Evaluation of oceanfront settlement areas, case study of Jalan Kelapa, Ilir Village, Gunungsitoli City

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Abstrak. Housing needs to be increased in the center of Gunungsitoli City after the 2015 earthquake, this situation has caused coastal areas and coastal borders to be used as residential areas, whose development is out of control, and has an impact on decreasing environmental quality. Therefore, an analysis is needed to determine the dominant factors that affect the condition of the housing area, and identify the suitability of the regional management plan in the city land use plan, taking into account the existing conditions. Analysis of the data used in this study is an assessment and describes each selected variable. The results of the study are in the form of information about the condition of the seaside residential area, which can be an input for stakeholders in determining the direction of sustainable waterfront management policies.

1. Introduction
The need for shelter in a city is a primary need to increase the dignity and dignity of its inhabitants. Someone will use any land to shelter, which is his residence. After the 2015 earthquake, the Ilir village in Gunungsitoli City received assistance for the construction of a house damaged by the earthquake. Areas with relatively flat contours in the center of the city, have led to rapid development, and have an impact on land use as a residential area with uncontrolled population growth. Rapid population growth hurts people's lives, social and economic fields, one of which is the availability of supporting facilities in inadequate housing areas. [1]. The use of coastal border areas that are not by its function as a support for the Coastal area has an impact on decreasing the environmental quality and sustainability of the coast in the region. Damage to coastal areas results in a decrease in the carrying capacity, thus threatening the sustainability of the coastal system and the economic, social and environmental survival of the community in coastal communities [2].

The coastal area in Desa Ilir, in the Land Use Plan of Gunungsitoli City, is a strategic economic area, with a priority maintenance scale, which is planned as a local protected area, capture fisheries area, and tourism area. The objectives of regional development plans are expected to increase economic value while maintaining the quality of settlements and the sustainability. However, the realization of the area's plan is problematic, if seen from the existing conditions as current residential areas. So from the problems mentioned above, the purpose of this study is to find out the dominant factors that affect the condition of residential area and to determine the suitability of local government policy plans, in the utilization of coastal areas by considering land use in the area.
2. Evaluation of Livable Settlements

One of the goals of evaluation is to know the ability and determine feasibility, not only seen from the physical aspects but also including non-physical. [3]. The feasibility assessment in this study was carried out by identifying each problem in the seaside settlement environment. Settlement problems that occur at this time, including: (a) the implementation system has not been maximized, including the institutional system needed; (b) the low level of fulfillment of adequate and affordable housing needs; (c) the decreasing quality of the existing settlement environment, is still limited and has not met service standards.[4]. Coastal settlements can run well, if the handling of infrastructure pays attention to elements, namely nature, humans, social communities, facilities and infrastructure.[5].

3. Policy for Utilizing Seaside Areas

The reason for the policy of utilizing the seaside area is because the potential possessed by the seaside area must be sustainable and utilized for the welfare of the community. Coastal areas have strategic significance because they are a transition area between terrestrial and marine ecosystems, and have rich natural resource potential, and environmental services. The wealth of the coastal or seaside area attracts various parties and various institutions regulate their utilization. However, in efforts to manage coastal areas many problems are faced, including: (a) depletion of resources; (b) pollution; (c) biodiversity; (d) natural disasters; (e) sea level rise; (f) coastal erosion; (g) land use; (h) subordinate area; (i) landscapes; (j) natural resource conflict.[6].

4. Methods

This research is using qualitative descriptive method with scoring analysis techniques to analyze the condition of the housing and evaluate the policy plan for managing the seaside area by considering the existing conditions. Data collection is done using observation and interviews with data management techniques through the ArcGIS program. The chosen research variables are the results of interpretations from several literature studies that influence the quality and development of settlements on the seafront. Variable assessment is the result of the accumulation of the number of each indicator based on the 2006 Directorate General of Cipta Karya Regulation the identification of slums and Minimum Service Standards in 2010.[7]. The classification of weights is divided based on the level of condition, level of importance, and level of service.

5. Results and Discussions

Analysis of the Sea Front Settlement area. The results of the condition of housing areas based on the assessment of each variable, it was found that settlement infrastructure was the condition with the worst service, which affected the current seaside settlements. A summary of the results of the analysis can be see in the following table:

| No | Variable          | Indicator          | Criteria                        | Analysis   | Indicator Score | Variable Score |
|----|-------------------|--------------------|---------------------------------|------------|----------------|----------------|
| 1  | Population Aspect | Population density | > 401 people/ha                 | 527 people/ha | 50             | 40 Medium category |
|    |                   |                    | 151-400 people/ha               |            |                |                |
|    |                   |                    | < 150 people/ha                 |            |                |                |
|    |                   | Population growth  | > 2 %                           | 1.44 %     | 30             |                |
|    |                   |                    | 1.7-2 %                         |            |                |                |
|    |                   |                    | < 1.7 %                         |            |                |                |
| 2  | Building Aspects  | Building density   | > 100 unit/ha                   | 50 unit/ha | 30             | 35 Medium category |
|    |                   |                    | 80-100 unit/ha                  |            |                |                |
|    |                   |                    | < 80 unit/ha                    |            |                |                |
| No | Variable                          | Indicator                                      | Criteria                  | Analysis | Indicator Score | Variable Score |
|----|----------------------------------|-----------------------------------------------|---------------------------|----------|----------------|----------------|
|    | Non-permanent building           |                                               |                           | 38 %     | 30             |                |
|    |                                  |                                               | > 50 %                    |          |                |                |
|    |                                  |                                               | 25-50%                    |          |                |                |
|    |                                  |                                               | < 25%                     |          |                |                |
|    | Building coverage                |                                               |                           | 64.78%   | 30             |                |
|    |                                  |                                               | > 70%                     |          |                |                |
|    |                                  |                                               | 50-70%                    |          |                |                |
|    |                                  |                                               | < 50%                     |          |                |                |
|    | Distance between buildings       |                                               | < 1.5 m                   | 50       |                |                |
|    |                                  |                                               | 1.5-3.0 m                 |          |                |                |
|    |                                  |                                               | > 3.0 m                   |          |                |                |
| 3  | Economic Aspects                | The strategic location of the area             | Strategic                 | 20       |                |                |
|    |                                  |                                               | Less strategic            |          |                |                |
|    |                                  |                                               | Non strategic             |          |                |                |
|    | Distance to the center of activity|                                              | > 10 Km                   | 20       | 20             | Good          |
|    |                                  |                                               | 1-10 Km                   |          |                | category       |
|    |                                  |                                               | < 1 Km                    |          |                |                |
|    | Functions around the area        | Commercial center and office                   | Commercial center and     | 20       |                |                |
|    |                                  |                                               | office                    |          |                |                |
|    |                                  |                                               | Central government        |          |                |                |
|    |                                  |                                               | Settlements and others    |          |                |                |
| 4  | Land Ownership Aspect           | Dominate land ownership status                | Freehold Title            | 35.2%    | 30             | 30 Medium      |
|    |                                  |                                               | Government property       | 27.1%    |                |                |
|    |                                  |                                               | Girik (Non-SHM/SHGB)      | 37.7%    |                |                |
| 5  | Settlement Infrastructure Aspects| Environmental road conditions                |                           | 82.7%    | 50             |                |
|    |                                  |                                               | > 70%                     |          |                |                |
|    |                                  |                                               | 50 - 70 %                 |          |                |                |
|    |                                  |                                               | <50 %                     |          |                |                |
|    | Drainage conditions             |                                               | Puddle > 50%              |          |                |                |
|    |                                  |                                               | Puddle 25-50%             |          |                |                |
|    |                                  |                                               | Puddle < 25%              |          |                |                |
|    | Clean water conditions          |                                               | Service < 30%             |          |                |                |
|    |                                  |                                               | Service 30% -60%          |          |                |                |
|    |                                  |                                               | Service > 60%             |          |                |                |
|    | Wastewater conditions           |                                               | Service < 30%             |          |                |                |
|    |                                  |                                               | Service 30% -60%          |          |                |                |
|    | Waste condition                 |                                               | Service > 60%             |          |                |                |

Policy Evaluation of Region Realization Plan. The plan for the realization of the area as a zone of capture fisheries equipped with Fish Landing Base faces many obstacles when viewed from the availability of land with a minimum land area of 2 hectares. In addition to this, the availability of biomass that forms the food chain in the waters of the western region of Sumatra, including the Nias Islands, is still very lacking, due to upwelling conditions that only occur from August to October. The rare upwelling process affects the amount of fish in the waters.[8].

The planned realization of the area as a tourism zone must pay attention to environmental quality, and the preservation of coastal areas. Compliance with the conditions of the area specified in the Gunungsitoli City Spatial Plan, such as protected areas and cultivation areas, should consider the criteria of the beach as a tourism zone. The analysis can be see in the table, including:


Table 2. Suitability analysis of tourist sites.

| No | Parameter               | Tourism beach criteria                      | Analysis                                                                 |
|----|-------------------------|---------------------------------------------|--------------------------------------------------------------------------|
| 1  | Beach Type              | White Sand or White Sand is a bit of a rock | The seaside area on Jalan Kelapa, as a whole is a type of sandy beach without coral |
| 2  | Beach Width             | > 10 meter                                  | From the measurement results using the ArcGIS application, the average beach width is above 15 meters |
| 3  | Water Depth             | 0-6 meter                                   | Watershed depth is less than 3 meters                                     |
| 4  | Basic Beach Material    | Sand or Coral Sand                          | The basic material of the beach is sand                                  |
| 5  | Beach slope             | < 15 meter                                  | The beach slope starts from the edge of the water to towards Kelapa Kelapa, 0-7 meters, while the slope of the coastal border is 0-2 meters above sea level. |
| 6  | Beach Land Closure      | Coconut trees and open land                 | Open land is found in many coastal areas, with an area of ± 16,763.91 m2 or 1.6 ha, while vegetation that grows a lot is coconut trees. |
| 7  | Dangerous Biodata       | There is not                               | There is not                                                             |
| 8  | Distance to Availability of Clean Water | > 1 km                                      | The area is directly adjacent to the river, meaning the distance of the area to the river is less than 1 km |

From the results of the analysis, the seaside residential area in Ilir Village, Gunungsitoli City, is more suitable if its development is a tourist zone, it is see from the criteria and the existing conditions of the current area. The development is expected to be able to improve the community economy according to the Land Use Plan policy direction as an economic strategic area.

6. Conclusions

From the results of the analysis of the residential area, that the condition of residential infrastructure had the most influence on the quality of current seaside settlements. Other variables are still in normal but do not rule out the possibility of adverse impacts on the waterfront housing area, if not addressed immediately.

The evaluation of the policy analysis of the area utilization plan as a zone of capture fisheries and tourist zones found that the area as a zone of capture fisheries will experience obstacles in its development if seen from the potential number of fish in the waters that are not too much. Also, in realizing the capture fisheries zone must be supported by the existence of a Fish Landing Base, with an area of at least two hectare which is difficult to fulfill, because the current land condition is a residential area. While the allotment of the area as a tourism zone can still be realized when viewed from the location of the area which is in the center of the economic activities of the City of Gunungsitoli. Development of the area as a tourist zone must consider the existing conditions of the area and the sustainability.

Based on the benefits of the research, the recommendations in this study for Local Governments as stakeholders, communities, and subsequent research, which has been described as follows:

For governments, regional planning must be adapted to existing conditions and accelerate development based on the Minimum Service Standard, and control the use of coastal and rural boundaries as a whole, for the development of sustainable tourism zones, taking into account existing conditions.

For the community, increasing the active role with full awareness, in the management and supervision of the coastal area, as well as creating creativity and innovation to increase the economy, while maintaining environmental sustainability through community working groups.
For further researchers, develop research in analyzing disaster management, as well as reviewing design concepts as tourist zone areas, which pay attention to environmental impact analysis based on existing conditions and the sustainability of ecosystems in coastal areas.

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