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PLANNING FOR HOUSING DEVELOPMENT AND COASTAL SETTLEMENTS BASED ON ENVIRONMENTAL CARRYING CAPACITY IN TELUK HARU, LANGKAT REGENCY

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ABSTRACT

This study aims to analyze the existing conditions, constraints, and strategies for developing safe, comfortable, and sustainable housing in the coastal area of Teluk Haru, Langkat Regency. The study used a descriptive qualitative approach, with data collection through participatory observation, in-depth interviews, and documentation. The results show that settlements in Teluk Haru still face significant challenges, including limited land, flood and abrasion risks, mangrove damage, community economic constraints, and suboptimal development coordination. Recommended development strategies include adaptive housing development, mangrove conservation, community empowerment, and integration of planning with spatial planning and public infrastructure policies. The role of the government and other stakeholders is crucial in realizing integrated and sustainable housing development. This research is expected to serve as a reference in formulating housing development policies in coastal areas that consider social, economic, and environmental balance.

Introduction

The coastal area of Teluk Haru in Langkat Regency has strategic potential both from an economic and social perspective. Its proximity to the sea makes this area have the potential to be a center for fisheries, tourism, and trade activities. However, rapid population growth and urbanization in this area have posed significant challenges related to the provision of decent and affordable housing for the community. The current housing conditions in the coastal area of Teluk Haru are still dominated by housing that does not meet health and comfort standards, such as dense, semi-permanent houses, and lack of access to basic facilities such as clean water, sanitation, and adequate drainage. This not

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only affects the quality of life of residents, but also poses environmental risks, such as coastal erosion, flooding, and marine pollution due to unregulated settlement governance.

In addition, housing development in coastal areas requires special attention to sustainability and disaster risk mitigation aspects. Climate change and sea level rise are real challenges that can threaten the sustainability of coastal settlements. Without careful planning, housing development can have an impact on environmental damage, decreased economic productivity, and increased social vulnerability of coastal communities. A planned, integrated, and sustainable housing development strategy is needed in the Haru Bay area. This approach must consider the balance between housing needs, environmental conservation, and local community empowerment. With proper planning, housing development in the coastal area of Teluk Haru is expected not only to improve the quality of housing, but also to support socio-economic and environmental resilience for the local community.

Figure 1. Residential Housing Development in the Coastal Area of Teluk Haru in Langkat Regency

The coastal area of Teluk Haru in Langkat Regency shows complex social and environmental dynamics. Based on population data in 2023, Langkat Regency has a population of 1,109,248 people, with a proportion of 558,556 males and 550,692 females (Data.go.id). This high population indicates a significant need for decent housing and basic facilities, especially in coastal areas that are the center of community activities. Besitang District, which is included in the Teluk Haru area, has an area of 720.75 km² with an annual rainfall of 2,066 mm (BPS API, 2012). This condition shows its own potential and challenges for housing development, especially related to the risk of flooding and soil moisture that can affect construction and housing quality.

In terms of settlements and infrastructure, the coastal area of Teluk Haru is included in the flood-prone zone, as data from the Public Works and Spatial Planning Office of Langkat Regency shows that coastal areas, including Babalan, Tanjung Pura, and Teluk Haru Districts, are vulnerable to waterlogging and infrastructure damage (dputr-lkt.langkatkab.go.id). In addition, changes in the coastline in Langkat Regency show significant erosion that can threaten the stability of coastal settlements (ResearchGate). This condition emphasizes the importance of housing planning that not only considers aspects of housing needs, but also disaster risk mitigation and strengthening environmental resilience.

Natural resources in coastal areas are also an important factor in housing development. Coastal areas and small islands in Langkat Regency have mangrove forests covering an area of 63,467.4 ha, of which 27,019.57 ha are in good condition, while 36,447.83 ha have been damaged (North Sumatra). Mangroves play an important role in resisting abrasion, maintaining ecosystem balance, and reducing the impact of natural disasters such as tidal waves and flash floods. Therefore, housing development in Haru Bay must be carried out by paying attention to the preservation of mangroves and coastal ecosystems.

In addition, regional planning is key to sustainable housing development. The 2019-2024 Langkat Regency Regional Medium-Term Development Plan (RPJMD) emphasizes the development of the Teluk Haru area as one of the centers of local activities (dputr-lkt.langkatkab.go.id). This opens up opportunities for local governments to integrate housing development with public infrastructure, social facilities, and environmental management. This integrated planning approach is expected to improve the quality of life of the community, reduce disaster risk, and ensure the sustainability of settlements in the coastal area of Haru Bay.

Housing development in the coastal area of Teluk Haru of Langkat Regency is very important and urgent to be researched for several main reasons. First, the significant population growth in Langkat Regency creates a need for adequate, affordable, and safe housing for the community. Coastal areas, including Haru Bay, have great economic potential through the fisheries, trade, and tourism sectors. However, without proper housing planning, the utilization of this potential can be hampered due to unsuitable, congested, and disaster-prone housing conditions. Second, environmental conditions and coastal infrastructure present serious challenges to the sustainability of settlements. Data shows that Haru Bay is a flood-prone area, with significant shoreline erosion and damage to mangrove forests that serve as a natural shield from abrasion and tidal waves. The inability to overcome these challenges can threaten community safety, environmental quality, and local economic survival. This research provides urgency to design housing development strategies that are resilient to disasters and environmentally friendly.

Third, the existence of a regional development policy through the 2019-2024 Langkat Regency RPJMD which emphasizes the development of the Haru Bay area as a center of local activities requires integrated planning. This research is important to provide scientific data and analysis that supports governments and stakeholders in formulating sustainable housing policies, while improving the socio-economic well-being of coastal communities. Considering population growth, disaster-prone environmental conditions, and the need for integrated regional planning, research on residential housing development in Haru Bay is not only relevant, but also very feasible. This research is expected to make a real contribution in creating safe, comfortable, and sustainable settlements for the coastal communities of Lalat Regency.

Problem Identification

Based on the background and available data, some of the main problems faced in housing development in the coastal area of Teluk Haru can be identified as follows:

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1. Population growth and housing needs

The population of Langkat Regency, which reaches more than 1.1 million people, puts pressure on the availability of decent, affordable, and safe housing for the community.

2. Disaster-prone coastal environmental conditions

Haru Bay is a flood-prone area and has experienced significant shoreline erosion, so settlements are at risk of damage from natural disasters.

3. Destruction of natural resources and the environment

Mangrove forests in the damaged coastal areas reach more than 36 thousand hectares, reducing the natural protective function of the coastal tide and abrasion.

4. Limited infrastructure and basic facilities

Access to clean water, sanitation, drainage, and road facilities in some coastal settlements is still limited, thus impacting the quality of life of the community.

5. Lack of integrated housing planning

The development of the Teluk Haru area as a center of local activities through the RPJMD has not been fully integrated with the sustainable and environmentally friendly housing development strategy.

Problem Formulation

Based on the identification of the above problems, this study was formulated to answer the following questions:

1. What are the existing conditions of housing and settlements in the coastal area of Teluk Haru, including social, economic, and environmental aspects?
2. What are the obstacles and challenges in the development of decent and sustainable housing in the Teluk Haru area?
3. What is the strategy for the development of safe, comfortable, and sustainable residential housing in the coastal area of Teluk Haru?
4. What is the role of local governments and stakeholders in supporting integrated and sustainable housing development?

Literature Review

Definition of Coastal Settlements

Coastal settlements are residential areas located in the confluence area between land and sea, in which there are livelihood activities by settler groups who dominantly utilize the potential in coastal areas to meet needs (Damisi et al., 2014). The characteristics of coastal settlements include physical conditions that are often poor due to natural factors such as abrasion, floods, and earthquakes, as well as land use that tends to be uncontrolled and often conflicts between land users (Damisi et al., 2014).

Housing Development in Coastal Areas

Housing development in coastal areas faces challenges such as limited land, especially in coastal areas which are often overcome by increasing the area of residential land through

reclamation at coastal boundaries (Damisi et al., 2014). However, this can have an impact on the lack of supporting facilities such as open spaces (Damisi et al., 2014).

Infrastructure and Accessibility

Accessibility in coastal areas is often a problem due to poor infrastructure and high population density (Damisi et al., 2014). Adaptive infrastructure, such as the construction of sea dikes to prevent high tides and tides from encroaching into residential areas, is needed to increase the resilience of coastal settlements to natural disasters (Sutanto et al., 2025).

Natural Resources and Environment

Coastal areas are also areas that inhibit the entry of large waves of seawater to land, namely the existence of mangrove forests (Damisi et al., 2014). However, the destruction of mangrove forests can reduce the natural protective function of tidal waves and coastal abrasion (Damisi et al., 2014).

Coastal Area Planning and Management

Coastal planning and management must consider ecological, social, and economic aspects to achieve sustainable development (Damisi et al., 2014). Community involvement in coastal planning and management is essential to create policies that are effective and in accordance with local needs (Damisi et al., 2014).

RESEARCH METHOD

Types of Research

This study uses a descriptive qualitative approach. This approach is used to understand complex social phenomena through the perspective of participants, with the aim of describing real conditions that occur in the field without the manipulation of variables (Creswell, 2018). This method is suitable for case studies such as housing development in coastal areas that have distinctive social, cultural, and environmental characteristics.

Location and Subject of Research

This research was carried out in the coastal area of Teluk Haru, Langkat Regency, which is an area with unique social and environmental dynamics. The research subjects consisted of coastal communities, traditional leaders, village officials, and other related stakeholders. The selection of subjects is carried out purposively to obtain in-depth and relevant information to the research topic.

Data Collection Techniques

Data is collected through:

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1. Participatory observation: Researchers are directly involved in community activities to observe social interactions and environmental conditions directly (Moleong, 2018).
2. In-depth interviews: Conducted using semi-structured interview guidelines to explore public perceptions, experiences, and expectations related to housing in coastal areas (Kvale, 2015).
3. Documentation: Collect secondary data from archives, reports, and related documents that can support the analysis (Bowen, 2009).

Data Analysis Techniques

Data analysis was carried out by:

1. Data reduction: The process of selecting, focusing, and simplifying data obtained from the field (Miles & Huberman, 2014).
2. Data presentation: Organize data in the form of a matrix or narrative that makes it easy to understand (Miles & Huberman, 2014).
3. Drawing conclusions: Interpreting data to answer the problem formulation and achieve research objectives (Miles & Huberman, 2014).

Data Validity and Reliability

To ensure the validity and reliability of the data, the following are carried out:

1. Triangulation: Using a variety of data sources, techniques, and theories to verify findings (Denzin, 2012).
2. Member checking: Returning the results of the interview to the informant to ensure the accuracy and clarity of the data (Lincoln & Guba, 1985).

Audit trail: Document the entire research process in detail to ensure transparency and accountability (Lincoln & Guba, 1985).

Results and Discussion

What are the existing conditions of housing and settlements in the coastal area of Haru Bay, including social, economic, and environmental aspects

The coastal area of Teluk Haru in Langkat Regency currently shows the condition of settlements that still face various challenges in terms of social, economic, and environmental aspects. Socially, settlements in this area are dominated by fishing communities and small traders who live off coastal activities. The social structure is still communal with close interaction between citizens, but access to education, health facilities, and other public services is relatively limited. This has an impact on people's quality of life and their ability to deal with emerging social and environmental risks. From the economic aspect, the majority of the coastal population of Haru Bay depend on the

fishery sector, micro businesses, and local trade. This dependence on natural resources makes people's income levels tend to be low and fluctuate, so their ability to obtain decent housing is limited. This condition also affects the ability of people to repair and maintain their homes, so that many settlements do not meet healthy and comfortable housing standards.

Environmentally, the Haru Bay area faces significant risks due to its coastal location. The data shows that there is coastal erosion, flash flooding, and destruction of mangrove forests that affect land stability and settlement security. Supporting infrastructure such as drainage, roads, and sanitation facilities is also inadequate, increasing the vulnerability of communities to disasters and declining the quality of the residential environment. Overall, the existing conditions of housing and settlements in Teluk Haru show that there is a gap between the need for decent housing and the real conditions on the ground. Social, economic, and environmental problems are interconnected, requiring an integrated, sustainable, and adaptive approach to housing development to coastal risks to improve community welfare

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What are the obstacles and challenges in the development of decent and sustainable housing in the Haru Bay area

Housing development in the coastal area of Teluk Haru faces various obstacles and challenges that are complex, both from the physical, social, economic, and environmental aspects. From a physical point of view, one of the main obstacles is the limited amount of livable land. Coastal areas tend to be narrow and prone to flash floods and coastal abrasion. This condition is exacerbated by the destruction of mangrove forests that function as natural protectors from sea waves, so that land stability for housing development becomes vulnerable. In addition, supporting infrastructure such as roads, drainage, clean water, and sanitation in many coastal areas is still limited, hindering the development of safe and comfortable housing.

From a social and economic perspective, the majority of coastal communities in Teluk Haru work as fishermen and micro business actors with relatively low and unstable incomes. These economic conditions limit their ability to build or repair homes that meet feasibility standards. In addition, the level of education and access to information on sustainable development techniques and disaster risk mitigation is also low, so that people's awareness and ability to maintain the quality of housing and the environment are limited. In addition, government planning and policies related to coastal housing development face the challenges of inter-agency coordination and limited resources. Although the Regional Medium-Term Development Plan (RPJMD) of Langkat Regency emphasizes the development of the Haru Bay area, its implementation is sometimes hampered by budget limitations, supervision, and integration of planning with disaster risk mitigation and environmental conservation.

Environmentally, natural risks such as tidal waves, coastal erosion, and potential flash flooding disasters are significant challenges. Housing development that does not take into account environmental conditions can exacerbate ecosystem damage, reduce mangrove function, and increase community vulnerability to disasters. Thus, the

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obstacles and challenges in the development of decent and sustainable housing in Teluk Haru include limited land, inadequate infrastructure, economic limitations of the community, low awareness and knowledge, and high environmental risks. Housing development in the region requires a holistic strategy, involving integrated planning, community empowerment, and environment-based risk mitigation.

What is the strategy for the development of safe, comfortable, and sustainable residential housing in the coastal area of Teluk Haru

The strategy for developing residential housing in the coastal area of Haru Bay must consider social, economic, and environmental aspects in an integrated manner so that the housing built is safe, comfortable, and sustainable. First, from the physical and environmental aspects, development must integrate disaster mitigation principles, such as the determination of a safe location from the risk of flash flooding and coastal erosion. Strengthening the coastline through the rehabilitation and preservation of mangrove forests is the main strategy to protect settlements from the impact of sea waves and abrasion. In addition, the application of adaptive house design to coastal conditions, such as stilt houses and the use of waterproof and corrosion-resistant building materials, can increase the resilience of dwellings to natural disasters.

Second, from a social and economic perspective, development strategies must involve the community as the main actor. Community empowerment through sustainable construction training, counseling on disaster mitigation, and the formation of non-governmental groups can increase local capacity to build and maintain decent housing. In addition, innovative funding mechanisms, such as housing subsidies or microcredit programs, can help low-income communities to have decent housing.

Third, in terms of planning and policy, an effective strategy involves integrating housing development planning with the Regional Spatial Plan (RTRW) and Regional Medium-Term Development Plan (RPJMD). This ensures that housing development is in line with the management of coastal areas, environmental protection, and the provision of public infrastructure such as roads, clean water, and drainage. The involvement of the government, stakeholders, and the private sector in the form of public-private collaboration or partnerships is key to ensuring the sustainability of housing development.

By implementing these strategies, residential housing development in Haru Bay can be achieved holistically: housing becomes safe from disaster risk, comfortable to live in, and environmentally sustainable, socially, and economically. This approach not only improves the quality of life of coastal communities, but also strengthens the socio-economic resilience and coastal ecosystem in the Haru Bay region.

What is the role of local governments and stakeholders in supporting integrated and sustainable housing development

The role of local governments and stakeholders is very strategic in supporting integrated and sustainable housing development in the coastal area of Teluk Haru. Local governments have the main responsibility for planning, regulating, and supervising

housing development. Through spatial planning policies, Regional Medium-Term Development Plans (RPJMD), and regulations related to housing and coastal areas, the government can determine safe locations, set technical development standards, and allocate budgets for supporting infrastructure. In addition, the government is tasked with ensuring the integration of housing development with environmental conservation, disaster mitigation, and the provision of public facilities, so that the settlements built not only meet physical but also social and ecological aspects.

Other stakeholders, including non-governmental organizations, the private sector, and local communities, have complementary roles. Non-governmental organizations can play a role in advocacy, community education, and empowerment of citizens to be actively involved in settlement planning and maintenance. The private sector, especially housing developers and investors, contributes to the efficient provision of funds, technology, and development management. Meanwhile, local communities as beneficiaries are important actors in ensuring that housing development is in accordance with local needs, culture, and social conditions.

This collaboration between governments and stakeholders can be realized through participatory mechanisms, such as development deliberative forums, public consultations, and sustainable development partnerships. With this integrated approach, every aspect of development—from physical, social, economic, to environmental—can be considered simultaneously. Akibatnya, Housing development in Haru Bay not only meets technical and aesthetic standards, but is also able to improve the quality of life of the community, preserve the environment, and strengthen the resilience of the region to disaster risks.

Conclusion

Based on the results of research on residential housing development in the coastal area of Teluk Haru Beach, Langkat Regency, it can be concluded that several things are as follows:

1. Existing conditions: Settlements in Haru Bay still face various social, economic, and environmental constraints. The majority of dwellings are built simply by low-income communities, with limited access to public facilities such as clean water, sanitation, and road infrastructure. Coastal environments that are prone to flooding, abrasion, and erosion add to the vulnerability of settlements.
2. Constraints and challenges: The main obstacles include limited land, mangrove damage, natural disaster risk, limited economic capacity and community knowledge, and development coordination that is not yet fully integrated between the government and stakeholders.
3. Development strategies: Effective strategies include the development of adaptive and disaster-resilient housing, mangrove rehabilitation and conservation, community empowerment through education and training, and inclusive funding mechanisms. Integrated and sustainable planning also emphasizes integration with spatial planning, public infrastructure, and environmental risk mitigation.

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4. Role of government and stakeholders: Local governments play a role in planning, regulating, and providing infrastructure facilities, while other stakeholders including the private sector, NGOs, and local communities contribute through participation, advocacy, and investment and resource management. Collaboration between parties is crucial to the success of safe, comfortable, and sustainable housing development.

Overall, housing development in Teluk Haru requires a holistic approach that considers social, economic, and environmental aspects, as well as the active involvement of all stakeholders.

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