A Study on the Relationship between Community Participation and the Improvement of Slum Settlement Quality in Medan City, Indonesia

ABSTRACT

This study explores the intricate relationship between community participation and the improvement of slum settlement quality in Area 33 of Belawan II Sub-District, Medan Belawan, Indonesia. The research employs a mixed-methods approach, revealing a significant correlation between environmental cleanliness, community participation, and the quality of slum settlements. The findings indicate that poor drainage conditions, exacerbated by waste blockages leading to stagnant water, and low community participation, driven by a lack of awareness and minimal involvement in environmental initiatives, critically impede the advancement of slum settlement conditions. Through the implementation of socialization and education programs, a notable increase in community awareness and engagement in environmental management has been observed, suggesting these as pivotal strategies for enhancing slum settlement quality. The study identifies the utilization of available land and the maximization of community participation as essential strategies to mitigate threats such as flooding and disease outbreaks. A SWOT analysis conducted within the study underscores the importance of prioritizing educational programs, community participation enhancement, and optimal land use to create sustainable and habitable environments. The conclusion emphasizes that despite the low level of community participation affecting settlement quality, significant opportunities for improvement exist. The study recommends government-community collaboration and the adoption of educational initiatives to foster environmental conditions conducive to community well-being in slum settlements. This research contributes to the body of knowledge by demonstrating that informed community involvement is crucial for addressing local environmental challenges and enhancing slum settlement quality.

Keywords: Slum settlement, Community participation, Environmental cleanliness, SWOT analysis, Sustainable development

I. INTRODUCTION

The rapid urbanization in Indonesia is a prominent feature of its demographic transition, with the urban populace increasingly overshadowing the rural population. This migration trend towards urban centers is motivated by the pursuit of improved livelihoods but introduces a spectrum of challenges, particularly in

the social, economic, and environmental sectors. As of 2023, Indonesia's urban population has surged to an estimated 163.9 million, or 59.1% of the total population of 277.5 million, according to Worldometers. This significant uptick underscores a steady move towards urbanization, accompanying the burgeoning demands and challenges inherent in densely populated urban landscapes (Worldometers, 2023).

Urbanization's relentless pace has significantly escalated the demand for housing, giving rise to critical issues surrounding adequate housing and settlement concerns in city centers. This surge in demand often culminates in the emergence of slum settlements, marked by irregular construction, high densities, and insufficient infrastructure and services, challenging urban development (UU No.1 Tahun 2011). The migration of individuals and families into urban areas, driven by aspirations for better economic and living conditions (Iman, 2014; Bolay, 2006), leads to overcrowded living spaces (Marx et al., 2013), engendering unhealthy environments (Goswani & Samita, 2013), and exacerbating poverty (Bagheri, 2012), with adverse health impacts (Pryer, 2006).

Despite the advantages of rapid economic growth, it paradoxically fosters the spread of slum areas (Roy et al., 2014), with certain regions struggling to keep pace with economic development. This discrepancy worsens the socio-economic conditions of residents, affecting education and income levels (Çiçeklioğlu et al., 2012; Ucha, 2010; Sakdapolrak, 2013), and underscores the necessity for a comprehensive strategy to address the multifaceted issue of slum settlements. A detailed understanding of the phenomena and causes (Bolay, J.C., 2006), including infrastructure (Desai, 2012), homeownership patterns (Gulyani et al., 2012), access to clean water (Dagdeviren, 2011), waste disposal facilities (Bandyopadhyay & Vandana, 2013), and service availability (Idowu, 2013), is essential for tackling these challenges.

Belawan City, as Medan's maritime gateway, stands as a testament to the contrasting scenarios of rapid economic progress against a backdrop of enduring poverty. Despite its high activity levels and strategic significance as an international port and national growth center, Belawan confronts profound poverty challenges that distinguish it from other Medan areas (Kaspan & Melly, 2019). This situation highlights the critical need for regional development strategies that not only stimulate economic activities but also prioritize the fulfillment of basic human needs and community well-being (Arga, 2024; Satia, 2021). Such strategies must navigate the delicate equilibrium between facilitating economic growth and addressing the intricacies of urban development and population expansion.

This study embarks on an exploration of the intricate relationship between community participation and the improvement of slum settlements in Belawan, aiming to unravel the complex dynamics underpinning urban poverty and slum proliferation. By synthesizing insights from prior research with the distinct context of Belawan, this introduction paves the way for a comprehensive examination of strategies capable of fostering sustainable urban development and enhancing the quality of life for slum dwellers. Emphasizing the pivotal role of community engagement, this research seeks to offer a nuanced understanding of

and practical solutions to the challenges posed by urbanization and slum settlements.

II. Method

This study delineates the methodology applied to scrutinize community engagement in ameliorating slum settlements within the Belawan District of Medan, incorporating a mixed-method approach to thoroughly investigate phenomena from both quantitative and qualitative perspectives. This multifaceted strategy enables an exhaustive exploration of the dynamics at play, offering insights into the nuances of community participation.

2.1 Methodological Framework

The research adopts an exploratory and descriptive design, aiming not only to identify but also to meticulously analyze factors propelling community participation. This investigation spans a six-month period, providing a substantial timeframe for profound data gathering and analysis. The research focuses explicitly on the factors influencing community participation, including socio-economic status, education levels, awareness of environmental issues, and accessibility to resources, which are pivotal in understanding the complexities of engagement in slum settlement improvements.

2.2 Population and Sampling

The inhabitants of the Belawan District residing in slum areas constitute the research population. A purposive sampling technique, complemented by the Slovin formula, is employed to select a representative sample, ensuring a comprehensive depiction of individuals directly implicated in the slum settlement discourse. This study engages with 63 households within the strategic urban locale of Kelurahan 033, emphasizing port and commercial area developments.

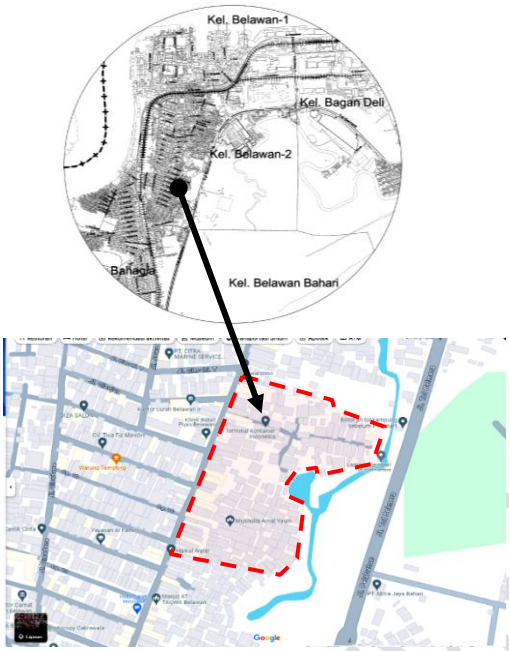

Figure 1 Research Location

2.3 Data Collection

An amalgamation of primary and secondary data forms the basis of our data collection. Primary data, derived from questionnaires and in-depth interviews, involves interaction with a diverse array of respondents, including local government officials, community leaders, and residents, ensuring a rich tapestry of perspectives. The number of respondents targeted for primary data collection is systematically determined using concurrent triangulation methods, facilitating a robust comparison between quantitative and qualitative data to forge a nuanced understanding of community participation dynamics. Secondary data is meticulously sourced from official documents and reports, enriching the contextual backdrop of the research.

2.4 Conceptual Framework

The study's conceptual framework posits community participation as the independent variable and the quality of slum settlements as the dependent variable, establishing a clear pathway to examine the impact of community engagement on settlement improvement efforts. This framework is crucial for delineating the scope of investigation and guiding the analytical process.

2.5 Data Analysis:

Quantitative data undergo descriptive statistical analysis, while qualitative data are explored through content analysis and observations, deepening the comprehension of participant perceptions and experiences. A pivotal component of our analysis is the SWOT analysis, a strategic planning tool

chosen for its efficacy in identifying strengths, weaknesses, opportunities, and threats related to community participation in slum improvement initiatives. This technique is instrumental in uncovering potential leverage points and barriers within the environmental context, offering strategic insights for enhancing community-led settlement upgrades.

In conclusion, this research endeavors to assess the impact of community participation on the enhancement of slum settlement quality, identifying both facilitators and impediments within this endeavor. By integrating a detailed examination of the methodological aspects, this revision aims to address the gaps identified by the reviewers, providing a comprehensive overview of the research approach and its alignment with the study's objectives.

III. RESULT AND DISCUSSION

3.1 Characteristics of Respondents and Physical Conditions of Slum Settlement Dwellings

This research was conducted on 63 respondents who are family members in Neighborhood 33 of Belawan II Village, Medan Belawan District, Medan City, regarding Community Participation in Addressing Slum Settlements Based on Sustainable Principles.

3.1.1 Characteristics of Respondents

The characteristics of respondents in this study include gender, age, education, occupation, income, number of household members, and domicile origin in terms of both numerical values and percentage distributions of respondent characteristics, as detailed in Table 1 below:

Table1Characteristic Respondent Percentage

No.	Characteristic of Respondents	Number	Percentage (%)
1	Gender		
	Female	12	19,0
	Male	51	81,0
2	Age (years)		
	<30 years	5	7.9
	30-40 years	17	27.0
	41-50 years	12	19.0
	51-60 years	9	14.3
	61-70 years	13	20.6
	>70 years	7	11.1
3	Education		
	Elementary School (SD)	10	15.9
	Junior High School (SMP)	24	38.1
	High School (SMA)	28	44.4
	Bachelor's Degree (S1)	1	1.6
4	Occupation		

	Housewife (IRT)	1	1.6
	Teacher	1	1.6
	Farmer	1	1.6
	Livestock farmer	4	6.3
	Trader	6	9.5
	Fisherman	7	11.1
	Driver	7	11.1
	Entrepreneur	8	12.7
	Laborer	28	44.4
5	Income		
	< Rp 2 million	37	58.7
	Rp 2 - 3 million	23	36.5
	> Rp 3 million	3	4.8
6	Number of Household Members		
	<3 people	10	15.9
	3-5 people	40	63.5
	>5 people	13	20.6
7	Domicile		
	Migrant	9	14.3
	Indigenous	54	85.7

Source :Result Data Processed 2023

3.1.2 Characteristics of Dwelling Structures

In this study, data sources were also obtained through research observations on the physical structures of buildings, including roof conditions, wall conditions, air circulation, lighting conditions, and cleanliness conditions. The results of the physical characteristics of dwellings based on the research questionnaire can be seen in Table 2 below:

Table2physical characteristics of dwellings

No.	Characteristic of Dwelling Structure	Number	Percentage (%)
1	Building Type		
	Permanent	10	15.9
	Semi-Permanent	53	84.1
2	Land/Building Ownership Status		
	Ownership (Freehold)	0	0
	Building Rights (HGB)	10	15.9
	Other Certificates	53	84.1
3	Has Building Permit (IMB)		
	Yes	0	0
	No	63	100
4	Building Land Area		
	< 50 m²	28	44.4
	50 – 100 m²	26	41.3
	100 – 150 m²	9	14.3

	150 – 200 m²	0	0
5	Ground Floor Area		
	< 25 m²	3	4.8
	25 – 50 m²	28	44.4
	50 – 75 m²	16	25.4
	75 – 100 m²	16	25.4

Source: Research Finding (Data analysis) 2023

3.1.3 Characteristics of Building Conditions

Research observations also examined the characteristics of building conditions based on roof conditions, wall conditions, air circulation, lighting conditions, and cleanliness conditions, as shown in Table 3 below:

Table3 Characteristics of Building Conditions

Area	Characteristic of Building Condition	Type	Number	Percentage (%)
Neighborhood 33	Roof Condition	Good	11	17.5
		Moderate	12	19.0
		Poor	40	63.5
	Wall Condition	Good	12	19.0
		Moderate	20	31.8
		Poor	31	49.2
	Air Circulation Condition	Good	34	54.0
		Moderate	18	28.6
		Poor	11	17.5
	Lighting Condition	Good	43	68.3
		Moderate	18	28.6
		Poor	2	3.17
	Cleanliness Condition	Good	10	15.9
		Moderate	21	33.3
		Poor	32	50.8

Source: Research findings (data analysis), 2023

The condition of semi-permanent and permanent houses is predominantly made of wood, zinc, and plywood, with many houses having poor roof and wall conditions, often leaning and leaking. The roof and wall conditions of some semi-permanent and permanent houses can be seen in the following Figures 1 and 2.

Figure 2House Condition Temporary

Figure 3 Permanent House Condition

3.1.4 Characteristics of Environmental Quality in Slum Settlements

The characteristics of environmental quality in slum settlements are assessments based on observations of each respondent regarding the physical environment. Variables of environmental quality characteristics include roads, building regularity, cleanliness, security, drainage, waste disposal, green open spaces (RTH), firefighting facilities, and natural disaster evacuation routes. The results of research observations on the characteristics of environmental quality in slum settlements can be seen in Table 4 below:

Table4Characteristics of Environmental Quality in Slum Settlements

No.	Environmental Quality Characteristic	Type	Number	Percentage (%)
1	Roads	Good	5	7.9
		Moderate	40	63.5
		Poor	18	28.6
2	Building Regularity	Good	5	7.9
		Moderate	58	92.1
		Poor	-	-
3	Cleanliness	Good	1	1.6
		Moderate	9	14.3
		Poor	53	84.1

		Good	47	74.6
4	Security	Moderate	13	20.6
		Poor	3	4.8
		Good	1	1.6
5	Drainage	Moderate	21	33.3
		Poor	41	65.1
		Good	-	-
6	Waste Disposal	Moderate	2	3.2
		Poor	61	96.8
		Good	1	1.6
7	Green Open Spaces (RTH)	Moderate	7	11.1
		Poor	55	87.3
		Good	62	98.4
8	Firefighting Facilities	Moderate	-	-
		Poor	1	1.6
		Good	-	-
9	Natural Disaster Evacuation Routes	Moderate	1	1.6
		Poor	62	98.4

Source: Research findings (data analysis), 2023

In this study, data were also collected based on observations directly assessed according to the conditions in Neighborhood 33. In Table 4, the majority of road conditions are moderate, mainly consisting of concrete pavement, but there are still some areas with wooden road surfaces. The condition of neighborhood roads also poses an environmental problem because during high tides, these roads become flooded. Residents hope these roads can be elevated to prevent water from entering their homes.

The cleanliness condition is poor, influenced by both community initiatives and inadequate waste disposal facilities. Improving cleanliness conditions is crucial for the area's image and the health of its residents.

The drainage condition in Neighborhood 33 is poor in terms of cleanliness, water flow, and the width of the drains. This is due to the drains being clogged with waste, resulting in stagnant water on neighborhood roads.

Figure 4 Road Environment Condition

The cleanliness condition in Neighborhood 33 is deemed poor, influenced by the lack of community initiative and inadequate waste disposal facilities. Enhancing cleanliness is imperative as it significantly impacts the area's image and the health of its residents.

Figure 5: Cleanliness Condition in Neighborhood 33

The drainage condition in Neighborhood 33 is poor, both in terms of cleanliness, smoothness of water flow, and the width of the drainage. This is due to the drainage channels being clogged with debris, preventing water from flowing and causing the neighborhood streets to flood.

3.2 Level of Community Participation

Social characteristics (indicator 1) consist of 7 questions regarding social cohesion among neighbors, security, conflict vulnerability, community satisfaction with living in the neighborhood, welfare/cost sufficiency, community roles, and compliance. The community participation indicator comprises 10 questions about the stages of community participation, including decision-making, program implementation, program utilization, and program evaluation. Thus, the distribution of categories for each indicator can be seen in Table 5 below:

Table 5: Community Participation Categories

No	Community Participation Level	Number	Percentage (%)
	Indicator 1: Community Perception of Housing Environment Conditions		
1	Low	39	61.9
	Moderate	20	31.7
	High	4	6.3

	Indicator 2: Decision Making		
	Low	41	65.1
2	Moderate	16	25.4
	High	6	9.5
	Indicator 3: Program Implementation		
	Low	36	57.1
3	Moderate	22	34.9
	High	5	7.9
	Indicator 4: Program Utilization		
	Low	39	61.9
4	Moderate	18	28.6
	High	6	9.5
	Indicator 5: Program Evaluation		
	Low	38	60.3
5	Moderate	19	30.2
	High	6	9.5

Source: Research findings (data processing), 2023

Reviewed from the community participation based on community perceptions of housing environment conditions (indicator 1), the research results show that out of 63 respondents, 39 individuals (61.9%) have a low level of social cohesion, 20 individuals (31.7%) have a moderate level, and 4 individuals (6.3%) have a high level. Thus, the majority of respondents have a low level of social cohesion (61.9%).

Reviewed from community participation based on decision-making (indicator 2), the research results show that out of 63 respondents, 41 individuals (65.1%) have a low level of participation in decision-making, 16 individuals (25.4%) have a moderate level, and 6 individuals (9.5%) have a high level. Thus, the majority of respondents have a low level of participation in decision-making (65.1%).

Reviewed from community participation based on program implementation (indicator 3), the research results show that out of 63 respondents, 36 individuals are at a moderate level, and 5 individuals (7.9%) have a high level of participation in program implementation. Thus, the majority of respondents have a low level of participation in program implementation (57.1%).

Reviewed from community participation based on program utilization (indicator 4), the research results show that out of 63 respondents, 39 individuals (61.9%) have a low level of participation in program utilization, 18 individuals (28.6%) have a moderate level, and 6 individuals (9.5%) have a high level. Thus, the majority of respondents have a low level of participation in program utilization (61.9%).

Reviewed from community participation based on program evaluation (indicator 5), the research results show that out of 63 respondents, 38 individuals (60.3%) have a low level of participation in program evaluation, 19 individuals (30.2%) have a moderate level, and 6 individuals (9.5%) have a high level. Thus, the majority of respondents have a low level of participation in program evaluation (60.3%).

To determine the level of community participation in addressing slum settlements in Neighborhood 33, it can be obtained from the questionnaire results related to social characteristics and community participation. From these respondent results, the total scores from 17 categories/items of statements per respondent are calculated. Then, based on the total score, the participation levels are classified.

3.3 SWOT Analysis

Table 6 : Based on the analysis of internal and external environments, strengths, weaknesses, opportunities, and threats can be identified as outlined in

No.	Internal Factors Strengths	External Factors Opportunities
1	Availability of sufficient land for socio-economic activities development.	Development of Belawan Port which supports livelihood opportunities and income growth.
2	Legal land status under PT. Pelindo ownership for environmental development.	Positive government support in regional development.
3	Native resident status that can be directed towards greater love and care for the environment.	Positive sustainable development programs in slum settlement management.
4	Moderate population density in Neighborhood 33, making environmental issues less complex.	Government cooperation with international organizations in Sustainable Development (SDGs) implementation.
5	Moderate level of slum conditions in Neighborhood 33.	Educational programs for communities regarding slum settlement management to increase environmental awareness.
No.	**Internal Factors** Weaknesses	**External Factors** Threats
1	Low community participation in slum settlement management in Neighborhood 33.	Extreme climatic conditions affecting port operations.
2	Poor handling of environmental settlement.	Threat of high tidal flooding.
3	Low community income.	Potential for high ground subsidence.
4	Poor environmental conditions.	Potential for high disease development.

Source: Research data from 2023

3.3.1 SWOT Quadrant

Strategies can be devised by examining opportunities and threats compared to strengths and weaknesses, as demonstrated by using a SWOT diagram that identifies the four quadrants. The results of comparing internal analysis with

external analysis of community participation in slum settlement management in Belawan II Sub-District are as follows: X = total score of strengths (S) - total score of weaknesses (W) Y = total score of opportunities (O) - total score of threats (T) Where: x = 1.93 - 1.35 y = 1.71 - 0.98 x = 0.58 y = 0.73

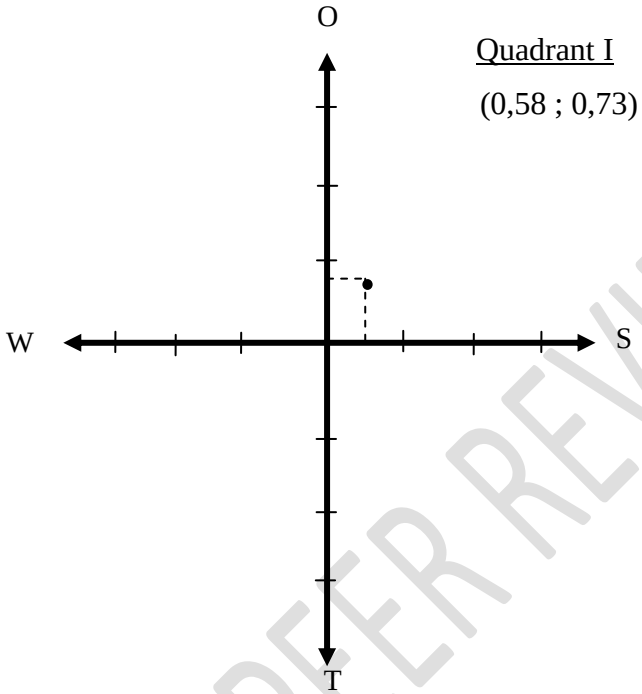

Figure 6 SWOT Quadranta.

In Quadrant I (Progressive Strategy), the general strategy to be pursued is to utilize existing strengths to seize every advantage of the opportunities available. b. In Quadrant II (Diversification Strategy), one can leverage opportunities as a reference to focus activities while avoiding weaknesses. c. In Quadrant III (Change Strategy), efforts should be directed towards minimizing weaknesses to confront every threat. d. In Quadrant IV (Survival Strategy), strengths should be leveraged to confront every threat by creating diversification to generate opportunities.

Based on the SWOT Quadrant diagram, the score for the strength factor is 1.93 and for the weakness factor is 1.35, resulting in a difference of 0.58. Similarly, the score for the opportunity factor is 1.71 and for the threat factor is 0.98, resulting in a difference of 0.73. These difference values can form coordinate points, namely (0.58; 0.73). Thus, the position in Quadrant I (Progressive) is obtained, which is a highly advantageous situation because it combines opportunities and strengths, enabling the utilization of existing conditions for application in the analysis of community participation in slum settlement management with sustainable principles. Therefore, the appropriate strategy for the government to implement in this situation is to support aggressive growth policies (Growth Oriented Strategy), allowing for continuous progress towards maximum advancement.

The research analysis using the SWOT matrix, which combines strengths, weaknesses, opportunities, and threats, provides insights for policy-making based on Strength-Opportunity (SO) Strategy, Weakness-Opportunity (WO) Strategy, Strength-Threat (ST) Strategy, and Weakness-Threat (WT) Strategy.

3.4.2 SWOT Matrix

The SWOT matrix is an analytical tool used to organize strategic factors. This matrix clearly illustrates how external opportunities and threats can be aligned with internal strengths and weaknesses. It can generate possible strategic alternatives for the community in developing slum settlement areas in Belawan II Sub-District.

Table 7: SWOT Matrix for Slum Settlement Area Development

	Strength (S)	**Weakness (W)**
Opportunity (O)	SO: Conducting education programs for community on area management and utilizing available land for socio-economic activities and area development to enhance income, supported by the government. (S1, O1, O2, O3, O4, O5)	WO: Increasing community participation in sustainable environmental management by utilizing education programs for community regarding settlement management with government support. (W1, W2, O2, O3, O5)
Threat (T)	ST: Maximizing land availability to anticipate threats of flooding and disease development. (S1, T2, T4)	WT: Enhancing community participation for slum environmental management by improving environmental conditions. (W1, W2, T1, T2)

Source: Research data, 2023 (processed data)

1. **Strength-Opportunity (SO) Strategy:** This strategy involves conducting educational programs for the community regarding area management and utilizing available land for socio-economic activities and area development to enhance income in support of sustainable development with government backing.
2. **Weakness-Opportunity (WO) Strategy:** This strategy focuses on increasing community participation in sustainable environmental management by utilizing education programs regarding settlement management with government support.
3. **Strength-Threat (ST) Strategy:** This strategy aims to maximize land availability to anticipate threats of flooding and disease development in the Belawan II Sub-District.
4. **Weakness-Threat (WT) Strategy:** This strategy focuses on enhancing community participation for slum environmental management by improving environmental conditions in the Belawan II Sub-District.

Table8. Internal Factor Evaluation Matrix (IFE)

No.	**Key Internal Factors**	**Total Value**	**Relative Weight**	**Average Rating**	**Score**

	Strength Indicator				
1	Availability of Ample Land for Socio-Economic Activities	23	0.118	3.83	0.45
2	Legal Status of Land under PT. Pelindo's Ownership for Environmental Development	22	0.113	3.67	0.41
3	Residency Status of Indigenous Population Encouraging Greater Environmental Stewardship	21	0.108	3.50	0.38
4	Moderate Population Density in Environment 33, Simplifying Environmental Issues	21	0.108	3.50	0.38
5	Intermediate Level of Squalor in Environment 33	19	0.098	3.17	0.31
	Subtotal for Strengths (A)	106	0.545	17.67	1.93
	Weakness Indicators				
1	Low Community Participation in Settlement Management in Environment 33	21	0.108	3.50	0.38
2	Poor Environmental Management of Settlements	19	0.098	3.17	0.31
3	Low Income Levels among the Community	17	0.088	2.83	0.25
4	Poor Environmental Conditions	16	0.083	2.67	0.22
5	Inferior Building and Infrastructure Aspects	15	0.077	2.50	0.19
	Subtotal for Weaknesses (B)	88	0.455	14.67	1.35
	Total (A+B)		1.00	32.34	3.28

Source: Research Finding, 2023 (Processed Data)

Table 9. External Factor Evaluation Matrix (EFE) for Belawan Port Development

No.	Key External Factors	Total Value	Relative Weight	Average Rating	Weighted Average
	Opportunity Indicators				
1	Development of Belawan Port fostering economic uplift and livelihood opportunities	21	0.139	3.50	0.49
2	Governmental support for regional	19	0.126	3.17	0.40

	development initiatives				
3	Positive impact of sustainable development programs on slum settlement management	17	0.113	2.83	0.32
4	Collaboration between government and international organizations on Sustainable Development Goals (SDGs)	16	0.106	2.67	0.28
5	Community educational programs on settlement care for enhanced environmental consciousness	14	0.093	2.33	0.22
Subtotal for Opportunities		87	0.576	14.50	1.71
Threat Indicators					
1	Extreme climate conditions impacting port operations	17	0.106	2.83	0.30
2	High risk of seawater inundation	14	0.087	2.33	0.20
3	Significant potential for land subsidence	12	0.075	2.00	0.15
4	Elevated risk of disease proliferation	13	0.081	2.17	0.18
5	Uncontrolled influx of migrants posing challenges	12	0.075	2.00	0.15
Subtotal for Threats		68	0.424	11.33	0.98
Total for Opportunities and Threats			1.00	26.00	2.69

Source: Research Findings, 2023 (Processed Data)

Strategy 1, which is the Strength-Opportunity (SO) Strategy in the SWOT analysis, involves conducting educational programs for the community regarding area management and utilizing available land for socio-economic activities and area development to enhance income in support of sustainable development with government backing. Educating the community about environmental management is crucial for raising awareness about the relationship between community well-being and the environment. Community participation in environmental management is necessary because informed communities are more likely to engage in solving local environmental issues.

1. **Weakness Threat (WT) Strategy:**
    - Priority: Second

- Description: Enhancing community participation for slum environmental management by improving environmental conditions. One of the principles of sustainable development is to utilize the community to address its environmental issues. With community participation, sustainable development can be pursued in both socio-economic and environmental aspects.

2. **Strength Threat (ST) Strategy:**
    - Priority: Third
    - Description: Maximizing land availability to anticipate threats of flooding and disease development. Government utilization of available land can help communities have more habitable environments with adequate facilities. Available land can be used for waste disposal, public open spaces for socio-economic activities, and provision of clean water sources. Improving poor drainage systems can mitigate the threats of flooding and disease development, creating habitable and sustainable environments.
3. **Weakness Opportunity (WO) Strategy:**
    - Priority: Fourth
    - Description: Increasing community participation in sustainable environmental management by utilizing education programs for community regarding settlement management with government support. Education programs for the community regarding environmental management are essential for raising awareness of the relationship between community well-being and the environment. Socializing community involvement in settlement environmental management, especially in slum areas, is crucial. Community participation in environmental management is necessary because informed communities are more likely to engage in solving local environmental issues.

Based on the SWOT analysis results, it is evident that slum settlement development in Belawan II Sub-District has fairly good opportunities and is worthy of development. This is indicated by the total weighted average value of strength and weakness factors (Table 8), which is 3.28, greater than the average value of 2.5. Meanwhile, the total weighted average value of opportunity and threat factors (Table 9) is 2.69, also greater than 2.5.

The best quantitative strategy for slum settlement development in Belawan II Sub-District is to use a diversification strategy in the first quadrant. Despite facing various threats, the slum settlement management program in Belawan II Sub-District still has internal strengths. Therefore, the strategy that should be applied to this slum settlement management program is to utilize or maximize the strengths.

3.5 Discussion

The findings from this study underscore the pivotal role of community participation in improving the quality of slum settlements in the Belawan II Sub-District, Medan Belawan, Indonesia. The critical importance of community involvement in slum area management strategies, our research reveals that enhanced community participation, facilitated through targeted socialization and education programs, leads to significant improvements in environmental cleanliness and overall settlement quality.

The impact of poor drainage conditions and waste management issues, leading to stagnant water and exacerbated flooding risks, was markedly reduced following the implementation of community-driven environmental improvement initiatives. Our SWOT analysis further highlighted the effectiveness of employing educational programs, community participation enhancement, and optimal land use as strategies to combat the challenges faced by slum settlements. This strategic approach resonates with the principles outlined in the Livable Settlement Concept which have a focus on education and empowerment not only raises awareness but also equips communities with the tools necessary for sustainable environmental management.

Moreover, the prioritization of strategies such as the Strength-Opportunity (SO) approach, aimed at leveraging community strengths to exploit opportunities for sustainable development, reflects the successful application of diversification strategies in slum settlement management. The quantitative and qualitative improvements observed in this study also lend support to the hypothesis that informed and engaged communities are better equipped to address local environmental issues.

V. Conclusion and Recommendations

In conclusion, this study not only reaffirms the critical role of community participation in slum settlement improvement efforts but also contributes to the growing body of evidence supporting the need for government-community collaboration and the implementation of education initiatives as foundational elements of sustainable urban development. By drawing on the insights provided by previous research, our findings offer a compelling case for the adoption of comprehensive, community-focused strategies in addressing the complex challenges of slum settlements.

The level of community participation in managing slum settlement environments in Area 33 of Belawan II Sub-District is still low but significantly affects the quality of settlements. Low participation is influenced by lack of awareness, focus on work, and minimal involvement in environmental improvement programs.

Socialization and education of the community are needed to improve the quality of settlements.

The government needs to optimize environmental improvement programs by empowering communities and building communication initiatives between the government and the community. Establishing platforms to convey community aspirations and involving organizational/community sectors in environmental improvement activities can enhance the quality of settlements in Area 33.

References

Bandyopadhyay, A., & Agrawal, V. (2013). Slums in India: From Past to Present. International Refereed Journal of Engineering and Science (IRJES), 2(4), 55-59.

Bagheri, M. (2012). The challenge of slums: socio-economic disparities. International Journal of Social Science and Humanity, 2, 412-413.

Çiçeklioğlu, M., Ergin, I., Demirelöz, M., Ceber, E., &Nazlı, A. (2012). Sociodemographic aspects of consanguineous marriage in an urban slum of a metropolitan area in Izmir, Turkey. Annals of Human Biology, 40(2), 39–145.

Dagdeviren, H., & Robertson, S. A. (2011). Access to Water in the Slums of Sub-Saharan Africa. Development Policy Review, 29(4), 485-505.

Desai, V., & Loftus, A. (2012). Speculating on Slums: Infrastructural Fixes in Informal.

Goswami, S., & Manna, S. (2013). Urban Poor Living in Slums: A Case Study of Raipur City in India. Global Journal of Human Social Science Sociology & Culture, 13(4), Version 1.0.

Gulyani, S., Ellen, M. B., & Debabrata, T. (2012). Land Economics Housing in the Global South. Antipode, 45(4), 789–808.

Idowu, O. O. (2013). Challenges of Urbanization and Urban Growth in Nigeria. American Journal of Sustainable Cities and Society, 2(1), 79-95.

Marx, B., Stoker, T., & Suri, T. (2013). The Economics of Slums in the Developing World. Journal of Economic Perspectives, 27(4), 187–210.

Pryer, J. A., & Rogers, S. (2006). Epidemiology of undernutrition in adults in Dhaka slum households, Bangladesh. European Journal of Clinical Nutrition, 60, 815–822.

Putra, K. P., & Andriana, M. (2017). Faktor PenyebabPermukimanKumuh Di Kelurahan Bagan Deli Belawan Kota Medan. JurnalKoridor, 8(2). https://doi.org/10.32734/koridor.v8i2.1334

Roy, D., Michael, H. L., Bharath, P., Karin, P., & Peter Sloot, M. A. (2014). The emergence of slums: A contemporary view on simulation models. Environmental Modelling & Software, 59, 76-90.

Sakdapolrak, P., Thomas, S., & Christina, E. (2013). Burden of direct and indirect costs of illness: Empirical findings from slum settlements in Chennai, South India. Progress in Development Studies, 13(2), 135–151.

Ucha, C. (2010). Poverty in Nigeria: Some Dimensions and Contributing Factors. Global Majority E-Journal, 1(1), 46-56.

Lubis, A. A. R. D. (2024). Housing Development Growth and Flood Risk in Medan City: A Multiple Linear Regression Analysis. Retrieved from https://www.researchgate.net/publication/377700521

Lubis, S. N. (2021). Mechanisms and Market Structure. Medan: USU Press. ISBN 978-602-465-375-0.