Tackling Environmental Pollution through Participatory Approach in Nambo, South Tangerang, Indonesia

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Abstract. A participatory approach is well-known for its time-consuming and no-instant approach. Tackling environmental pollution directly from its source in an urban area by participatory approach is very critical. Universitas Indonesia’s Community Engagement Program together with the City Without Slum or Kotaku Program in South Tangerang City, Banten Province, Indonesia, conducted in Kampung Nambo. This joint program carried out in two lines through the local government and the community by a bottom-up approach. The inhabitants of the neighbourhood involved through a charrette process. The outcome of the charrette is the guideline of the new master plan development of Kampung Nambo that responding to tackling the pollution created in the kampung. This master plan will use as a parameter for the Kampung Nambo development program. A team of experts that consists of the local government, the university scholars, the NGO, and the inhabitants joined together for the implementation plan under the intensive and an interactive designated workshop. It concluded that this approach is valuable to integrate the unplanned urban areas development, which happened quite vast in some Indonesian cities and towns. Thus, it helps to reduce the urgency of environmental degradation in the kampung, through awareness and educational campaign. This approach is challenging yet it is a long-term investment.

1. Introduction

South Tangerang city is one of the rapid growing cities in Indonesia. The city established in 2008 but its density is almost as dense as Jakarta, the capital city. There are 3 giant developers invested in the city and thus start-up very rapid urban development in the city. However, there are many slum areas that still exist in the city. Those areas have insufficient access to many services such as clean water, sanitation, and electricity [1].

In the case of towns and cities of Indonesia, slums are created from an unplanned or spontaneous settlement, where majority of urban poor live. To prevent the formation of slum within the kampung areas, Universitas of Indonesia together with BEST (Bina Ekonomi Sosial Terpadu or Integrated Social and Economic Development Institution) NGO, and Local Government of South Tangerang City, initiated the program called “Livable City”. This program aims to prevent the foundation of slum within the unplanned areas of the city and to integrate the kampung with the city development. Particularly on Kampung Nambo, 03/04 neighborhood. Kampung Nambo is adjacent to Cipeucang landfill and has some threats to become an example of an unplanned area of the city due to its
proximity to the other urban infrastructures yet in an affordable land price. Living near to the landfills area is chosen for the implementation of this new model approach. Nonetheless, Kampung Nambo has various potentials, with the natural environment and unique contoured land.

2. Materials and Methods
A broad array of public policy and anthropological research has demonstrated how the slum environment physically and symbolically omits its residents from society. Women in particular use the slum environment as a tool for personal and social redefinition. Women commented on how their techniques to see value in poor environmental conditions, could result in physical changes to environment and body. It reflects their spiritual capacities as “know-ers” of the environmental field, able to identify potential in an inadequate environment [2].

2.1 Charette Method
This study engaged the residents through a charette method, known as an intensive and multi-disciplinary workshop design [3]. This method is commonly used to facilitate discussions between stakeholders on a project or a program. A charrette, a group of experts come together with the community groups and related stakeholders. The program introduces and educates the community in Kampung Nambo about the concept and the goal of Livable City, as well as examples of well-organized villages/kampung and unwell-organized villages/kampung in Indonesia. Then, the joined team explore the potentials as well as the problems occurring in the Kampung, and planning the area to mitigate the problems, including mitigating the pollutions caused by the households.

2.2 Stakeholder Formation and The Roles Identification
The program is a joined program from several designated program. Those are Community Engagement Program Universitas Indonesia, City Without Slum or “Kotaku” South Tangerang City, The Polycentric Approach on Urban Waters from Bremen Overseas and Development Association (BORDA) and BEST NGO Group, and also Community-based Sanitation Program from Islamic Development Bank. Stakeholders have their own role and contribution to the program (Table 1).

| No. | Stakeholder | Designated Program | Main Roles | Contribution |
|-----|-------------|--------------------|------------|--------------|
| 1   | Universitas Indonesia Team | Community Engagement | Experts for Planning | Master Plan |
| 2   | South Tangerang Local Government Team | City without Slum or “Kotaku” | Experts for Implementation and Decision Makers | Funding and External Cooperation and Program Integration Household Sanitary Landfill (HSL) |
| 3   | BEST-BORDA NGO Team | Polycentric Approach on Urban Waters | Experts for Community Development and Sanitation | |
| 4   | Islamic Development Bank Team | Community Based Sanitation Program | Expert of Sanitation | Wastewater Treatment Plant (WWTP) |
| 5   | Kampung Nambo Community Neighbourhood Association 03/04 | Expert of the Actual Condition | Reporter and Users |

3. Finding and Discussion

3.1 Problems and Opportunities
Obviously, the major problems which are occurring in Kampung Nambo are the odors from Cipeucang landfills which located near the community housing. However, 9 out of 120 households in
the area are piping their wastewater directly to the river and polluted clean water source due to overcrowded and the un-proper septic tank constructions. More details from the problems are as follows:

3.1.1 Insufficient public facilities
There is an insufficient public facility in Kampung Nambo. There is only one mosque or Musholla within the kampung. It is the only public facility in the kampung which is used not only for praying but also meetings and discussions. The community does not have a place to do social activities, such as joint workshop and woman empowerment program. Whilst the community has many great potentials to enhance their abilities and to develop their village.

3.1.2 All day with odors
Odors from Cipeucang landfill has become part of the life of the Nambo community. The TPA is in the southwest side of the kampung Nambo, it causes the smell effortlessly carried by the wind. During the rainy season, it gets worst. Plants along the border of TPA and kampung Nambo do not act as buffer zones properly. Even though the community used to it, it is less comfortable for other visitors.

3.1.3 Un-proper sanitation system
Among all the environmental degradation happens in the kampung, un proper sanitation system found significantly in some houses. There are 9 houses out of 120 don’t have the septic tank. These houses throw their black water into the river and water bodies. This certainly has a negative impact on the environment because it pollutes river water and reduces groundwater quality.

3.1.4 Unmanaged drainage
In some points in the Kampung, many unmanaged drainages can be found. They are sometimes due to the un-fitted size thus gets the wastewater overloaded or rather there is no proper drainage. Even in some locations, there is no drainage. So that household wastewater flows into the road and causes unpleasant odors. In some locations the road conditions damaged due to the water runoff. This is certainly also due to the limited land and the narrow roads.

3.1.5 Lack of lighting intensity during night time
During night time, many spots are very dark. These spots found almost in alleys in the lower part of the kampung. So, there is not much activity going on in the area at night. In addition, although the safety matter in the village of Nambo sufficiently maintained, residents still feel worried about the dark road conditions.

Aside from the problems, there are also some potentials, such as the abundances of greeneries and water bodies which become the habitat of birds and fish, and the prosperos social life which shown by the proximity and the friendliness among the inhabitants. They know each other houses locations as well as the types and the location of each clean water sources and septic tanks within the settlement. They are also knowledgable about the terrain of their Kampong, the location of the greeneries and water bodies, the width of the streets, as well as the lands’ owner, whether they are belong to private or local government. During the intervention, they are also acknowledged by the need of open spaces for socializing and recreation and ways to fulfil those needs.

3.2 Design Interventions
Based on the problems and potentials, it is clear that they need interventions, mainly on those 5. Through charrette and discussions that have taken place several times, there are various lists of community needs that necessarily applied in the village of Nambo. Some of them are the buffer zone implementation to minimize the bad smell coming from the landfill, a well-managed wastewater treatment plant and clean drinking water sources. For safety reason, the residents also state that they are in need of parking spaces for their cars and fire trucks in case of emergency. Also, it is necessary to fulfill the needs of the children, by suggesting a reading garden to improve the knowledge of the children, and soccer field where the children can play futsal and volleyball during their free time so that they can keep their health as well (Figure 1). The list of needs is then reconciled and developed together with all relevant parties, to produce several criteria regarding design interventions. Such as the placement, dimension, amount, ownership, development plan, construction plan, and maintenance.

3.2.1 Community Facilities and Wastewater Treatment Plant
The Millennium Development Goals (MDG) calls for a 50 percent reduction in the proportion of people without sustainable access to safe drinking water and sanitation. Provision of these services by city authorities is often absent in slum settlements in densely populated countries, nevertheless in Indonesia [4]. That is why the joined program aims to provide communal wastewater plant to make sure that the wastewater is clean enough to released to the river or reused for watering plants, and to keep the source of clean water unpolluted by wastewater. Moreover, a community deep well and pipe water is developed to keep the clean water free from any pollution and manageable.

Because the land price is very high, the communal wastewater plant incorporated within the community park. On top of the communal wastewater plant, there is a playground area for children which also adjacent to a reading spot. WWTP placed in the lowest plane of the village to facilitate wastewater distribution. The reading space can also be used as a workshop for the women to improve their abilities. Later the products of the workshop and the people's handicrafts sold to visitors who come to the village. Behind the reading spot, there is a hydroponic garden where the residents can plant a variety of herbs and vegetables. Adjacent to the park, there is a soccer field where the residents can play futsal or volleyball during their free time to keep them healthy.

3.2.2 Water Recreation Park
Urban kampung tourism has evolved from being practiced at only a limited number of places into a truly global phenomenon, which now performed on five continents [5]. Kampung Nambo blessed with
a natural spring, and so that we provide a water recreation park as a source of tourism for Kampung Nambo. The water recreation park consists of clean water reservoir in which the clean water is going to be channeled to the drinking water well above, a skywalk bridge to connect the parking spaces and the water recreation park, a children playground, an artificial river with stepping-stones for children to play and get across, a sitting area for the parents waiting on their children, a dancing fountain, a hamster ball where the children can get inside and walk on the water, a fishing pond for the fish that the residents cultivate, and a buffer zone which consists of greenery to minimize the smell from Cipeucang landfill. In the buffer zone area which is quite extensive, the scheme to reduce odor is by planting trees that can reduce air pollution, such as tanjung trees, then trees that are able to filter groundwater so that it is not polluted by water from landfill, such as bamboo trees and flower trees to provide a fragrance. In addition, the planting of broadleaf trees is also needed to direct the wind naturally.

3.2.3 Clean Water Source, Visitors and Firefighters Trucks Parking Area

The drinking water well located just above the clean water reservoir. The parking space provides the firefighters’ trucks, tourists’ cars, and motorcycles. There is also a gateway to welcome the tourists, with some stalls nearby which functioned as a place to sell the souvenirs. The residents process the gift such as foods made from fishes, hydroponic vegetables and compost products. Alongside the cliff, there are gazebos where visitors can sit and eat the local cuisine while enjoying the view to the water recreation park below, as well as services area for public toilets and a security post. The master plan implementation, at least for some of the items executed this year by the municipality, including the communal waste treatment plant construction and the deep well construction.

3.2.4 Urban Infrastructure Improvement

The kampung master plan also includes the existing roads and lanes improvement within the community. It provides the guidance for new land/property subdivision to create a proper road and lanes to allow the light and fresh air penetration to the buildings. Moreover, the mediation on organic solid waste directed by community- and home-based composting through Household Sanitary Landfill (HSL). It is a simple method of composting at a source, supervised by BEST NGO. It guarantees the waste at its best quality. Further, the compost will used by the urban farming in the area. The interventions are intended to make the settlement pattern more organized. Thus, the kampung environment becomes more healthy, comfortable, and livable.

4. Conclusion

Tackling the environmental pollution can be done by many approaches; by involving the community is the most effective way of doing it. The participatory approach in Nambo has pulled in many stakeholders to contribute to the livable city program. Improving the impromptu areas and preventing it from slum transformation is critical for the city and especially for the people that possess in the area. The process of the kampung improvement as a pilot project that involves the community, the experts including the NGO, and the municipal agencies whose response to urban infrastructures, proved very fruitful and colourful. The procedure of intervention took some time and the outcome came gradually but evolving. Community approach in Kampung Nambo is very significant to build the sense of ownership. Thus, it empowers the community and keeps the local wisdom alive. Finally, kampung moves toward a livable kampung and becomes a part of a livable city, live, life and prospers.

5. References:
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