

## Environmental Characteristics of Slum Settlements in Batang Arau Village of Padang City

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### Abstract

In order to comprehend the problems of slums comprehensively, knowledge of the environmental characteristics of slums is needed based on the classification of aspects of facilities, infrastructure, social, economic, and disaster (hazard). This study aims to understand the characteristics of the environment in the form of infrastructure, social, economic, and slum disasters in the Batang Arau Village, Padang City. Primary data were obtained through field observations and interviews with 80 informants, while secondary data obtained from related documents and regulations. The physical condition of the area is that the regularity of residential buildings is only 102 units of households with the level of regularity of buildings, only 0.26%. The level of residential building density of 522.36 units / Ha, with the feasibility of residential buildings, is only 0.76%. Accessibility following technical requirements is only 0.40%. The condition of the drainage network that meets the minimum quality standard is 0.19%. The number of houses served with water facilities for basic needs of 0.58% with the fulfillment of 0.47%. The percentage of family latrines according to technical requirements of 0.41%, and the amount of domestic household waste that is transported at least twice a week is 49%. Socially, the number of people by sex is almost the same, with the distribution of the productive age of the population of 69.32% of the total population, the level of education varies but in general is high school education, and the most dominant ethnic group in this area is the Minangkabau. From an economic aspect, people's income varies, with work predominantly being fishermen and trade/services. This area is located on a hillside, making it prone to landslides, and due to dense houses, this area is also prone to fires.

### Keywords

Environmental Characteristics, Slum Area, Batang Arau Village, Padang City

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## 1. INTRODUCTION

Slum settlement is a condition of the environment of a residential area with a very uninhabitable quality characterized by very high building density, minimal area, prone to social and environmental ailments, deficient quality building, unsatisfied environmental infrastructure, and even invites danger to the sustainability of life and the livelihoods of its inhabitants (Budiharjo, 2005). Slum housing will have an impact on the decline in the quality of the function of residential areas as a place to live.

The occurrence of slum areas due to the growth of houses that do not have a building permit, the status of land that is not self-ownership, and the building built on land that not intended for housing and settlements. Law No. 1 of 2011 stated that slums are caused by irregularities in buildings, high levels of building density, quality of buildings that

do not meet the requirements, and the unavailability of adequate facilities, and infrastructure.

In the slums, the house requirements as a place to live for individuals or family gathering places do not meet decent living standards and comfortable places to live, rest, and as a means of fostering a healthy and happy family for its inhabitants. Indeed, the function of the house is not only as a place to shelter from climate disturbances, and other living things, but the essence of the home is also a place for a healthy, happy, and prosperous human life.

In Indonesia, the state has determined that every citizen has the right to occupy and or enjoy and or have a decent home in a healthy, safe, harmonious, and orderly environment (Government, 2011). Construction of a house can be done by building its self, renting, buying (in cash or installments), grants, or in other ways under applicable

laws and regulations.

In addition to meeting the physical construction standards for housing, it is also necessary to meet the infrastructure supporting activities in housing, such as the availability of facilities and accessibility for environmental security, sewerage, road facilities, electricity networks, telephone networks, and others (Komarudin, 1997). In the condition that infrastructure facilities not fulfilled, slum areas will emerge, and those areas that usually not planned as housing or settlement areas, including waterfront areas, riverbanks, disaster-prone areas, and or railroad boundaries.

The problem of the slum is currently one of the problems that must be addressed immediately, which is generally faced by big cities in Indonesia, including Padang City as the capital of West Sumatra Province. Delay in handling urban slums will make the condition of the area worse so that it will also affect the quality of life and the future of the people living in the area.

In connection with these matters, sufficient knowledge is needed about the characteristics of slums, so that the causes and consequences of slum areas can be understood. Environmental characteristics of slum areas are based on the classification of aspects of facilities and infrastructure, social, economic, physical, and disaster (hazard). The goal is to find a solution to overcome them. Besides, the results of this study can also be used as a result of a mapping study of slum problems and serve as a guideline or be of concern to development planners and implementers to prevent slums in other locations.

## 2. EXPERIMENTAL SECTION

### 2.1 Type of Study

This research is a qualitative descriptive study because it will describe the characteristics of housing and settlement areas, explain the relationship between the slum characters found and formulate solutions to solve and overcome the problems of slums in the area of study. By its objectives, this study will provide an overview of the slums of the residential areas under study, explain the root causes of slum problems, and find solutions or solutions to overcome slums in the future.

### 2.2 Location and Schedules

The research will be carried out in Batang Arau, as one of the slums with a total area of 16.71 hectares of slums. Batang Arau Urban Village, located in the District of South Padang, consisting of 19 RTs spread over four (4) RWs in Batang Arau Urban Village, with a height of 5-10 m above sea level and has an area of 91 Ha. The total population of Batang Arau in 2016 was 4,431 people, with a total of 1,210 households.

Based on the data above, it can be seen that the distribution of this research location is quite a lot. Therefore a purposive technique is used to take location samples. The considerations of location sampling include 1) RT that has

a high enough threat of disaster conditions as seen from the topography of the place of residence; 2) the level of environmental slums in the neighborhood association (RT) area; 3) availability of interviewed informants. Through these considerations, the location of this study was carried out in eight RT areas namely RT 1 / RW 1, RT 2 / RW2, RT 4 / RW 1, RT 2 / RW 2, RT3 / RW 2, RT 3 / RW 3, RT 4 / RW 3, RT 5 / RW 3 in Batang Harau Kelurahan. The research period is 7 months, starting in May 2019 until November 2019.

### 2.3 Data and Sources

The type of research data is qualitative and quantitative data in the form of primary and secondary data. Primary data are sourced from direct observations, or in the form of information from key informants and households in slum areas. The number of key informants used in this study was eight people who came from the head of the RT and community leaders. Eighties respondents spread over eight RTs to fulfill the data over the research location. The technique used to determine informants and respondents is a purposive technique. The amount is estimated to be sufficient for the type of qualitative research selected. Secondary data obtained from reports from relevant technical agencies, the government at the Padang City, and Village levels.

Primary data includes physical aspects, including seven slum indicators in the form of building conditions, environmental road conditions, environmental drainage conditions, drinking water supply conditions, wastewater management conditions, waste management conditions, fire safety conditions. Besides the non-physical aspects of the strategic value of the location and socio-economic potential, as well as aspects of land legality in the form of land status, building status and suitability of the location with the city spatial.

Secondary data includes the physical condition of the region, which includes geographical location, topographical conditions, and slope, and land use patterns in the research location. Moreover, demographic data such as population, population by sex, population density, number of families located in the slum area studied, and the availability of facilities and infrastructure in the slum area under study. Furthermore, numerical data of seven slum indicators are also needed. The building conditions, environmental road conditions, environmental drainage conditions, drinking water supply conditions, wastewater management conditions, waste management conditions, fire safety conditions, and data on the number of buildings that have legal and illegal land status or squatters.

### 2.4 Method and Data Collection

The data collection method uses the method of open interview and direct observation or observation of field conditions to obtain primary data. Secondary data obtained by studying the documents or regulations that apply to the housing and settlements in Padang City.

**Table 1.** Condition of Residential Buildings in the Slum Area of Batang Arau Village

Variable/Indicator	Unit	Value
1. The regularity of residential buildings		
Amount of Regularity of Residential Buildings	Buildings	102
Regularity of Residential Buildings	Percentage (%)	0.26
2. The residential building density		
Area of settlement	Ha	8.25
Total number of buildings	Number	391
Building density level	Number/Ha	522.36
The area with high density	Ha	-
3. The residential building feasibility		
The residential building has a floor area of $\geq 7.2$ m <sup>2</sup> per person	Percentage (%)	0.76
Residential buildings have roof, floor, wall conditions according to technical requirements	Percentage (%)	0.67

**Figure 1.** Padang Selatan District in Padang City Administrative Map

The instrument used for the interview was a list of un-structured and structured questions, portrait tools, and interview recording tools, while secondary data as reports and documents both in hard copy and soft copy.

### 2.5 Data Analysis

As a study that classified as a type of qualitative descriptive research, the data analysis uses qualitative analysis methods. Characteristics of slum housing and settlement areas analyzed qualitatively based on aspects of physical, economic, social, and disaster facilities (hazards) found in slums in Batang Arau Village. The slum criteria follow the criteria set by Ministry of Public Work and Housing namely Permen PU No. 2 of 2018 (PUPR, 2018).

## 3. RESULTS AND DISCUSSION

### 3.1 General Condition of Batang Arau Village

Batang Arau Urban Village is part of the administrative area of Padang Selatan District, Padang City. The position of the District of South Padang showed in Figure 1.

The area of Batang Arau is 0.34 Km<sup>2</sup> out of the total area of Padang Selatan District, which is 10.03 Km<sup>2</sup>. Batang Arau, based on the level of development, is classified into self-sufficient villages. The number of citizen association (RW) in this village is 4 units and RT are 19 units [5].

The total population in the Batang Arau Village is 4,391 inhabitants divided by gender, 2,205 male, and 2,186 female. The population has decreased from the previous year, so the percentage of population growth is at -0.45%. According to the age grouping, the population aged 0-14 years was 1,162 people, aged 15-64 as many as 3,044, and aged 65+ as many as 185 people. This data means that the population in Batang Arau is at the age of students and productive (BPS, 2018).

For educational infrastructure, there are one kindergarten and two elementary schools. The health infrastructure in the Batang Arau Village is one auxiliary health center (Pustu) and ten integrated healthcare center (Posyandu). The total number of worship facilities available in Batang Arau is four mosques (BPS, 2018).

### 3.2 Environmental Characteristics of Slums in Batang Arau Village

#### 3.2.1 Characteristic of Infrastructure and Facilities

Batang Arau Village located along the Batang Arau River, which ends in the Muara City of Padang. As a slum area determined by the Padang City government, of course, there are many aspects to its assessment. One aspect used by the Padang City government is facilities and infrastructure.

The availability of complete supporting facilities and infrastructure in an area can improve the quality of the environment, and vice versa at the time when the limited supporting facilities and infrastructure in a residential envi-

**Table 2.** Conditions of Environmental Accessibility in Slum Areas of Batang Arau Village

Indicator	Percentage
The total length of the existing Environmental Road Network	49.7
The length of the environmental road with a width of > 1.5 meters	48.58
The length of the environmental road is > 1.5 meters wide with a hardened surface	54.45
Length of needs New existing roads outside existing to serve settlements, including links to the urban road system.	45.59
Length of new road requirements outside existing to serve settlements, including connections to the urban road system.	58.68
The total length of the Ideal Neighborhood Road Network	48.84
Coverage of the Environmental Road Network	0.83
The length of the environmental road with a width of ≥ 1.5 meters whose surface is hardened and not damaged	44.68
The length of the environmental road with a width of ≥ 1.5 meters whose surface is ground (not hardened) and not damaged	-
The length of the environmental road with a width of <1.5 meters whose surface is hardened and not damaged	63.14
The length of the environmental road with width <1.5 meters whose surface is ground (not hardened) and not damaged	-
The length of the environmental road with a width of ≥ 1.5 meters with drainage beside of the road	47.46
The length of the environmental road with a width of <1.5 meters which is equipped with drainage beside of the road	100
The total length of environmental roads whose surface is not damaged	47.87
Roads that Fit Technical Requirements	0.4

**Table 3.** Add caption

Indicator	Percentage
An extensive residential area that does not experience standing water/floods	1
Length of settlement drainage from the entire drainage network.	0.43
Drainage length of the existing drainage link with the city drainage system	0.17
Long drainage that is clean and does not smell	0.01
Drainage network conditions that meet minimum quality standards	0.19

ronment can cause slums (Oktaviansyah, 2012). The statement was emphasized in Law No. 1 of 2011 concerning Housing and Settlement Areas, that slums occur because the quality of facilities and infrastructure does not meet the requirements. Limited housing facilities and infrastructure such as clean water, sanitation (latrines), waste manage-

ment systems, rainwater drainage, are the cause of slum environments in a residential area (Hariyanto and Tukidi, 2007).

**Table 4.** Condition of Drinking Water Services in the Slum Area of Batang Arau Village

Indicator	Percentage
Number of houses served Drinking water for drinking, bathing, and washing (adequately protected piping or non-piped)	0.58
Number of houses fulfilled drinking water, bathing, washing needs (minimum 60 liters/person/day)	0.47

In connection with the concept and theory of supporting facilities and infrastructure support in a residential area, it is necessary to describe the conditions that exist in the slum area of Batang Arau. An overview of community residential buildings in this area can be seen in Table 1.

Data Table 1 shows that the total regularity of residen-

**Table 5.** Condition of Wastewater Management in Slum Areas of Batang Arau Village

Indicator	Percentage
Percentage of the community has access to family toilet / shared toilet (5 households/latrines)	0.74
Percentage of family latrines / shared latrines according to technical requirements (having a gooseneck toilet connected to a septic tank)	0.41
Separate household sewerage from the environment	-

**Table 6.** Condition of Solid Waste Management in Slum Areas of Batang Arau District

Indicator	Percentage
Solid Waste Infrastructure and Facilities under Technical requirements	0.75
The amount of domestic household waste in the residential area is transported to the transfer station/ final disposal site at least twice a week.	0.49
Percentage of solid waste infrastructure & facilities with good construction conditions/ not damaged (maintained)	-

tial buildings in the study focus area was only 102 household units, or the overall level of regularity of buildings was only 0.26%. This condition shows the very low regularity of residential buildings in the slum area of Batang Arau. In terms of residential building density, this area is quite dense. It found 522.36 units/Ha the level of density of residential buildings in this area. The feasibility of residential buildings in this area is also very low, amounting to 0.76% of the buildings that have a floor area of 7.2 m<sup>2</sup> per person. Residential buildings have a roof, floor, and wall conditions according to technical requirements of only 0.67%.

Environmental accessibility is also an indicator that measures the condition of facilities and infrastructure in slums. An overview of the conditions of environmental accessibility in the focus areas of the study can be seen in Table 2.

The condition of environmental roads for the accessibility of residents in this area is quite diverse, there are few roads that can be passed by 4-wheeled vehicles and many roads that can be passed by 2-wheeled vehicles only.

The condition of other facilities and infrastructures is tertiary drainage. The drainage functions to drain or divert water or to control groundwater quality for sanitation. The drainage conditions in the focus area of the study can be seen in Table 3.

**Table 7.** Community Social Conditions in the Slum Areas of Batang Arau Village

Variable / Indicator	Number	Category
1. Gender	(%)	
Male	50.22	
Female	49.78	
2. Age		
0-14	26.46	
15-64	69.32	
≥65	4.21	
3. Education		
Primary school	5	
Junior high school	10	
Senior high school	75	
Undergraduate	10	
4. Tribes		
Minang		Many
Chinese		Medium
Nias		Medium
Batak		Little
Others		Little
5. Health		
Skin disease		Little
Respiratory disease		Little
Digestive ailments		Little

Data Table 3 shows that the drainage that is clean and odorless is only 0.01% of the total drainage available in this area. Besides, only 1.00% of the area was found to be free from flooding.

The availability of facilities and infrastructure for clean water or drinking water is one indicator used to assess the clean or slum area of a community settlement. Table 4 shows a description of the condition of drinking/clean water services in the Batang Arau area.

The average number of people served by improved drinking water facilities is only 0.58%, and the average percentage of people who can meet with a minimum of 60 liters/person/day of clean water is only 0.47%. The cleanliness of an environment can be seen from the availability of facilities and infrastructure for wastewater management. This condition can be seen through the data in Table 5.

From Table 5, it can be seen that only 0.74% of the population has access to family toilets / shared toilets (5 households/latrines). That is, not many of the residents in this area have private latrines in their homes. The condition of latrines following technical requirements, only 0.41% of the average owned by the community. One of the most astonishing facts is that none of the people in the community has a separate household wastewater drainage from the tertiary drainage channel.

The slum of an environment or community settlement

can also be measured by the availability of waste management facilities and infrastructure. Table 6 illustrates the conditions for waste management in the Batang Arau village community.

The data above shows that only 0.75% of the average value of waste management infrastructure and facilities is by technical requirements. Furthermore, only 0.49% of the average amount of community waste is transported to the transfer station/ final disposal site. There are no solid waste infrastructure & facilities found with good construction conditions/ not damaged (maintained).

### 3.2.2 Characteristic of Social Aspects

The social aspect is one of the main characteristics inherent in the residential environment. Likewise, there are slum areas. Table 7 shows the social conditions that exist in the study area.

Table 7 shows that the sex of the population in the slum settlement area of Batang Arau is almost equal between men and women. Judging from the age distribution of the population, most people are in the productive age, which is 69.32% of the total population. The level of community education in this area is quite diverse. However, in general, the community is at the level of high school education.

The people in Batang Arau are in a heterogeneous group. The most dominant tribe in this area is the Minangkabau. However, some people come from other tribes such as Chinese, Nias, Batak, and other ethnic groups.

Public health is also a component of the social aspect. There are several types of diseases caused by these environmental conditions. However, not many people are stricken with diseases caused by slum conditions. Based on the informant's statement, a small portion of the community did experience skin, respiratory, and digestive diseases.

### 3.2.3 Characteristic of Economic Aspects

Wijaya (2016) revealed that the economic conditions of communities in slum areas are at a low-income level. This statement is in line with the opinion of Alit (2015), who revealed that one of the characteristics of slum areas is the population in the area with low income and high unemployment.

Statements from the two sources are not much different from the economic conditions of the people in the Batang Arau Village. As many as 20% of the total respondents have low income or below the Padang City UMR. Around 70% of respondents have an income above the minimum wage but have not been able to meet the needs of the household fully, and about 10% of respondents who have an income above 4.56 million rupiah per month.

Referring to the statements of several informants in this study, the economic condition of the community is in the middle to lower category. Generally, people in this area have not been able to meet the needs of families by expectations.

**Table 8.** Economic Conditions of Communities in Slum Areas of Batang Arau District

Variable / Indicator	Percentage (%)
1. Main Job	
Agriculture, plantation, forestry and animal husbandry	2.56
Fishing/fishermen	49.62
Mining/quarrying	-
Industry/factory	2.05
Building construction	4.09
Trading/services (teachers, health workers, hotels, etc.)	39.9
Government employees	1.79
2. Income	
< 2,28 Million	20
2,28 JT - 4,56 Million	70
> 4,56 Million	10

There is even a group of people with unemployment status. For more details, it can be seen the data in Table 8.

All community income comes from diverse types of work. The most dominant type of work is fishing and followed by the type of trade/service job.

### 3.2.4 Characteristic of Disaster Aspects

The condition of building houses in the slum settlement of Batang Arau that not following technical standards is built with impermanent conditions has a high level of density and located on the slopes of the hills. The cause of this area is prone to disaster threats. The types of natural disasters that are a threat in this area are land sponsorship and house fires.

The data obtained, only 1% of community houses have fire protection facilities. Even in some RTs, such as RT 3 RW 3, they have experienced land slide. Both types of disasters pose threats that can harm the community in this area.

The above findings are in line with those obtained by Rahayu and Rutiana (2007), that slums have the threat of a house fire disaster. Likewise, Cahya and Juanda (2012) found that slums have significant problems, namely floods and house fires.

## 4. CONCLUSIONS

From the research conducted, it found that the environmental characteristics of the slums in Batang Arau Village, Padang City are the condition of infrastructure facilities describes as follows: the regularity of residential buildings only 102 household units with a building level of regularity of only 0.26%; the level of residential building density of 522.36 units/Ha; the feasibility figure for residential buildings is only 0.76%; the accessibility under technical requirements is

only 0.40%; the drainage network conditions that following the minimum quality standards of 0.19%; the number of houses served with water facilities for basic needs of 0.58% with a level of fulfillment of 0.47%; the percentage of family latrines by technical requirements of 0.41%; and the amount of domestic household solid waste that transported at least twice a week is 49%. The number of people by sex is almost the same; the distribution of the productive age of the population is 69.32% of the total population; educational levels vary, but in general are high school education; the most dominant tribe in this area is the Minangkabau. People's income gained from a variety of jobs with the predominance of work in the form of fishermen and trade / services. This area is on the slopes of the hills so it is prone to landslides, and because of dense houses, this area is also prone to fires.

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