Slum Upgrading in Cengkareng, West Jakarta

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ABSTRACT

This research aims to evaluate the level of slum conditions in Cengkareng Subdistrict and identify suitable upgrading alternatives to address the situation. The assessment method used is scoring/weighting based on the Guidelines for PU Cipta Karya to measure the level of slum conditions, and the Analytic Hierarchy Process (AHP) method to determine slum upgrading. This strategy is based on best practices taken from the Book of CODI updates with a focus on Community Upgrading Projects published by the Community Organizations Development Institute in Thailand. The study results indicate that there are three levels of slum conditions in Cengkareng Subdistrict, namely, light, moderate, and severe slums. For alternative rejuvenation strategies, on-site upgrading is chosen for low and moderate slum levels, while on-site reblocking is selected for areas with a very severe slum condition.

1. Introduction

The ongoing phenomenon of urbanization is one of the main factors driving the drastic increase in the population in urban areas, without adequate control [6]. With the rapid development of cities, attractive opportunities have opened up for residents living in rural areas to migrate to urban areas in the hope of finding a better life. This situation necessitates efforts to provide urban facilities and infrastructure, especially in terms of housing needs and supporting infrastructure [13]. Considering the general background of urban dwellers, most of them are not yet equipped with the skills or expertise to face the impacts of current technological growth. As a result, individuals who do not possess relevant skills become more vulnerable to unemployment, which in turn increases the demand for housing [4]. This situation also triggers the potential formation of illegal settlements, often known as slums or "squatter" areas. Settlements like this emerge in areas that should not be allowed to be inhabited. In essence, the emergence of areas with high poverty levels is caused by the gap between income and the needs of the community, which cannot compete with technological advancements [9].

The ideal population growth rate in Indonesia should be between one to two million individuals per year. However, currently, the population growth rate exceeds this ideal figure, reaching 1.49 percent or around four million individuals per year. Based on information from the Central Statistics Agency, the data regarding the population of Cengkareng District in 2021 reached 583,984 people, with a population density of 128,689 people/km². In 2021, the number of poor people in Jakarta reached 363,200. The total area of DKI Jakarta covers approximately 66,200 hectares, of which about 49.47% is allocated as residential and settlement areas. Within this area, there are about 5.4% slum settlements, involving 392 slum neighborhoods.

2. Method

This research uses a scoring/weighting analysis approach based on the 2007 PU Cipta Karya Guidelines to assess the level of slum conditions and AHP analysis to determine alternative revitalization strategies in addressing slum settlement issues.

Data collection, this process is carried out through interviews with stakeholders and literature studies. The interviews with stakeholders are intended to determine the priority of alternative strategies for the revitalization of slum settlements. Literature Study is needed as support and reference in the formation of the research foundation. The use of literature related to this research includes studies of best practices taken from the Book of CODI updates with a focus on Community Upgrading Projects published by the Community Organizations Development Institute in Thailand, geographic information systems, and the AHP method. The data obtained and used in this research are secondary data obtained from the Cengkareng Subdistrict Office and also primary data obtained through interviews. The secondary data consists of non-spatial data, namely quantitative data on slum settlements, and spatial data, namely the administrative map of Cengkareng Subdistrict, building condition maps, and road condition maps.

environment, map of drinking water supply conditions, map of environmental drainage conditions, map of wastewater management conditions, map of waste management conditions, map of fire protection conditions. Secondary data will then be processed using spatial analysis, specifically through overlay, and subsequently will be processed to create a map of slum settlement criteria. Meanwhile, the primary data obtained will be processed to become the basis for the level of importance, which will be included in the pairwise comparison matrix.

3. Results and Discussion

The slum residential areas in the Cengkareng sub-district are spread across all villages, with a total of 20 neighborhood units (RW) out of 87 RW in the Cengkareng sub-district. The research study area within these 20 slum RW covers an area of 961.16 Ha, as can be seen from the map above and the table below:

Kelurahan	Jumlah RW	Klasifikasi	Luas RW (Ha)
Duri Kosambi	2	Sedang	81,49
	1	Ringan	37,92
	1	Sangat Ringan	10,69
Rawa Buaya	1	Ringan	70,03
	1	Sangat ringan	99,32
Kedaung Kaliangke	1	Sedang	29,62
	4	Ringan	25,80
Kapuk	2	Berat	83,15
	4	Ringan	322,92
	1	Sangat Ringan	36,84
Cengkareng Timur	2	Sedang	28,93
Cengkareng Barat	3	Sedang	130,43
	1	Ringan	11,69

3.1 Characteristics of Slum Settlements in Cengkareng District

In terms of public facilities and infrastructure, the condition of amenities and infrastructure in slum areas is quite good, including clean water supply, accessibility, and waste management. Regarding the clean water supply, the majority of residents already have access to Drinking Water Supply (PAM) at a rate of about 30%. Concerning accessibility, the road conditions around these settlements are generally good and have been improved. Sanitation and drainage conditions. Most residents already have bathroom and private toilet facilities in their respective homes. However, there are also residents who still use shared sanitation facilities, especially those living in rented rooms or boarding houses, which are generally occupied by workers or laborers. In terms of waste management, most residents have personal trash bins at their homes, which are then collected by waste officers and transported by garbage trucks to the Bantar Gebang Landfill. Although there has been progress in several aspects, there are still deficiencies in terms of sanitation and drainage, which need to be addressed further to improve the environmental conditions and the well-being of the residents in this

low-income slum settlement. Hazard Aspect: In slum settlements, the average elevation condition ranges from 50 meters to 1 meter (35%). As for the duration of flooding, it generally lasts for one day (52%) and also 2-3 days (48%). Generally, flooding occurs in these settlements every year. The slum settlements in Cengkareng District are mostly flood-prone areas. 3.3 Strategi Peremajaan Permukiman Kumuh Kota Jakarta Barat.

3.3.1 AHP Calculation

Determination of slum settlement revitalization strategies using 5 slum settlement indicators, namely infrastructure feasibility conditions, health and sanitation, security and resilience, community involvement, social and economic aspects, legality and regulations.with its strategic alternatives of On-site Upgrading, On-site Reblocking, On-site Reconstruction. In the next stage, which is determining the priority of the elements, by comparing the elements in pairs according to the given criteria. The results of the analysis obtained the weighting calculations for all indicators as follows, as shown in the pairwise comparison matrix in Table 3.1.

Table 1. Pairwise Matrix

	Infrastructure Feasibility	Sanitation	Hazards	Community Involvement	Social and Economic	Legality and Regulations
Infrastructure Feasibility	1	3	5	7	5	3
Sanitation	1/3	1	3	5	3	3
Hazards	1/5	1/3	1	3	3	5
Community Involvement	1/7	1/5	1/3	1	3	3
Social and Economic	1/5	1/3	1/3	1/3	1	3
Legality and Regulations	1/3	1/3	1/5	1/3	1/3	1
∑coloum	2,2	5,2	9,8	16,6	15,3	18

The next step is to divide the elements in each column by the total sum of the respective column, resulting in normalized relative weights. The results can be seen in Table 3.2 below

	Infrastructure Feasibility	Sanitation	Hazards	Community Involvement	Social and Economic	Legality and Regulations	∑ raw	Average a
Infrastructure Feasibility	1	3	5	7	5	3	21,00	0,41
Sanitation	1/3	1	3	5	3	3	12,33	0,22

Hazards	1/5	1/3	1	3	3	5	7,53	0,15
Community Involvement	1/7	1/5	1/3	1	3	3	4,68	0,09
Social and Economic	1/5	1/3	1/3	1/3	1	3	2,20	0,07
Legality and Regulations	1/3	1/3	1/5	1/3	1/3	1	1,53	0,06

Tabel 3.3 *eigen vector*

Indikator	Nilai Eigen Vector
Infrastructure Feasibility	0,57
Sanitation	0,19
Hazards	0,06
Community Involvement	0,03
Social and Economic	0,06

Legality and Regulations	0,06

3.3.2 Classification of Upgrading Strategies

In the next stage, evaluate the planning strategies that can be implemented in the future related to the revitalization of slum settlements using the Analytic Hierarchy Process. (AHP). AHP is a method commonly used to evaluate actions associated with the comparison of importance weights between factors and the comparison of several alternative choices. Alternative strategy choices are taken from best practices that have been successfully implemented in Thailand. There are 5 strategies outlined in the Book of CODI update, namely On-site Upgrading, On-site Reblocking, On-site Reconstruction. In this AHP calculation, it is conducted on each indicator present in the slum settlements of Cengkareng District.

a. Infrastructure Feasibility

Tabel 3.4 Matriks *Pair-Wise* Alternatif Strategi Perencanan

Alternatif	On-site Upgrading	On-site Reblocking	On-site Reconstruction	Average a	EV
On-site Upgrading	1	1/3	5	0,28	0,24
On-site Reblocking	3	1	7	0,64	0,71
On-site Reconstruction	1/5	1/7	1	0,07	0,05
∑Kolom	4,2	1,47619	13		

The slums in Cengkareng District are characterized by high density, minimal basic infrastructure, and environmental issues such as flooding and poor sanitation. This area generally consists of semi-permanent to non-permanent buildings constructed without formal planning, resulting in low accessibility for emergency services and limited open space for social interaction and public needs.

The procurement of physical infrastructure such as roads, drainage systems, and waste management is a vital element in slum upgrading projects. Studies show that such projects need to be designed to address environmental issues like flooding, which is a common problem in Jakarta. A similar project in Bandung emphasizes flood control and sanitation infrastructure, which has proven effective in the long term [12].

b. Sanitation

Tabel 3.5 Matriks *Pair-Wise* Alternatif Strategi Perencanan

Alternatif	On-site Upgrading	On-site Reblocking	On-site Reconstruction	Averagea	EV
On-site Upgrading	1	1/5	1/3	0,11	0,11
On-site Reblocking	5	1	3	0,63	0,56
On-site Reconstruction	3	1/3	1	0,26	0,33

The slum settlements in Cengkareng District already have their own sanitation facilities in each house, but many of these sanitation facilities are in poor condition and not well-maintained, as well as the provision of public toilets. However, sometimes society has adapted to the existing conditions and considers them normal and not too impactful on their environment. Based on field observations, it is also evident that the sanitation conditions in the area are inadequate, leading to the formation of slum settlements in the region.

The improvement of sanitation quality and clean water facilities in this area heavily relies on community participation and empowerment programs. The local government has tried to involve the community in efforts to improve sanitation facilities through programs like Sanimas. (Sanitasi Berbasis Masyarakat). However, the success of this program is limited due to the lack of public awareness about the importance of maintaining environmental cleanliness and sanitation [5]. Mitigation efforts through government programs such as environmental sanitation need to be continuously strengthened with ongoing education for the community to achieve sustainable behavioral change [15].

c. Hazard

Tabel 3.6 Matriks *Pair-Wise* Alternatif Strategi Perencanan

	On-site Upgrading	On-site Reblocking	On-site Reconstruction	Average a	EV
On-site Upgrading	1	1/3	3	0,26	0,23
On-site Reblocking	3	1	5	0,63	0,69
On-site Reconstruction	1/3	1/5	1	0,11	0,08
	4,333333333	1,533333	9		

The slum settlements located in the Cengkareng district are included in the flood-prone disaster areas. Generally, the flooding found in slum settlements has a height between 30 cm to 50 cm. In flood-prone slum areas like Cengkareng, climate-resilient strategies, such as the construction of flood-

resistant infrastructure, must be integrated into project designs. Projects in other Southeast Asian countries have highlighted the importance of using community-based and spatial approaches to build resilience against natural disaster risks [3].

d. Community Involvement

Tabel 3.7 Matriks *Pair-Wise* Alternatif Strategi Perencanan

	On-site Upgrading	On-site Reblocking	On-site Reconstruction	Avera gea	EV
On-site Upgrading	1	1/3	1/7	0,09	0,09
On-site Reblocking	3	1	1/3	0,24	0,27
On-site Reconstruction	7	3	1	0,67	0,64

The community is still quite lacking in self-initiated environmental improvements, as evidenced by the environmental improvement activities carried out by the community, which usually can only repair a small part or a fraction of a percent, especially in terms of funding, so they depend on other parties such as the government and private sector to carry out environmental improvement programs. Involving the community in various participatory activities, from planning and implementation to monitoring and evaluation, can enhance the community's sense of ownership over its environment. Therefore, this is considered important.

e. Legality and Regulations

Tabel 3.8 Matriks *Pair-Wise* Alternatif Strategi Perencanan

	On-site Upgrading	On-site Reblocking	On-site Reconstruction	Average a	EV
On-site Upgrading	1	1/3	3	0,26	0,23
On-site Reblocking	3	1	5	0,63	0,69

On-site Reconstruction	1/3	1/5	1	0,11	0,0 8

Land ownership in slum areas in Cengkareng District is 95% under freehold status.However, regarding building ownership, many people there rent or lease. Thus, there are obstacles in renovating the building because permission from the building owner is required, so an approach regarding this matter is needed. As part of the restoration efforts, programs like this must also consider land ownership status. Programs in the Philippines demonstrate the importance of regulations that support public participation and legal certainty for urban poor communities, who often lack clear land

f. Social dan Economic

Tabel 3.9 Matriks *Pair-Wise* Alternatif Strategi Perencanan

Alternatif	On-site Upgrading	On-site Reblocking	On-site Reconstruction	Average a	EV
On-site Upgrading	1	1/3	1/5	0,11	0,1 1
On-site Reblocking	3	1	1/3	0,26	0,3 3
On-site Reconstruction	5	3	1	0,63	0,5 6

Tabel 3.10 Prioritas Strategi Perencanaan Peremajaan Permukiman Kumuh di kecamatan Cengkareng

Strategi Upgrading	Bobot Final	Peringkat
On-site Upgrading	0,209	2
On-site Reblocking	0,580	1
On-site Reconstruction	0,208	3

Generally, the community living in the slum areas of Cengkareng sub-district does not have a high level of education. The majority of its population only completes education up to junior high school/equivalent. Only a few among them have higher education. The majority of the population in the slum areas of Cengkareng Subdistrict earn a living as laborers (43%). This is due to the proximity of the industrial location in that area. For other livelihoods, they generally involve jobs in the informal sector, such as motorcycle taxi drivers, construction laborers, warteg attendants, and so on.

Consistency Ratio

The final step that needs to be analyzed is the level of consistency of the respondents in providing answers to the questions posed. Although it is difficult to achieve perfection, a consistency ratio of less than or equal to 10% is expected. (Tabel 3.11)

Tabel 3. 11. Rasio Konsistensi Responden

Indikator	CI	CR	Keterangan
Infrastructure Feasibility	0,05	0,08	Konsisten
Sanitation	0,03	0,05	Konsisten
Hazards	0,02	0,04	Konsisten
Community Involvement	0,005	0,009	Konsisten
Social and Economic	0,02	0,04	Konsisten
Legality and Regulations	0,02	0,04	Konsisten

Based on Table 11, it can be seen that for each answer from each item of the questionnaire distributed to respondents, the answer values are consistent because they have a consistency ratio value of less than 10% or CR < 0.1. Based on the series of AHP process flows that have been carried out, it can be briefly explained that among the three alternative strategies with the highest priority value, namely On-site Reblocking. The figure serves as the basis for selecting the strategy used and was obtained from 5 respondents directly related to the issue of slum settlements. It is hoped that the chosen strategy represents the aspirations and desires of everyone involved in the slum settlement revitalization activities in the Cengkareng District of West Jakarta City.

On-site upgrading includes the improvement of basic infrastructure such as sanitation, access to clean water, roads, and public facilities. This approach aims to improve the quality of life for residents without relocating them from their current location. In a study conducted in Jakarta, it was mentioned that physical improvements involving community participation in planning and implementation proved effective in enhancing the quality of life in slum areas. Through community-based sanitation programs, public health conditions also experienced significant improvements. [16]. On-site Reblocking is carried out by relocating buildings within slum areas to create a more orderly and efficient layout. This usually involves rearranging residential locations, road access, and public facilities to reduce flood risk and improve accessibility. Research conducted by the Urban Planning Journal shows that reblocking involving active participation from residents can enhance the effectiveness of the new layout. The community involved in this process shows higher satisfaction with the results and is more committed to maintaining the facilities that have been built [5]. On-site Reconstruction involves the construction of new structures on land that has been cleared and prepared. This includes safer and more disaster-resistant housing, as well as better public facilities. In a report published by the World Bank, it is recommended that reconstruction in slum areas should consider aspects of sustainability and disaster resilience. Well-planned development that involves the community not only improves physical conditions but also empowers the community to participate in maintaining and caring for their environment [7].

4. Conclusion

This study evaluates the conditions of slum areas in Cengkareng, West Jakarta, and proposes upgrading strategies based on the Analytic Hierarchy Process (AHP). Through comprehensive analysis, the research identifies three levels of slum conditions: mild, moderate, and severe. The recommendations indicate that On-site Upgrading should be implemented in mild and moderate slum areas, while On-site Reblocking is advised for severely affected areas. Based on the Analytical Hierarchy Process (AHP) that has been conducted, it can be briefly explained that among the three alternative strategies, on-site reblocking is the most important. This is done by relocating buildings in slum areas to create a more organized and efficient layout. To reduce the risk of flooding and improve accessibility, this usually involves reorganizing the locations of residences, roads, and public facilities

Thus, this study contributes significantly to the development of more effective slum management strategies and provides valuable guidance for sustainable urban planning in Cengkareng

Acknowledgement

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