDAM's dirty water channel access is able to connect its household channel to the channel. Spatially, it can be described the condition of the distribution of sanitation access conditions in urban villages in Bandung City. Figure 1 shows that there are still 28.5% of urban villages in the red zone (range of access to sanitation 0-35%) while 35% of them are in the green zone (range of access to sanitation 71-99%) while the yellow zone is at 32%. 

---

References:

[7] The Bojongsoang IPAL has a more optimal role in accommodating fecal waste in Bandung City, because only 7 out of 151 kelurahan in Bandung have been declared Kelurahan ODF. Kelurahan through which the PDAM's dirty water channel access is able to connect its household channel to the channel. Spatially, it can be described the condition of the distribution of sanitation access conditions in urban villages in Bandung City. Figure 1 shows that there are still 28.5% of urban villages in the red zone (range of access to sanitation 0-35%) while 35% of them are in the green zone (range of access to sanitation 71-99%) while the yellow zone is at 32%.
4. Problem Identification

Some of the problems of the people of Bandung City in accessing basic sanitation not to open defecation are divided into several aspects, namely financial, social, physical, economic and institutional problems [9]. On the financial aspect, people tend to be reluctant to connect to dirty water channels because there is no cost to build a septic tank or connect to a dirty water channel. A pandemic condition has consequences for not prioritizing sanitation matters [12]. On the social aspect, there is a concern that there is a septic tank leak that will result in an unpleasant smell or even a septic tank that explodes due to poor management [13]. On the physical aspect, the topographic characteristics of Bandung City are dominated by hills so that the position of the houses are not on flat land but there are several houses located in the lowlands and highlands. Therefore, not all areas in Bandung City can connect their household wastewater to the Bojongsoang IPAL wastewater channel. The economic aspect has implications for people who cannot reach housing areas, then they will build housing in slum settlements, which results in the emergence of buildings without a building permit (IMB) so that on average they choose to practically dispose of their household waste into river channels. The institutional aspect in the form of coordination for data transparency and certainty of authority in deciding sanitation cases becomes an obstacle in implementing the construction of a communal septic tank both internal institutions in the City of Bandung (Health Service, DPKP3, Bappelitbang, Districts, Kelurahan etc) and external institutions (BBWS Citarum, and Dansektor 22).

5. Solution Framework for ODF Bandung

From the results of interviews and FGDs with various government agencies, several forms of development were obtained to solve the problem. There are still many kelurahan in Bandung that still have open defecation, namely.

5.1 Individual Septic Tank

Sanitation is an obligation and responsibility for each person. The spirit of community-based total sanitation (STBM) must be reactivated. Especially people in the well-off category who are in housing complexes and in residential areas. The spirit of STBM is not to assist / grants to the community, but the community must first understand and be aware of the importance of sanitation so that septic tank development activities can be discussed together. For families who cannot afford it, it is necessary to connect with charity organizations in the city of
Bandung such as Zakat, Infaq, Sadaqah and Waqf (ZISW) institutions as well as to social foundations. In addition, it can be optimized through the use of CSR from companies around the kelurahan. The use of independent septic tanks can take advantage of conventional septic tank models (concrete/ cement construction) or biosepticank (fabrication).

5.2. Connecting to the PDAM Sewerage

Bandung has an off-site sewage treatment system, namely the Bojongsoang IPAL. There are several types of channels including BUDP I and II channels which have a channel length of 304 km and PDAM channels of 50,702 km (PDAM website). This channel has only been utilized by the community by 67%, so there is still 33% of the capacity that can connect the sewer to this channel. Since 2019, the community can obtain wastewater grants from the central government and from abroad based on PDAM provisions. One of them must be a customer of PDAM water. With this connection, it can minimize the construction of septic tanks independently. It is hoped that sustainably, it can reduce the level of water pollution in the rivers in Bandung.

5.3. Communal Septic tank/IPAL (Small Scale)

This solution was created to accommodate areas in the urban village of Bandung City that cannot connect their household dirty waterways to the PDAM (off-site system) dirty water so they have to process independently or local management (on-site system). The form of Septic tank or IPAL depends on the function of its designation. Septic tank is used only for feces (Blackwater) while IPAL is intended for waste water (gray water). For conditions in Bandung City, the WWTP function has also functioned as a feces processing facility. Small-scale communal WWTPs are very suitable to be applied to densely populated settlements outside riverbanks with a capacity of 5-10 households. This will be very strategically implemented, especially in sub-districts that have limitations in providing land for septic tank development. At the same time, for areas that are spatially spread out, the number of people who are still OD, the small-scale communal IPAL can be completed efficiently. The source of the budget can be obtained from the DAU Kelurahan, PIPPK RW and CSR assistance.

5.4. Communal Septic tank/IPAL (Large-Scale)

This solution was created on the basis of the need for massive sanitation measures. This communal IPAL is intended for densely populated residential areas where the number of families with open defecation is very high, so a large-scale development is required to serve 50-100 households. The challenge faced in the construction of this IPAL is the availability of large enough land that the government must own the land. Due to the source of the budget from government funds, both APBN (KOTAKU program, SANIMAS), Provincial APBD (Provincial Grants) and district / city APBD, it is absolutely necessary to build on government land. With these characteristics, the challenge of obtaining land that can be utilized becomes a problem in itself. In 2019, much of the DPKP3 budget was not absorbed for the construction of communal IPALs because there was no clear and clean land to build Communal IPALs [14].

5.5 Construction of “Gendong “ Pipelines

The construction of carrying pipelines is one of the solutions for handling waste by making pipelines in riverbank areas. The main function of this pipe is as temporary storage. This takes into account the existing conditions of the community that disposes of their waste water into the river so that each pipe needs to be connected and accommodated through a special channel so that it does not go into the river. The reason why many families do not change the sewerage to the PDAM is that it is considered impractical to dismantle the sewer that has been installed. However, in its implementation, it is necessary to pay attention to the legality aspect because buildings are not allowed on the riverbanks and also consider the potential for pipe damage due to striking river water during the rainy season. In addition, the authority of large rivers under the authority of BBWS (Ministry of PUPR), especially do not interfere with the normalization of the river if there is an obstacle to river flow. It is necessary to have a comprehensive study from the aspects of planning to construction so that the construction can function properly. The end of the carrying channel needs to be connected to a PDAM dirty water channel which is still
within reach, but if you have problems with the topography, it is necessary to build a communal IPAL beside the riverbank where if possible it is 50-100 meters from the road that can be passed by the Suction Car.

Many possible solutions need to be done. Figure 2 illustrates an integrated handling method so that Bandung can achieve ODF.

**Figure 2. The Logical Framework Solution of Bandung ODF**

6. Highest and Best Use Analysis

After finding several alternatives for handling wastewater in the city of Bandung, especially blackwater waste, it is necessary to look at the feasibility of their application so that things can be considered that can support the success of the development carried out. Table 1 states that legally all models can be carried out except for the carrying pipeline which still needs to be reviewed. Regarding the physical aspect, it can be said that it really depends on the condition of the land, both in terms of land area and topography for the construction of an IPAL / Septic tank. As for the carrying pipe, it is necessary to pay attention to the connection to the PDAM water channel or it can also be done by building a local processing facility. In the financial aspect, it really depends on government funds and CSR. This is due to the conditions of the Covid 19 pandemic, sanitation is not a priority. Whereas in productivity, all can provide productivity with different levels of scale.
Table 1. The Highest and Best Use of Sewerage

| Types of Sewerage                     | Legally Permissible | Physically Possible                                                                 | Financially Feasible                                      | Maximally Productive                                      |
|---------------------------------------|---------------------|--------------------------------------------------------------------------------------|------------------------------------------------------------|------------------------------------------------------------|
| Individual Septic tank/IPAL          | Yes                 | Conditional, just for housing area and located 50-100 meters from the road           | Conditional, but overall didn’t be a priority              | Conditional, but overall didn’t be a priority              |
| Communal Septic tank/IPAL (Small Scale) | Yes                 | Conditional, only if Land is available and located 50-100 meters from the road      | Conditional, only if is supported by CSR or Government Budget | Conditional, only if is supported by CSR or Government Budget |
| Communal Septic tank/IPAL (large Scale) | Yes                 | Conditional, only if Land is available and people connect to IPAL Channel and located 50-100 meters from the road | Conditional, only if is supported by CSR or Government Budget | Conditional, only if is supported by CSR or Government Budget |
| Bojongsoang Sewerage                 | Yes                 | Conditional, just for high topography                                               | Yes                                                        | Yes                                                        |
| “Gendong” pipelines                  | No, several rivers under the authority of BBWS | Yes, but need a feasibility Study and “IPAL gendong” located 50-100 meters from the road | Conditional, only if is supported by CSR or Government Budget | Yes, just for block in riverbank |

7. Conclusion

The problem of access to sanitation in Bandung City with an average growth of 3-5% / year, to realize Bandung ODF it takes 6-10 years at the fastest, so we need ways that are not used to make it happen. The handling method needs to be done from various models and approaches that are integrated with each other and have a significant impact. The main priority for handling is that each community consciously provides their septic tank in each house so that the water entering the river is not polluted. This is in line with the spirit of STBM where the person concerned builds without depending on funds from the government. In addition, the community can connect to the PDAM’s sewerage through the wastewater grant assistance process. To accelerate development, the presence of the government as stimulant fund provider through the APBN, Provincial APBD and District / city APBD to build small and large-scale IPAL / septic tank so that the number of ODF villages will increase. Even if it is possible, it is necessary to realize the carrying pipelines, the faster the sanitation access will be improved. However, due to budget limitations from the government, completing the Bandung ODF requires support from ZISW, BUMN, BUMD, CSR, universities and other social communities.

References

[1] Sarosa W 2020 Kota Untuk Semua : Huntian yang Selaras dengan Sustainanble Development Goals dan New Urban Agenda (Expose Publika)
[2] Halder J and Islam N 2015 Water Pollution and its Impact on the Human Health J. Environ. Hum.
[3] Rose C, Parker A, Jefferson B and Cartmell E 2015 The characterization of feces and urine: A review of the literature to inform advanced treatment technology Crit. Rev. Environ. Sci. Technol.
[4] Larsen D A, Grisham T, Slawsky E and Narine L 2017 An individual-level meta-analysis assessing the impact of community-level sanitation access on child stunting, anemia, and diarrhea: Evidence from DHS and MICS surveys
Hunter P R and Prüss-Ustün A 2016 Have we substantially underestimated the impact of improved sanitation coverage on child health? A Generalized Additive Model panel analysis of global data on child mortality and malnutrition *PLoS One*

Naranjo J 2014 PERATURAN MENTRI KESEHATAN RI NO 3 TAHUN 2014 TENTANG SANITASI TOTAL BERBASIS MASYARAKAT PERMENKES RI

Anon 2020 Website Monev STBM

Bandung B K 2020 *Bahan Tayang Percepatan ODF Kota Bandung*

Tarlani T, Nurhasanah H and Destiani A T 2020 Challenges and efforts for sanitation access growth in Indonesia *IOP Conf. Ser. Mater. Sci. Eng.* **830** 032069

Svinicki M D 2010 A Guidebook On Conceptual Frameworks For Research In Engineering Education *Eng. Educ.*

Maxwell D G 1996 Highest and best use? *Land use policy*

Hossain M 2020 The effect of the Covid-19 on sharing economy activities *J. Clean. Prod.*

Anggraini A P 2019 Sebabkan Seorang Petugas Sedot WC Tewas, Mengapa Septic Tank Bisa Meledak? *Kompas*

Bandung O D K 2020 LKPJ Kota Bandung 2019