

Improving Slum Infrastructure in Sri Meranti Village Pekanbaru City

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Abstract. Sri Meranti Village is one of the villages in Rumbai District, Pekanbaru City, which still has slum status. Many factors can influence the existence of slum areas. These factors include urbanization, infrastructure, economics, urban land, spatial planning, socio-cultural urban attractiveness, building ownership status, and length of residence. Sri Meranti Village was included in the Pekanbaru City Slum Decree in 2017. Problems faced by the community include poor residential conditions, substandard road networks, the lack of clean water, which relies on communal wells, poorly maintained drainage systems, the absence of waste management facilities, the continued lack of proper drainage and the lack of hydrants in the area. The purpose of this study was to identify infrastructure improvements in slum areas. The research method used was a qualitative descriptive method with field observations, interviews with RT RW and local residents. The results indicate the need for infrastructure improvements, such as repairing and paving neighborhood roads, improving drainage, installing trash bins, improving communal water facilities, improving sanitation, providing fire protection facilities, and providing green open space.

1. Introduction

Rumbai District is a sub-district in Pekanbaru City, consisting of 63 neighborhood units (RW) and 252 neighborhood units (RT). The area of Rumbai District is 128.85 square kilometers. Rumbai District has several sub-districts identified as slums, namely Palas, Rumbai Bukit, Muara Fajar, Umban Sari, and Sri Meranti. However, Sri Meranti Village was included in the Pekanbaru City Slum Decree in 2017. Problems faced by the community include poor residential conditions, substandard road networks, the lack of clean water, which relies on communal wells, poorly maintained drainage systems, the absence of waste management facilities, the continued lack of proper drainage and the lack of hydrants in the area. These conditions undoubtedly impact the quantity and quality of housing and even contribute to the growth of slums. In terms of socio-cultural structure, communities living in slum areas are generally economically disadvantaged and low-income [1]. Uncontrolled slums can cause various problems for a city [2]. The slum studied in this research is in Sri Meranti Village. The purpose of this study is to identify infrastructure improvements in Sri Meranti Village.

2. Research Methods

This research is a qualitative descriptive study. Descriptive methods are used to describe independent variables, either one or more (stand-alone variables without making comparisons or comparing the variable with other variables) [3].

Primary data collection was conducted through field observations and interviews with government officials, starting from the Housing and Settlement Agency in Sri Meranti Village, down to the neighborhood unit (RT/RW) level, as well as with the community living in the slum area of Sri Meranti Village.

3. Results and Discussion

3.1 Neighborhood road service coverage and road surface condition

The coverage of neighborhood road services can be seen from two indicators: the need for connectivity between housing units within a regional settlement and the need for connectivity between roads within housing units within a regional area. A field survey revealed that within the slum areas of Sri Meranti Village, there are 130 meters of neighborhood roads not served by the neighborhood road network.



Figure 1. Condition of environmental road service coverage

The quality of neighborhood road surfaces is the condition of the existing neighborhood road pavement types in Sri Meranti Village. Based on the results of observations, the quality of neighborhood roads in Sri Meranti Village is cemented, but there are still neighborhood roads with unpaved dirt surfaces. The neighborhood road surface with cemented and dirt pavement types is damaged, with a length of 1,185 meters.



Figure 2. Environmental road surface quality condition

3.2 Drinking water

Access to safe drinking water is defined as the community's access to a drinking water distribution network that meets drinking water health standards, which include physical, microbiological, and chemical requirements. Observations at the study site revealed that the availability of safe drinking water is suboptimal because not all residents have access to safe drinking water. This is because the water quality does not meet health standards, with 110 households experiencing odor, color, and cloudiness. However, the majority of residents have access to safe drinking water.



Figure 3. Drinking water source

Generally, residents in the study area use drilled wells as their source of clean water for bathing and washing. For drinking water, some residents purchase gallons of water, while others boil water from drilled wells. Currently, there is one communal clean water source in the planning area that can be shared, although it does not yet meet the drinking water needs of the study site.

3.3 Environmental drainage

Environmental drainage that is unable to drain rainwater runoff will cause flooding. Observations show that many drainage channels in the Sri Meranti Village area are poorly maintained. The existing drainage channels are unable to fully drain runoff due to blockages caused by narrowing of the channels, accumulation of garbage, stagnant water flow, and sedimentation. This results in an area affected by flooding of 0.93 hectares.



Figure 4. Drainage incapable of draining water runoff

3.4 Wastewater management

The wastewater management system does not comply with technical standards if the wastewater management conditions in residential or residential areas do not have an adequate wastewater system, as seen from the toilets/closets connected to septic tanks, whether individual/domestic, communal, or centralized. Wastewater management infrastructure and facilities do not meet technical requirements if the condition of the wastewater management infrastructure and facilities in housing or settlements, where the gooseneck toilet is not connected to a septic tank, and where there is no on-site or centralized waste treatment system, is lacking.

3.5 Waste management

Waste management infrastructure and facilities do not meet technical requirements if the waste infrastructure and facilities, consisting of waste bins and waste sorting at the domestic or household level, are not met. Waste collection sites (TPS) or 3R (Reduce, Reuse, Recycle) TPS at the neighborhood level, garbage carts and/or garbage trucks at the neighborhood level, and integrated waste processing facilities (TPST) at the neighborhood level.

Based on field observations, the condition of waste infrastructure and facilities at the study site does not meet technical requirements. There are no waste bins with waste sorting at the domestic or household level, only one TPS available in the study area, no 3R (Reduce, Reuse, Recycle) TPS, only a garbage truck at the neighborhood level, and no integrated waste processing facilities (TPST) at the study site. The total number of households with facilities and infrastructure that do not meet technical standards, namely the lack of waste bins with waste sorting at the domestic or household level, is 298 households.



Figure 5. Waste condition

3.6 Improving the quality of infrastructure in the Sri Meranti Urban Village Slum Area

The plan to improve the quality of infrastructure in the slum area includes plans for improving the quality of road infrastructure, drainage, waste management, clean water, and sanitation.

3.6.1 Improving the quality of road network infrastructure

Road damage is indicated by changes in the shape of the road surface [4]. The plan to improve the quality of road infrastructure depends on the condition of the existing road network. For unpaved roads, road quality improvement is achieved through paving/casting (cementing). For damaged pavement, road repairs can be carried out in the form of pavement overlays. In the Sri Meranti Urban Village slum area, the maximum width of road management is 2.5 meters and the minimum width is 1.5 meters.

3.6.2 Improving the quality of environmental drainage infrastructure

Drainage is a curve or water channel on the surface or underground, either naturally formed or man-made. [5] The plan to improve the quality of environmental drainage infrastructure will involve the construction of drainage on both the right and left sides of roads, as several roads in the slum areas of Sri Meranti Village still lack drainage. The planned drainage width is between 0.4 and 1 meter.

3.6.3 Improving the quality of waste infrastructure

The waste management concept is implemented at two scales: Individual-scale management, which involves processing directly at the source (households/offices) by waste producers. In addition to the waste infrastructure mentioned above, consideration should also be given to providing waste management infrastructure at the Waste Management Site (TPST), which is a waste disposal site (TPS) integrated with integrated waste processing, such as large-scale composting.

3.6.4 Improving the quality of clean water and sanitation infrastructure

Wastewater management, including environmental sanitation programs, aims to improve public health and prevent environmental pollution caused by uncontrolled wastewater

disposal. The wastewater disposal system in the planning area is currently individual and lacks a piped wastewater distribution network or wastewater treatment plant (WWTP). Household waste disposal is not separated and is still directly connected to the local drainage system, potentially polluting the environment. However, based on field data, the majority of residents have their own toilets and septic tanks for their sanitation needs. However, improved planning is still needed considering the future population growth. System planning is necessary to prevent environmental pollution. Several technical criteria used to estimate future waste production are as follows:

- Domestic waste production is predicted to account for approximately 80% of the daily clean water requirement per person. The increase in the volume and quantity of liquid waste correlates with population growth.
- Provision of communal toilets in specific locations deemed necessary, such as public facilities measuring $1.5 \times 3 \text{ m} = 4.5 \text{ m}^2$.

In general, there are no serious problems with clean water infrastructure in the slum areas of Sri Meranti Village. Residents use drilled wells collectively or individually to obtain clean water, and several neighborhood units (RTs) already have communal clean water. The proposed provision of communal clean water and sanitation facilities in the slum areas of Sri Meranti Village can be directed at public facility locations. Therefore, consideration should be given to the provision of collective clean water tanks, which are also integrated with collective public toilets at these locations.

4. Conclusions

The plan to improve the quality of environmental road infrastructure depends on the condition of the existing road network. On the dirt road network, it is done by improving the quality of the road with paving/casting (cementing). And on the damaged pavement road network, it can be done by road repairs in the form of road pavement coating, drainage construction both on the right and left sides of the road, because there are still some road sections in the slum area of Sri Meranti Village that do not have environmental drainage. The planned width of the environmental drainage dimension is between 0.4 to 1 meter, the provision of communal containers, waste collection equipment and TPS, the provision of IPAL is very much needed.

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