Case Study

Study of Patterns to Handling Slum Settlement Areas Based on Residential Facilities and Infrastructure
Case Study: Bandar Rahmat Village, Batubara Regency

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ABSTRACT

The problem of slum settlements is one of the problems faced by almost all developing countries in the world. One of the international agendas that discusses slum settlements is NUA (*New Urban Agenda)* that supports goals and objectives then implementation of *Sustainable Development Goal*s (SDGs) which include 17 Sustainable Development Goals up to 2030 including the handling and development of slum settlements.

In Indonesia, there are several programs for dealing with slums, including the KOTAKU program which is one of the strategic efforts of the Directorate General of Human Settlements and one of the districts that launched a slum handling program, namely Batubara Regency, including those located in Bandar Rahmat Village, mostly area is in the coastal area. Spread of housing with inadequate conditions and irregularity of buildings and the lack of environmental infrastructure are the main problems. Seeing the complexity of the existing problems, it is necessary to conduct a research study on residential areas which will then be formulated in a strategic plan for handling slums and prioritizing the provision of facilities and infrastructure to improve environmental quality in Bandar Rahmat Village area.

This research was conducted with the aim of identifying the factors causing slums and knowing the condition of the facilities and infrastructure in Bandar Rahmat Village. The scope of this research material covers residential areas in Bandar RahmatVillage with the main objects as indicators of slums, namely buildings/houses, environmental roads, drinking water supply, environmental drainage, waste water management, waste management and fire protection.

The research method that will be used in this study is descriptive research, using a qualitative approach. This research will describe the conditions related to the condition of slum settlements which are expected to provide answers in the study of characteristics and determine the level of slums in the residential area of Bandar Rahmat Village in producing appropriate handling strategies based on minimum service standards for settlement facilities and infrastructure that apply in Indonesia.

Keywords: Slums Settlements, Coastal Settlements, Facilities and Infrastructure.

INTRODUCTION

Slum settlement is one of the problems faced by almost all developing countries in the world. And there have been many international agendas discussing slum settlements, one of which is NUA (*New Urban Agenda)* NUA which is an affirmation of global commitment in sustainable urban and settlement development that supports goals and objectives then implementation of *Sustainable Development Goal*s (SDGs) which include 17 Sustainable Development Goals up to 2030 including the handling and development of slum settlements.

In addition, there have been many studies discussing the development of slums, including the journal "Slum Upgrading and Health Equity" by Alice Sverdlik and Jason Corburn in 2016 and the journal; "Slum Upgrading: Can the 1.5 °C Carbon Reduction Work with SDGs in these Settlements?" by Zafu Assefa Teferi and Peter Newman in 2014 about the effect of developing slum areas on reducing carbon gas levels in urban areas. And there is the journal "Slum Settlement Level Analysis Using AHP Method Based on GIS in Magelang City" by Silvia Yolanda Sastanti and CharitasFibriani from Univeritas Kristen Satya Wacana.

In Indonesia, there are several programs for handling slums, including the KOTAKU program, which is one of the strategic efforts of the Directorate General of Human Settlements in accelerating the handling of slums, including handling post-disaster conditions. And in Indonesia, slum settlements often occur in coastal settlement areas considering that Indonesia is a country that has a long coastline. Wesnawa (1993) argued that in the development of settlements in coastal areas developed increasingly dense and disorderly. Most of the housing conditions of coastal communities are in the uninhabitable category with settlement facilities and infrastructure that do not accordance the standards and tend to be slums.

And this is also experienced by Bandar Rahmat Village, which most of its territory is in the coastal area of Kec. TanjungTiram, Batu Bara Regency. Bandar Rahmat Village is a village where the majority of the population are fishermen. The spread of housing with unsuitable conditions and irregularity of buildings and the lack of environmental infrastructure are the main problems experienced by Bandar Rahmat Village.

LITERATURE REVIEW

Kurniasih (2007), explained that slum areas are areas where the housing and residential conditions of the people in the area are very poor. The existing houses or facilities and infrastructure are not in accordance with applicable standards, including the standard of needs, building density, healthy housing requirements, the need for clean water facilities, sanitation and requirements for completeness of road infrastructure, open spaces, and other social facilities.

According to Arawinda Nawagamuwa and Nils Viking (2003:3-5) the causes of slum settlements are:

1. The character of building is the age of building that is too old, not organized, ventilation, lighting and sanitation that do not meet the requirements,
2. The environmental character is that there is no open space (green open space) and no facilities for family recreation, high population density, poorly planned infrastructure.

According to WALHI (2008), Indonesian fishermen's settlements generally have problems, namely the low level of welfare of coastal people and environmental quality. The level of community welfare which is quite low is shown from the distribution of underdeveloped areas that have many coastal areas. One of the reasons is the lack of infrastructure and supporting facilities in the marine and fisheries sector. Meanwhile, the low quality of the environment in the fishermen's settlements is due to the lack of basic infrastructure and facilities which have an impact on low productivity.

Infrastructure according to Law Number 1 of 2011 concerning Housing and Settlement Areas is the basic physical completeness of a residential environment that meets certain fulfillment standards for the needs of a decent, healthy, safe and comfortable place to live. Meanwhile, facilities are facilities in a residential area that function to support the implementation and development of social, cultural and economic life.

Fishermen settlement facilities and infrastructure quoted from Patandianan and Toban in Darmiwati (2011) include health

facilities, educational facilities, trade facilities, social facilities, sports venues and places for managing marine products such as drying, fishing nets and fish auctions. Meanwhile, the infrastructure includes piers, boat moorings, breakwater embankments, electricity networks, road networks, bridges, clean water networks, drainage and waste.

METHODS

The research method used in this study is descriptive research, using a qualitative approach. This research will describe the conditions related to the condition of slum settlements which are expected to provide answers in the study of characteristics and determine the level of slums in the residential area of Bandar Rahmat Village in determining the appropriate pattern of handling based on the minimum service standards of fishing settlement facilities and infrastructure.

RESULT AND DISCUSSION

Bandar RahmatVillage is located in a coastal area where most of the population make a living as fishermen. The area of Bandar Rahmat village is +110 ha. Consisting of 6 hamlets with a population of 1,782 people or 456 families. Research data in the form of area maps is needed as a means of analyzing and processing spatially and primary data in the form of survey results from field observations on the condition of settlement facilities and infrastructure and measuring the level of slums.
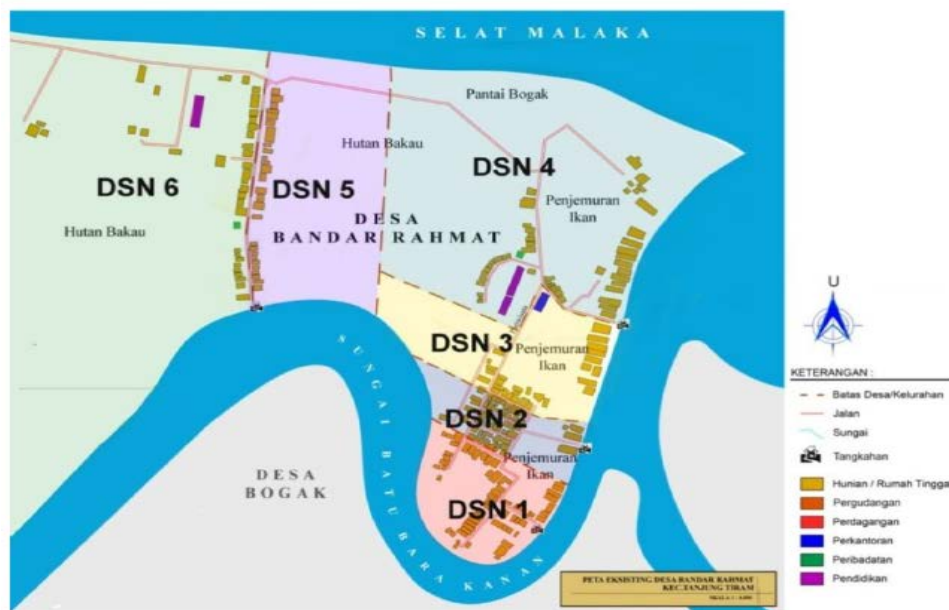

Figure 1: Existing Map of Bandar Rahmat Village

Condition of Facilities and Infrastructure

Based on the results of interviews and direct observations, it can be seen that the condition of the facilities and infrastructure of Bandar Rahmat Village are largely not up to standard. Quoted from Patandianan and Toban in Darmiwati (2011), fisherman settlement facilities and infrastructure include health facilities, educational facilities, trading facilities, social facilities, sports venues and places for managing marine products such as drying, netting and fish auctions. Meanwhile, the infrastructure includes piers, boat moorings, breakwater embankments, electricity networks, road networks, bridges, clean water networks, drainage and waste.

Table 1: Condition of Settlement Facilities and Infrastructure of Bandar Rahmat Village
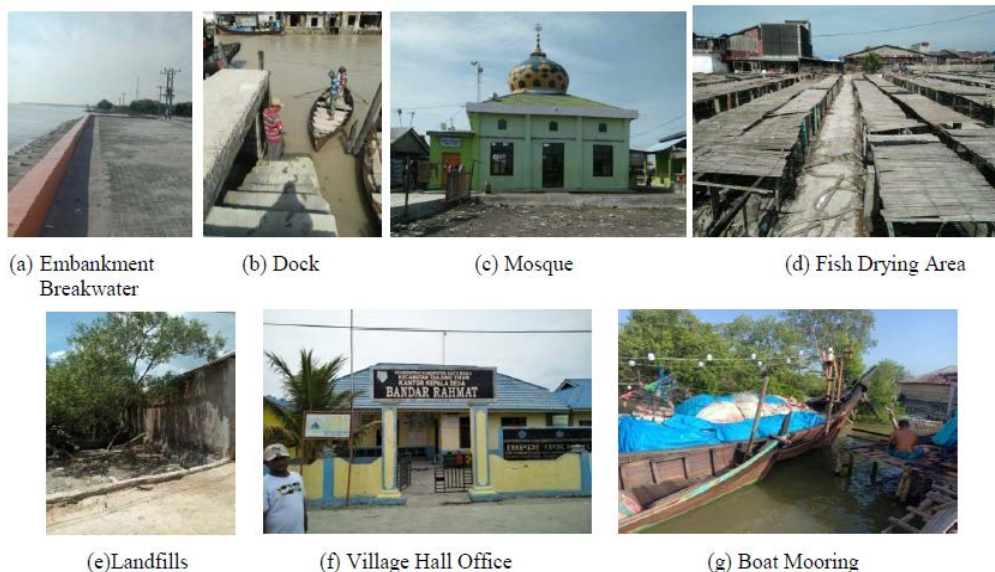
Nu	Types of Facilities and Infrastructure	Explanation
I.	**Facilities**	
1.	Health Facility	There is not any.
2.	Education Facility	Educational facilities are only 2 state elementary schools.
3.	Trading Facility	Trading facilities are only in the form of small stalls in residents' houses.
4.	Social Facility	Social facilities in the form of houses of worship, namely 2 mosques and 2 mushollahs. There is a Village Hall office as a service facility.
5.	Playground/Sports	There is not any.
6.	Fish Drying Place, Making Nets and Fish Auction	There are several areas that are used as a place for drying fish. There are also residents' houses which are used as fish storage warehouses and nets.
II.	**Infrastructures**	
1.	Dock	There are 3 tangkahan places for fishing boats to dock.
2.	Boat Mooring	Boat moorings are located along the banks of the Batu Bara Kanan River which empties into the sea.
3.	Embankment Breakwater	There is an embankment that breaks the sea water to the north of Bunga Beach.
4.	Power Grid	Power grid in the area of Bandar Rahmat Village is adequate. All residents' houses have been supplied with electricity.
5.	Road Network	The roads in the Bandar Rahmat Village area are adequate. All residents' houses have been provided with road access, although not yet in good condition.
6.	Bridge	There are 3 small bridges in the form of concrete bridges that connect District 3 and District 4 to Bunga Beach area.

Looking at the table data above, the existing facilities are educational facilities in the form of 2 State Elementary Schools located in Hamlets 4 and 6, social facilities, namely places of worship in the form of 2 mosques and 2 prayer rooms as well as 1 Village Hall office in District 3 and facilities for the location of a drying area. fish in District 2, 3 and 4. For facilities that have not been fulfilled, namely health facilities and places to play/sports.

While the existing infrastructure is 3 main docks where ships dock to Bandar Rahmat village. The boat mooring area is located along the banks of Batu Bara Kanan river or in front of people's houses which are used as fish storage warehouses and net making. There is a sea water embankment breakwater on the north side of Bandar Rahmat Village beach.

The existing electricity network in Bandar Rahmat Village area has reached the entire district area. All of the residents' houses have also been provided with road access, although not yet in good condition. For the clean water network, there is 1 source of water in the form of groundwater drills in each district which is then channeled to residents' houses. There are also garbage bins in each district which are used as a place to collect waste from residents' houses before being transported to final disposal.

(a) Embankment Breakwater (b) Dock (c) Mosque (d) Fish Drying Area

(e) Landfills (f) Village Hall Office (g) Boat Mooring

Figure 2: Facilities and Infrastructure in Bandar Rahmat Village

Slum Level Measurement

In determining the identification of slum areas, it is done by determining the priority of the criteria that affect slums using seven slum indicators. Identification of slums is carried out based on the definition of slum settlements, as well as the minimum service standards required nationally based on several indicators (Directorate of Settlement Area Development, 2016), namely: Building Conditions, Road Environmental Conditions, Drinking Water Supply Conditions, Environmental Drainage Conditions, Wastewater Management Conditions, Waste Management Conditions and Fire Protection Conditions in Bandar Rahmat Village.

▪ Scoring of each sub-indicator, based on the assessment parameters:
– Good Quality (0% - 25%):
Score 0
– Fairly Good Quality (26% - 50%):
Score 1
– Poor Quality (51% - 75%):
Score 3
– Very Poor Quality (76% - 100%):

Score 5

▪ Calculation of the total assessment of each indicator is approached by using the following formula:

$$Si = \frac{\sum Bi}{\sum P}$$

Explanation:
Si   : Total Score on Each Indicator.
Bi   : Sub Indicator Score.
P   : Number of Sub Indicators.

▪ The classification of each indicator is approached using the middle range between each score in the rating scale. This is intended to determine the quality of each indicator related to the analysis for handling the identification of slum settlements. So that the classification value obtained for each class is:
– Level 1 (Good Quality):
0 – 0,5
– Level 2 (Fairly Good Quality):
0,51 – 2,0
– Level 3 (Poor Quality):
2,01 – 4,0
– Level 4 (Very Poor Quality):
4,01 – 5,0

Table 2: Slum Indicator Value of Bandar Rahmat Village

Nu	Indicator	Total Value	Explanation
1	Residential House Condition	3,51	Poor Quality
2	Environmental Road Condition	0,91	Good Quality
3	Drinking Water Supply Condition	2,00	Fairly Good Quality
4	Environmental Drainage Condition	5,00	Very Poor Quality
5	Wastewater Management Condition	4,88	Very Poor Quality
6	Waste Management Condition	2,15	Poor Quality
7	Fire Protection Condition	2,50	Poor Quality

Slum Level Classification

The classification of the level of slums in each district is taken from the results of the scoring of each indicator then the scores of 7 indicators are added up to determine the classification of the level of slums. The classification of the level of slums is divided into 4 criteria by using an interval of 8.75 for each criterion in the rating scale. This is intended to determine the classification of the level of slums in each district based on the analysis of the assessment that has been done previously. So that the classification value is obtained for each district, namely:

Table 3: Slum Classification of Each District

District	Total Value	Classification Level
01	20,70	Medium Slums
02	20,50	Medium Slums
03	26,80	Heavy Slums
04	27,60	Heavy Slums
05	22,60	Medium Slums
06	23,30	Medium Slums

The table above shows that District 1,2.5 and 6 have a medium slum area classification. District 3 and 4 have a classification level of heavy slums. From the average total value obtained from 6 districts, which is 23.58, it shows that Bandar Rahmat Village is included in the "Medium Slum Area" category with the biggest causes of slums, namely

environmental drainage conditions, waste water management conditions and the conditions of people's houses.

Table 4: Indicators of Causes of Slums Related to Settlement Facilities and Infrastructure

District	Causes of Slums Based on Minimum Standards of Facilities and Infrastructure in Fishermen's Settlements
01	Drainage
02	Drainage
03	Drainage, Garbage
04	Drainage, Garbage
05	Drainage
06	Drainage

Based on the calculation of the level of slums in each district, the indicators for the cause of the highest slums related to the minimum standard of facilities and infrastructure in fishermen's settlements are determined, namely:

Slums Handling Pattern

Based on the results of the classification of the level of slums and the identification of the legality of the land in each hamlet, a plan for the handling pattern for each slum area in Bandar Rahmat Village is generate, namely:

Table 4: Indicators of Causes of Slums Related to Settlement Facilities and Infrastructure

District	Number of House Units	Land Status		Slum Level	Handling Pattern Planning
		Legal	Illegal		
01	66	66	-	Medium	Renovation
02	55	55	-	Medium	Renovation
03	66	66	-	Heavy	Renovation
04	52	52	-	Heavy	Renovation
05	56	56	-	Medium	Renovation
06	50	50	-	Medium	Renovation

CONCLUSION

Based on the results of the calculation of the level of slums and the identification of the condition of the fishermen's settlement facilities and infrastructure, the conclusions are as follows:

− Based on the geographical location, the settlements of Bandar Rahmat Village residents are categorized as slums which have 2 typologies of settlements, namely slum settlements on the water's edge and slum settlements on the water.

− Based on 7 indicators measuring the level of slums, the highest causes of slums in Bandar Rahmat Village are indicators of drainage conditions, waste water management and the condition of residents' houses.

− Improving the quality of facilities and infrastructure for settlements in Bandar Rahmat Village can reduce the level of slums because there are 2 dominant indicators that cause slums which are part of the infrastructure of fishermen's settlements, namely drainage and garbage with conditions still in the category of poor quality.

− From the results of the determination of the level of slums and the legal status of residential land, it is obtained that the planning of the pattern of handling slums in each district is in the form of renovation.

From these conclusions, the suggestions that can be given are to prioritize the rejuvenation of settlement infrastructure in the form of waste water management, waste management and the construction of environmental channel drainage which is one of the basic components of the minimum standard of fisherman settlement facilities and infrastructure in accordance with the technical requirements in the village development plan because it This has a direct impact on improving the quality of life and decreasing the level of slums in Bandar Rahmat Village.

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