Ecodevelopment Journal
Vol. 4 No. 1 (14-18)
https://jurnal.unpad.ac.id/ecodev
cess.unpad.ac.id

IMPORTANT FACTORS OF OPEN DEFECATION CONTROLLING EFFORTS IN GREATER BANDUNG URBAN SLUM AREA

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ABSTRACT

Sanitation is one of development aspects which human basic necessity. One of sanitation development policies in Indonesia is refers to community needs (demand driven) rather than achieving technical target (supply driven). Communities in urban slum area, as a target focus management, should play a major role in the development process and become an active participant in facility planning, construction, utilization and maintenance. This research is intended to identify the condition of sanitation management implementation in slum areas and explore important factors for community in sanitation management. This research is using Fishbein method and then followed by Importance Performance Analysis (IPA) with Cartesius diagram, with focus in exploring community ideas/perception for sanitation management in slum area. There are two responded components : fact (stating performance) and expectation (stating importance level) related to the operated policy/program in important factors. This research is conducted in Greater Bandung Area which is a metropolitan area comprising of 4 (four) cities/regencies that structure West Java Province capital area. The result is among ten requested important factors, the financial factor becomes major important factor that had to be improved (2,24;4,25), however community participation (2,86;4,05), environmental (2,79;4,07) and social impact factors (2,86;4,01) are satisfied important factors. Resilience to the climate change is also considered in this research since the effects of climate change on sanitation may be direct while water is an essential part of the technology process (e.g. sewerage) is indirect where the capability of the environment to absorb or reduce the adverse effect of wastes is changed. The result concludes that community has experience their self sanitation management to overcome environmental and social problems. On the other hand financial factor is still required to improve the better sanitation management.

Keywords: Climate change, Demand driven sanitation, Urban slam area.

INTRODUCTION

Access to drinking water and sanitation is human basic needs (UN, 2010). WHO data (2013) in World Progress Report for Drinking Water and Sanitation stated that 768 million world inhabitants had no access for drinking water and 2,5 billion people had no sanitation facility. However, open defecation practice had been reduced from 24% in 1990 to 15% in 2011. Indonesia Statistic Bureau (BPS) data stated that proper sanitation achievement had increased from 51,19% in 2009 to 55,60% in 2011, meanwhile *Millenium Development Goals (MDGs)* is targeted 62,41% proper sanitation in Indonesia by 2015 (RPJMN, 2010/2014). West Java Province, which has the largest population in Indonesia, sanitation service in 2013 was 62,5% and is aimed to reach 70% by 2015 (RPJMD, 2008/2013).

Indonesian population in 2011 reached 230 million, mostly living in urban area and growing rapidly. There is over than 300 Ha urban slum areas in Greater Bandung. Lumanti (2004) defined that slum area lacked sanitation and other basic facilities, for instance: drinking water, drainage and solid waste management. From economical aspect slum area was categorized as a poor area which was indicated largely by low income and unemployed inhabitants. Low sanitation service created diarrhea and other disease which generated by poor sanitation. Those conditions will continue to children growth disorder (Checkley et a1., 2008), physical fitness and cognitive function (Guerrant et al., 1999; Niehaus et al., 2002).

Indonesian government effort and policy is confirmed by initiating a National Program for Human Settlement Sanitation Development Acceleration (PPSP) for 2010-2014 which aims to stop open defecation practice or open defecation free (ODF) in 2014. There are two approaches for development scheme. The first is supply driven by top-down program from the government to the community. This scheme has been implemented for years. The second approach is demand driven based on community needs as users. Top-down approach, also known as conventional approach, has several characteristic consumer aspiration neglect, ineffective promotion, weak public awareness and limited stakeholder participation (Schertenleib, 2002). In opposite to the first approach is the second approach (demand driven) that is conducted by involving various stakeholder, particularly community as users, focusing active community participation to initiate and beresponsible for constructing sanitation facility, empowering community and dedicated to low income inhabitants (Dayal et al., 2000).

Community based decentralization system is the technically and economically chosen approach for low income inhabitants (Paterson et al., 2007). Several sanitation development experiences by community development are conducted in many developing countries, for instance Ghana (Osumanu, 2010), Peru (Hubbard et a1., 2011), Bostwana (Bolaane dan Ikgopoleng, 201 I), Bangladesh (Ali dan Stevens, 2009), Salvador (Santos et a1., 201 I),Kibera-Kenya (Schouten et al., 2010), Vanuatu (Stitt, 2005), Southern Ethiopia (Baye et al., 2012). Those experiences show that planning activities are conducted in line with user technical capability and more effective management (Deverill dan Smout, 2000; Mutume, 2004).

The primary indicator for successful development is sustainability which influenced by several determinant factors. Setiawati et a1., (2013) formulate several influence factors for sustainable sanitation system comprising technology selection, finance, environment, institution and community culture. Basically sustainable sanitation system covers the environment, institution, finance, technology and social (WSSCC, 2000). Sustainable sanitation can be defined as long term black water treatment and management (Chinyama et al., 2012). Influence/obstruction factors for community based sanitation system are

DOI: 10.24198/ecodev.v4i1.39128
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caused by less priority from stakeholders, lack of finance, inappropriate technology and inconsistent role sharing (Isunju et al., 2011; Hubbard et al., 2011; Schouten dan Mathenge, 2010; Cumming, 2008).

All sanitation technologies will be vulnerable to climate change and all have some adaptive capacity. Sewerage widely perceived as the gold standard in sanitation technology is only resilient to climate change in some scenarios. Modified sewerage is more climate resilient than conventional sewerage (WHO, 2009).

Based on the above mentioned figures, this research is intended to identify sanitation management in urban slum area and explore important factors for communities in slum area as sanitation management users.

METHODS

Research Design

Design for this research is conclusive descriptive referring to explaining one or more characteristic of structured and specific variables for problem solving decision. Quantitative analysis shall be used (Firdaus, 2012). Research stages are shown in Figure I below.

Research Variables

Survey variables consist of two components, which are:

1. Respondent general figures and sanitation management facilities variable that is comprised of:
   a. Respondent identity
   b. Black water discharge
   c. Septic tank
   d. Others, for instance: sanitation perceptive and disease plague (diarrhea)

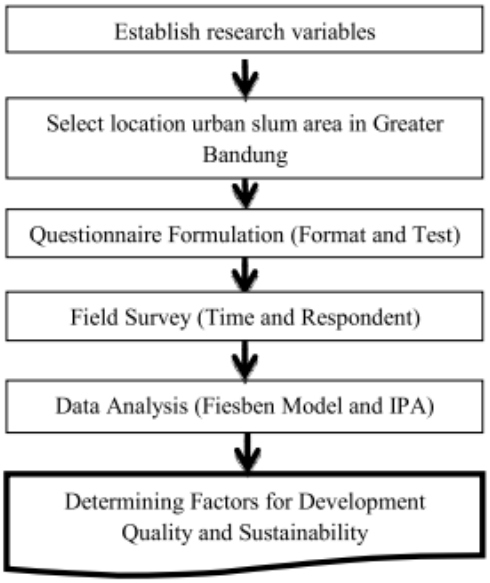

Figure 1. Research Stages Scheme

2. Important factors variable. Question type is directed to user characteristic or consumer satisfaction according to respondent aspiration and ideas that are derived from fact and expectation. Based on several theories and research, there are 10 (ten) factors which influence sanitation development achievement and sustainability by community empowerment as shown in **Table 1**.

Research Location

Research location is Greater Bandung Area urban slum area. Selection criteria will refer to:

1. Population density. Ideal population density is 75 persons/Ha (WHO, 2010). This research is aimed for density over 75 person/Ha/village.
2. Stated as slum area.
3. Prone Sanitation Area, according to *Environmental Health Risk Assessment (EHRA)* study which was conducted by City/Regency to describe sanitation condition.
4. Urban area characteristics.

Table 1. Research Variables

No	Research Variable	Fact	Expectation
1.	Institution	Institutional role in sanitation management	How important the institution that manage sanitation is
2.	Regulation	Regulation role in sanitation management	How important the regulation concerning sanitation management is
3.	Finance	Government financial support for sanitation	How important the government finance for sanitation is
4.	Community involvement	Community involvement in sanitation management	How important community involvement in sanitation management is
5.	Technology	Applied technology performance	How important the role of technology is
6.	Private sector	Private sector involvement in sanitation management	How important private sector involvement in sanitation management is
7.	Culture	Attention for culture/habit role	How important the attention for culture/habit role is
8.	Gender	Housewife role in sanitation management	How important the housewife role in sanitation management is
9.	Social Impact	Attention for social impact	How important the attention for social impact is
10.	Environmental Impact	Attention for environmental impact	How important the attention for environmental impact is

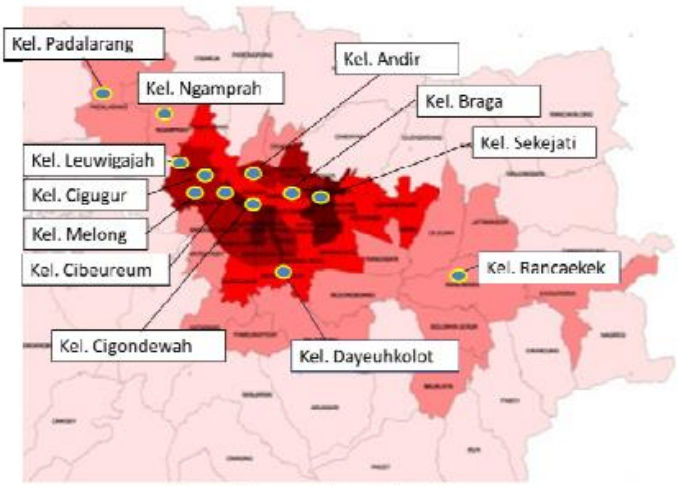

Figure 2. Research Location Map

Figure 2 above shows research location position with respondent sampling number of 400 people or 100 household.

Questionnaire

Data collecting instrument used is questionnaire for closed information. This research shall examine respondents' attitude and practice by Likert scale as follows:

Fact	Expectation
5 = Excellent	5 = very important
4 = Good	4 = important
3 = Fair	3 = important enough
2 = Poor	2 = less important
1 = Worst	1 = unimportant

Field Survey

Survey or data collecting time will be held on July 22 September 13, 2013. In accordance to filling the questionnaire, respondents will be interviewed for additional information/explanation.

Data Analysis

General information data will be analyzed by descriptive statistic, while the second group variable will be analyzed by Fishbein model and Important Performance Analysis (IPA) by Cartesius diagram.

RESULTS AND DISCUSSIONS

Following obtained fact and expectation average scores then plotted to axis (X,Y) in Important Performance Analysis (IPA)/Cartesius diagram. Plotting result to Importance Performance Analysis (IPA)/Cartesius diagram with axis (X,Y) is shown in the following Figure 3.

Table 2. Fact and Expectation Average Scores

Variable	Fact	Expectation	Average Gap
1. Institution	2,43	3,71	-1,28
2. Regulation	2,43	3,91	-1,48
3. Finance	2,45	4,25	-1,80
4. Community	2,86	4,05	-1,19
5. Technology	2,66	3,80	-1,14
6. Private Sector	2.62	3,95	-1,33
7. Culture	2.76	3,84	-1,08
8. Gender	3,03	3,91	-0,88
9. Social Impact	2,86	4,01	-1,16
10. Environmental Impact	2,79	4,07	-1,28
Average	**2,69**	**3,95**	**-1,26**

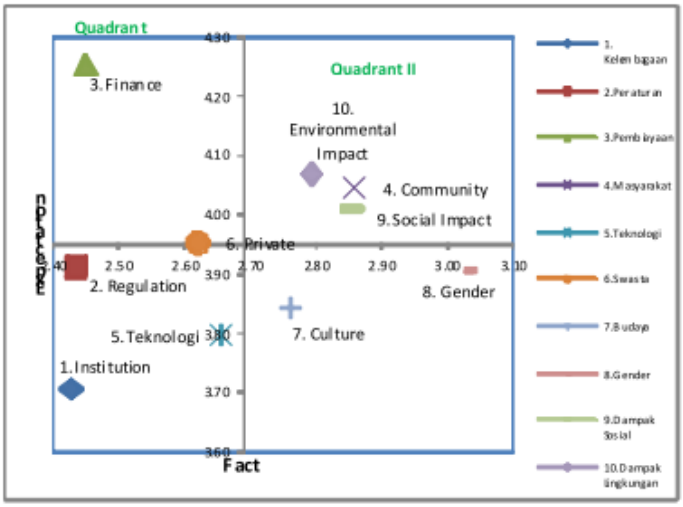

Figure 3. Important Performance Analysisfiiagram Cartesius

Table 3. Cartesius Diagram Recapitulation Result

Quadrant	Factor
Quadrant I fimportant factor, not satisfied yet/need improvement)	V3. COSt
Quadrant II (important factor, satisfied/ preserve)	V4. Community Involvement V9. Social Impact V10. Environmental Impact
Quadrant III (unimportant factor,not satisfied/need to consider)	VI . Institution V2. Regulation V5. Technology V6. Private Sector
Quadrant IV (unimportant factor, satisfied/ redundant)	V7. Cultural Role V8. Gender Role

Based on Important Performance Analysis (IPA) and plotting result on the above figure, question attribute could be categorized to each quadrant as shown in the Table 3.

Important Performance Analysis (IPA)

Quadrant I, the important factor not yet satisfied (need improvement) is Finance. The community think that finance is the important factor where they have limited income. Generally their economic level is on the City/Regency Minimum Wages limit, this condition reflects urban slum area indicators which are medium educational level and low income refers to regional minimum wages regulation (Lumanti, 2004). According to general figures in this area, the highest income is Rp. 1 .500.000,-/month, yet the minimum wages is Rp. 1.338.333 Rp. l.538.703,-/month. At this time, there is no government financial support obtained, usually community manage their sanitation facility. Based on the survey result, the financial support, if any, should be directed to developing suitable and simple technology (Katukiza et al., 2010). Community has no capability to manage or maintain their septic tank yet. Survey result illustrates that 44,9% of community members have no information about recent drain and 40,2% never drain their septic tank. A slum area with high density and limited space require simple management and appropriate technology sanitation management system (Avvannavar and Mani, 2008).

Quadrant II, the important factors and satisfied (preserve) are Community Involvement, Social Impact and Environmental Impact. Community voluntary participate to solve their sanitation problems to avoid both social and environmental impact and believe in their achievement (Bryant et al., 1987). Survey result illustrate that community perception for sanitation is high proven by 85,9% respondent realizing the negative impact from open defecation practice. Supported by self- provide facility that use individual toilet/WC (88,8%) equipped by swan neck squat toilet (79,7%), swan neck sit toilet (15,9%) and septic tank (45,3%). This condition has positive impact for both social and environment, proven by 90,0% of the respondents never having diarrhea.

Quadrant **III,** the unimportant factors and not satisfied yet (not required) are Institution, Regulation, Technology and Private Sector Participation. Community realizes that their self- sanitation management has solved the social and environmental problems. Consequently institutions, the government, regulation, technology and private sector aspects are considered as unimportant factors. Community is capable of managing their sanitation, so the government institution is not required. Similar to regulation aspect, existing regulation is sufficient even indefinite, yet community understands the importance of sanitation. No more regulation is needed. This indicates community is overwhelmed by the government's performance. Other supports are also not required, such as technology development and private sector participation are not recognized.

Quadrant IV, the unimportant factors but satisfied (redundant) are Cultural and Gender Role. Those factors are considered as unimportant in urban slum area which are created by cultural and emancipation shifting in urban community. Existing sanitation facility has provide private and equal handling for every part of community.

Resilience to Climate Change

Where precipitation levels decline, sewerage system may become more difficult to operate and maintain. This will be a particular problem for conventional sewerage with its relatively high water requirements. A further problem may also arise from the reduced capacity of water resources to absorb and dilute pollution, which will increase the performance requirements, and hence the cost and potentially the carbon footprint of wastewater treatment. Sewers are also at risk of flooding damage where sewers also carry storm water. The increase flooding will result in widespread contamination, overwhelmed treatment facilities and an increase in public health risk.

Pit latrines as a group of technologies are resilient, because different (what?) allow adaptation to changing climate. Individual facilities may, however not be resilient. Where groundwater level is rising, pollution from pit latrines may become difficult to control. The resilience of sanitation technology to climate change is shown in Table 4.

Table 4. Resilience of Sanitation Technology to Climate Change

Category	Definition	Technology
1	Potentially resilient to all expected climate change	1. Pit latrines 2. Low flush septic tank
2	Potentially resilient to all expected climate change	1. High volume septic system 2. Conventional and modified sewerage
3	Not improved sanitation *)	1. Latrines without a slab or platform 2. Hanging latrines

Note: *) Categorized by Joint Monitoring Program
Source: WHO, 2009

CONCLUSIONS

Based on survey result and data analysis, it can be concluded that:

1. Open defecation practice has been controlled, shown by 92% of no open defecation in community mainly adults.
2. There is sanitation facility in each house, 88,8% people have individual toilet. This condition shows that private sanitation is highly required while available area for public toilet is constricted.
3. There is still large environmental impact (pollution) caused by septic tank utilization only 45,3%. This condition worsen by the lack of septic tank maintenance shown by 44,9% of respondents not knowing, any information about recent drain and 40,9% of respondent never draining their septic tank. More detailed study is required particularly regarding septic tank quality and surrounding environmental condition.
4. There is a lack of information on which technologies and what type of management will be resilient to climate change in different circumstances. This knowledge will be critical in reviewing program and operation to assess and increase the achievement of resilience of climate change.

Research main conclusion is determining important factors for open defecation controlling efforts. The important factors are cost/finance, community involvement, social impact and environmental impact.

ACKNOWLEDGMENT

On this occasion the author expresses his gratitude to Dr. Guspika, MBA as the head of the BAPPENAS Pusbindiklatren, Bungo Regency BAPPEDA, Datuk Rio, Senamat Ulu hamlet and the Traditional Forest Management Group along with the customary law community in Senamat Ulu hamlet. Thanks are also given to Agseora Ediyen as the language translator.

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