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Waste management in subsidized housing in Palangka Raya city based on SNI 3242:2008

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Abstract

The decision of the Low Income Community (MBR) to designate the location of subsidized housing provides an opportunity for housing development. However, this new development has led to environmental problems, in particular inadequate disposal of household waste. The locations of social housing, which are mostly on the outskirts of the city and far from landfills (TPS), mean that MBRs tend to dispose of their waste indiscriminately. The impact on the environment is evident in the pollution of water. In addition, the socio-economic aspects of the community are disrupted, ranging from the emergence of unpleasant odors to the disruption of environmental esthetics. Urban waste management in Indonesia always adheres to the technical operating procedures outlined in SNI 19-2454-2002. In this study, waste management in subsidized housing in Palangka Raya City is investigated based on SNI 3242:2008 through qualitative and descriptive analysis. The results of the analysis show that waste management in subsidized housing requires a collective role and commitment to implement the 3Rs concept (reduce, reuse and recycle). It also requires the support of the City Government, both in terms of waste infrastructure and awareness campaigns that emphasize the importance of environmental protection through proper waste management.

1. Introduction

Palangka Raya serves as the provincial capital of Central Kalimantan, encompassing an extensive area of 2,853.52 km^2, making it the largest city in Indonesia[1]. A significant portion of Palangka Raya's land is still covered by forests[2]. Residential areas are scarce in this region, particularly on the outskirts, and some areas lack proper access roads. This situation is attributed to the uneven distribution of the population, resulting in slow development in peripheral areas while the majority of inhabitants concentrate in the central urban areas. According to the 2019 data from the Central Bureau of Statistics (BPS) in Palangka Raya, the total population stands at 266,020, with a majority residing in the districts of Jekan Raya and Pahandut, predominantly situated in the city center. Given these circumstances, there is a pressing need for a strategic development plan for the settlements.

A crucial urban development in Palangka Raya is the equal distribution of the population, along with stimulating the provision of adequate facilities and infrastructure, aiming to establish the area as a new economic center. For instance, the construction of subsidized housing. The spread of subsi-

dized housing developments in Palangka Raya can be a solution for the city government to achieve population distribution balance. The decision of the low income community (Masyarakat Berpenghasilan Rendah or MBR) to choose sites for subsidized housing is a great opportunity for the development of residential areas in Palangka Raya. The subsidized housing program, which is located on the outskirts of the city due to high land prices in the city center, is expected to develop new residential areas.

Subsidized housing is a government program aimed at providing decent and affordable housing for low-income communities (MBR)[3]. This program has been in operation since 1994 and has greatly benefited the public, especially in large cities. However, the subsidized housing program still faces various challenges. Common issues include low building quality, a frequent complaint from subsidy recipients due to inadequate government supervision over the quality of construction by developers[4,5]. Consequently, many subsidized houses are built with low-quality materials and weak constructions.

The second issue is the less strategic locations of subsidized housing. Many subsidized developments are situated in less strategic locations, such as the outskirts of cities or areas far from public facilities[6,7]. This complicates residents' access to public amenities like schools, hospitals, and shopping centers. Another challenge is the mismatch between house prices and residents' incomes. The government-set prices for subsidized houses often do not align with the incomes of low-income communities, making it difficult for them to afford mortgage payments.

Additionally, there is the issue of misappropriation of subsidy funds. Misuse of subsidy funds is a common occurrence in subsidized housing programs due to weak government supervision of fund distribution[8]. Consequently, many developers divert subsidy funds for other purposes, such as building luxury homes or personal interests.

Among these various problems, the exploration of how new residential developments contribute to environmental issues is an area that has not been extensively studied. Household waste generated from subsidized housing is not adequately managed. The predominant location of subsidized housing on the outskirts, far from Waste Disposal Sites (TPS), leads to a tendency for MBR residing in subsidized housing to dispose of waste indiscriminately. Urban waste management, referring to waste generated within the city, always adheres to the technical operational procedures outlined in SNI (Standar Nasional Indonesia or Indonesia National Standard) 19-2454-2002.

Given these circumstances, the fundamental question arises: how is waste management in subsidized housing in Palangka Raya based on SNI 3242:2008? Based on this question, the focus of this study is narrowed down to the management of waste in subsidized housing in Palangka Raya, specifically referring to SNI 3242:2008 on Waste Management Procedures in Residential Areas.

This research aims to uncover the intricacies of waste management practices within subsidized housing developments in Palangka Raya, particularly examining adherence to the standards outlined in SNI 3242:2008. By addressing this issue, the study seeks to contribute valuable insights into the challenges and potential solutions associated with waste management in subsidized housing areas, ultimately fostering a more sustainable and environmentally friendly living environment.

2. Methods

The integration of both qualitative and descriptive methods is central to the comprehensive investigation conducted in this study. Qualitative research, at its core, involves engaging intensively with the subjects, observing them in their natural habitat, interacting with them to recognize their perspectives, and engaging with the nuances of their language[9,10]. In the specific context of this study, these observational practices serve as cornerstones to gain deep insights into the multifaceted field of waste management in Palangka Raya subsidized housing.

Qualitative research goes beyond mere observation and expands its scope to explore intricate relationships, social dimensions and contextual factors that contribute to a nuanced understanding of the qualitative data. It explores the layers of meaning embedded in individuals' interactions and behaviors[11], shedding light on the complex dynamics of waste management practices in subsidized housing.

The descriptive approach taken in this study represents a systematic way to address the main research problem[12]. This method unfolds step by step and leads to results in the form of precise and tangible descriptive information presented in written form. This approach is achieved through the use of qualitative methods that ensure a detailed and accurate account of the complexity of waste management in subsidized housing in Palangka Raya. In particular, the author uses these methods to decipher the intricacies of waste management in subsidized housing and to align the analysis with the standards described in SNI 3242:2008.

3. Results and Discussion

3.1. Waste Production at Residential Locations

The subsidized housing program in the urban area is a government effort to provide a solution to the challenges of housing access for low-income communities in urban areas[13–15]. The rapid increase in the population of Palangka Raya City has resulted in an increase in people's need for housing. The government is working together with developers to respond quickly to the need for housing. From basic apartments to luxury homes are being built to meet the needs of these consumers (Table 1).

Table 1. Data on subsidized housing in Palangka Raya

Subdistrict	Number of Subsidized Housing Units	Number of Subsidized Units Sold	Number of Commercial Units	Number of Commercial Units Sold	Number of Subsidized Units booked	Total number of Registered Units
Pahandut	366	1.320	23	51	30	1.790
Bukit Batu	0	0	0	0	0	0
Jekan Raya	654	1.362	20	23	41	2.100
Sabangau	323	621	17	25	28	1.014
Rakumpit	0	0	0		0	0
Total	1.343	3.303	60	99	99	4.904

Source: https://sikumbang.tapera.go.id/ (reprocessed)

Table 1 shows that the increase in the number of housing units in Palangka Raya City has led to new problems, especially in public housing, most of which are located in the outskirts of the city. The apartments are spread across 266 sites in the Palangka Raya City area. Based on this data, there is no subsidized housing in 2 (two) sub-districts, namely Bukit Batu district and Rakumpit district.

Subsidized housing in Palangka Raya City has several characteristics aimed at meeting the housing needs of low-income communities. The selling prices are set lower than market prices, enabling low-income individuals to own their own homes. Additionally, there are often subsidy facilities or credits that support the purchasing process, helping alleviate the financial burden on the beneficiaries. The locations of subsidized housing are typically chosen with considerations for accessibility to public facilities such as schools, health centers, public transportation, and shopping places. This strategic placement aims to enhance the quality of life for residents and provide better access to various services in the city. The importance of social and economic integration is also a focus in the planning of subsidized housing. Beneficiaries of this program are expected to actively participate in social and economic activities in their surroundings, creating a strong and sustainable community.

In addition to population growth and housing development, the environmental aspects of waste management must also be taken seriously. Effective and sustainable housing development involves not only the structural design of the building, but also an integrated strategy for managing the waste produced by the residents. Good waste management in a residential environment not only affects the living comfort of the residents, but also has a major impact on the environment.

According to Nugroho[16], waste is an object that was considered unused and discarded by the previous owner/user, but is still useful to some people if treated with the right procedures. In practise, waste sources are divided into 2 broad groups, namely a. Residential waste, or household waste, b. Non-residential waste, which is similar to household waste, e.g. from markets, commercial areas, etc. There is a different processing method for each type of waste.

In addition, Nugroho[16] provides an elaboration on waste as follows:

> Household waste is waste generated by activities in the household activities or in the environment, or it is often referred to as domestic waste. Generally, waste from this source group is food scraps, plastic, paper, cardboard, cloth, wood, glass, leaves, metal and sometimes large waste such as branches. Waste commonly found in industrialized countries, such as furniture, used televisions, mattresses, etc., is practically non-existent. This group can include residential houses occupied by one family or a group of houses in a residential area as well as residential units in the form of apartments. Hazardous and toxic waste (B3) can also be generated in residential buildings, such as batteries, light bulbs, leftover medicines, used oil, etc.

There are different methods of handling each type of waste. The most important thing is to treat the waste at the source through various measures that can reduce the amount of waste thrown into the TPA (final disposal site). Most of Palangka Raya City's waste consists of organic waste. This type of organic waste dominates the total waste and waste from various sources (households, streets, markets). In waste management, the amount of waste produced can be used to predict the amount of waste that will be generated in the future so that it can be used to plan the amount of waste to be hauled away[17]. Table 2 shows the volume of waste transported by month in Palangka Raya City.

Table 2. Volume of waste transported by month in Palangka Raya City (m^3)

Month-total	Garbage inside TPS			Garbage outside TPS			Total		
	2020	2021	2022	2020	2021	2022	2020	2021	2022
January	11.460	3.058	3.101.717	2.352	395	251.483	13.812	3.454	3.353.200
February	12.315	2.608	2.761.230	1.059	323	205.821	13.374	2.931	2.967.050
March	13.244	3.022	3.100.787	1.171	296	215.554	14.415	3.317	3.316.340
April	12.795	2.852	2.986.332	802	320	224.769	13.597	3.171	3.211.101
May	12.624	3.120	3.253.219	703	310	282.901	13.327	3.430	3.536.120
June	12.297	2.842	2.979.808	887	317	203.142	13.184	3.160	3.182.950
July	12.701	2.976	3.099.627	950	336	215.493	13.651	3.312	3.315.120
August	12.642	2.947	3.055.490	859	338	229.770	13.501	3.285	3.285.260
September	12.765	2.825	2.956.582	797	318	204.518	13.562	3.143	3.161.100
October	12.908	2.892	3.112.822	858	321	198.678	13.766	3.213	3.311.500
November	12.388	3.152	3.169.747	892	317	238.553	13.280	3.469	3.408.300
December	13.036	3.506	3.330.024	901	328	286.576	13.937	3.834	3.616.600
Total	151.175	35.799	36.907.385	12.231	3.919	2.757.256	163.406	39.718	39.664.641

Source: Badan Pusat Statistik Kota Palangka Raya[18]

The final disposal site for the waste of Palangka Raya city is located at TPA Cilik Riwut KM. 14 with an area of 10 ha. The TPA was put into operation in 1997. The location of the waste disposal site (TPS) in Palangka Raya City is shown in Figure 1.

Figure 1. Distribution of waste disposal sites (TPS) in Palangka Raya
Source: Google Maps (2023)

The bins used for waste collection in Palangka Raya City are not yet standardized in type and form, they still vary for residential areas, commercial areas and other public areas. Bin systems at waste sources include iron barrels/bins, plastic barrels, plastic bags, baskets, stone walls and earth pits/heaps. In stores and commercial premises, plastic bags are generally used, which are thrown away immediately, and used baskets are used.

The usual method of waste collection in residential areas is to collect the waste by motorcycle and an open garbage can, which is then taken to the TPS/waste depot. It can also be taken directly from the householder to the TPS/waste depot. A garbage truck from the Palangka Raya Municipality is used for transportation from the TPS to the TPA. The location is far from the TPS and since there are no motorcycles with open loading area for waste transportation, residents tend to dump or burn their waste near their houses. Below are the number of dumpsites in Palangka Raya City, depending on the circumstances.

Table 3. Number of waste disposal sites according to conditions in Palangka Raya City

Subdistrict	Number of waste disposal sites according to conditions							
	Good		Moderate		Light Damage		Heavy Damaged	
	2021	2022	2021	2022	2021	2022	2021	2022
Pahandut	19	18	1	1	1	1	1	1
Sabangau	1	1	1	1	1	-	-	-
Jekan Raya	41	41	7	6	9	8	2	2
Bukit Batu	11	11	1	1	-	-	-	-
Rakumpit	-	-	-	-	-	-	-	-
Palangka Raya	72	71	10	9	11	9	3	3

Source: Badan Pusat Statistik Kota Palangka Raya[18]

3.2. Standards for Waste Management Operational Techniques

Law Number 18 of 2008 on Waste Management states that waste management is a systematic, comprehensive and sustainable activity which involves the reduction and management of waste[17]. According to the Regulation of the Minister of Public Works of the Republic of Indonesia No. 03/PRT/M/2013, waste management includes the activities of sorting, collecting, conveying, transporting, processing and final processing of waste[19]. The technical structure of waste management is explained in Figure 2.

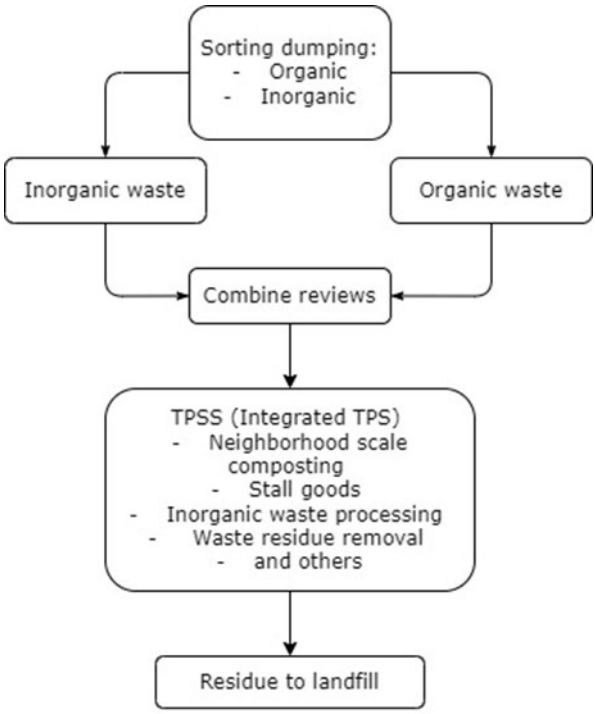

Figure 2. Diagram of management system in subsidized housing

SNI number 3242:2008 on waste management states the following:

The provisions to be achieved in waste management in residential areas are legal provisions on environmental management, environmental impact analysis, public order, urban/environmental cleanliness, establishment of institutions/organizations/administrations and urban spatial planning and implementation regulations; management in residential areas must focus on improving the performance of waste management institutions and strengthening the functions of regulators and operators. The goal to be achieved is a system and institution capable of fully managing and taking care of waste in the environment by involving the community in management and levies or charges, and implementing the 3R concept as much as possible at the source. Implement a local waste management system by: 1) sorting organic and non-organic waste; 2) implementing the 3Rs technique at the sources and TPS; 3) treatment of residues by city waste managers; Pay attention to increasing financial capacity to provide services with gradual cost recovery so that systems and institutions, as well as communities and businesses have sufficient capacity to ensure sustainability and environmental quality for citizens. Community participation is also needed in: 1) sorting waste at source; 2) processing waste according to the 3-R concept; 3) paying waste fees/charges; 4) complying with established waste management regulations; 5) participating in maintaining the cleanliness of the environment; 6) actively participating in the socialization of environmental waste management

Based on these technical instructions, there are several known things that must be done in waste management by all communities.

3.3. Waste Management in Subsidized Housing

The authority responsible for waste management in Palangka Raya City is the Palangka Raya City Environmental Service. Currently, the DLH prioritizes the processing of waste at the TPA into a source of gas fuel that can be used for various purposes. The provisions that need to be achieved in the management of municipal waste are legal provisions related to environmental management, environmental impact assessment, public order, city/environmental cleanliness, establishment of institutions/organizations/administrations and urban spatial planning and implementation regulations, management in residential areas. needs to focus on improving the performance of waste management facilities and strengthening regulatory and enforcement functions[19].

In order to create a clean and healthy environment, it is necessary to develop an environmentally friendly waste management system. Healthy living, a clean environment makes society more productive[20]. One of them is the need for trash cans. Trash garbage cans are something that cannot be separated from the estates or the residents because it can facilitate the community and keep the environment clean[21].

There is a different processing method for each type of waste. The most important thing is to treat the waste at the source, through various measures that can reduce the amount of waste thrown into the landfill. This method aims to achieve one mission, which is to achieve goodness and safety[22]. In order to create a clean and healthy environment, it is necessary to develop an environmentally friendly waste management system. The changes and development of measures correspond to logical thinking and considerations carried out for the residents' own needs for healthy living[23]. Healthy living, a clean environment makes society more productive[20]. However, different conditions prevail in subsidized housing. The location is far from the TPS and since there are no motorcycles with open beds for garbage transportation, residents tend to throw or burn their garbage around housing.

Based on SNI 3242:2008 on procedures for waste management in housing estates, the municipality still does not have the waste problems in subsidized housing. This is because the waste recycling plant (TPS) is far away from the housing locations, which means that the residents of the estates tend to throw or burn their waste in nearby empty areas. According to Rizal (2011), the issue of waste continues to be debated because it is related to the lifestyle and culture of the community itself. The rapid population growth is leading to an increase in people's consumption behavior and thus a further increase in waste production[25].

It is clear from the above waste management in Subsidized Housing areas requires a very large and strong joint participation and commitment from the community, both from the City Government, Developers and housing residents in accordance with their respective roles to implement the 3Rs concept. The support of the municipality is urgently needed both in terms of waste infrastructure and in terms of education on the importance of environmental protection through good waste management.

4. Conclusion

Healthy and clean housing and environment make society more productive. However, other conditions prevail in subsidized housing. The location is far from the TPS and the lack of availability of motorcycles with an open loading area for waste transportation means that residents tend to throw or burn their waste around housing. Based on SNI 3242:2008 on procedures for waste disposal in housing estates, the municipality still does not have a good grip on waste problems well in subsidized housing. This is because the waste processing site (TPS) is far away from the housing locations, which means that the residents of the estates tend to throw their waste on the nearby empty land or burn it. The issue of waste continues to be debated because it is related to the lifestyle and culture of the community itself. The rapid population growth is leading to an increase in people's consumption behavior and thus a further increase in waste production[25].

From the above, it is clear that waste management in subsidized housing areas requires a very large and strong joint participation and commitment from the community, both from the municipality and from the housing developers and residents according to their respective roles in the implementation of the 3Rs concept.

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