DEVELOPMENT DIVERSITY STUDY OF TOURISM URBAN AREA FUNCTION IN TOMINI BAY COAST-INDONESIA

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**ABSTRACT**

**Purpose:** This study aims to analyze the development diversity and land usage in coastal areas, especially development with a combination of three values (littoral, marine, anthropic) at Tomini Bay coast, Gorontalo City, in relation to Detailed Spatial Planning of Gorontalo City.

**Design/methodology/approach:** This research uses Quantitative descriptive method using primary data and secondary data. The analysis technique is three and four dimensional mapping from the cumulative percentage calculation of each index to determine the tendency of concentration and distribution of various coastal land usage indices.

**Findings:** The development by stakeholders and residents in each village shows a varied index value. This can be seen from the diversity index value. The highest diversity index value is Talumolo Village of 14.53, followed by North Leato Village of 12.08, South Leato Village of 11.34 and the lowest is Pohe Village of 7.17. This indicates a tendency of littoral area development by utilizing the coastal border area of Tomini Bay while the marine area is still limited to port construction to load and unload goods and passengers services.

**Research limitations/implications:** The research is limited to the most of coastal cultivated areas in along the Tomini Bay that cannot accommodate many other interested phenomena.

**Practical implications:** The strategy for regional development in coastal border areas should have technical provisions implementation for settlement development, especially for the intensity of building layout and environment.

**Social Implications:** The city government should control the development of new buildings in coastal border area of Tomini Bay, providing protection to coastal border of Tomini Bay, and providing disaster protection buildings around the coastal border of Tomini Bay.

**Originality/value:** Most of coastal cultivated along the Tomini Bay become main concern but still not researched for the technical provisions implementation for settlement development. This research examine the technical provisions implementation for settlement development

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ESTUDO DA DIVERSIDADE DE DESENVOLVIMENTO DA FUNÇÃO DE ÁREA URBANA TURÍSTICA NA COSTA DA BAÍA DE TOMINI - INDONÉSIA

RESUMO
Objetivo: Este estudo tem como objetivo analisar a diversidade do desenvolvimento e o uso da terra em áreas costeiras, especialmente o desenvolvimento com uma combinação de três valores (litorâneo, marinho e antrópico) na costa da Baía de Tomini, Cidade de Gorontalo, em relação ao Planejamento Espacial Detalhado da Cidade de Gorontalo.

Projeto/metodologia/abordagem: Esta pesquisa utiliza o método descritivo quantitativo com dados primários e secundários. A técnica de análise é o mapeamento tridimensional e quadridimensional a partir do cálculo da porcentagem cumulativa de cada índice para determinar a tendência de concentração e distribuição de vários índices de uso da terra costeira.

Conclusões: O desenvolvimento pelas partes interessadas e pelos residentes em cada vilarejo mostra um valor de índice variado. Isso pode ser visto no valor do índice de diversidade. O valor mais alto do índice de diversidade é o do vilarejo de Talumolo, com 14,53, seguido pelo vilarejo de North Leato, com 12,08, pelo vilarejo de South Leato, com 11,34, e o mais baixo é o do vilarejo de Pohe, com 7,17. Isso indica uma tendência de desenvolvimento da área litorânea por meio da utilização da área da borda costeira da Baía de Tomini, enquanto a área marinha ainda está limitada à construção de portos para carregar e descarregar mercadorias e serviços de passageiros.

Limitações/implicações da pesquisa: A pesquisa limita-se à maioria das áreas costeiras cultivadas ao longo da Baía de Tomini, que não pode acomodar muitos outros fenômenos de interesse.

Implicações práticas: A estratégia para o desenvolvimento regional em áreas de fronteira costeira deve ter a implementação de provisões técnicas para o desenvolvimento de assentamentos, especialmente para a intensidade do layout e do ambiente da construção.

Implicações sociais: O governo da cidade deve controlar o desenvolvimento de novos edifícios na área da borda costeira da Baía de Tomini, fornecendo proteção à borda costeira da Baía de Tomini e fornecendo edifícios de proteção contra desastres ao redor da borda costeira da Baía de Tomini.

Originalidade/valor: A maioria das áreas costeiras cultivadas ao longo da Baía de Tomini tornou-se a principal preocupação, mas ainda não foi pesquisada quanto à implementação de provisões técnicas para o desenvolvimento de assentamentos. Esta pesquisa examina a implementação de provisões técnicas para o desenvolvimento de assentamentos

Palavras-chave: Diversidade, Desenvolvimento, Região, Baía de Tomini.

ESTUDIO DE LA DIVERSIDAD DE DESARROLLO DE LA FUNCIÓN DE ZONA TURÍSTICA URBANA EN LA COSTA DE LA BAHÍA DE TOMINI - INDONESIA

RESUMEN
Objetivo: Este estudio pretende analizar la diversidad de desarrollo y uso del suelo en las zonas costeras, especialmente el desarrollo con una combinación de tres valores (costero, marino y antrópico) en la costa de la bahía de Tomini, ciudad de Gorontalo, en relación con la Planificación Espacial Detallada de la ciudad de Gorontalo.

Diseño/metodología/enfoque: Esta investigación utiliza el método cuantitativo descriptivo con datos primarios y secundarios. La técnica de análisis es la cartografía tridimensional y cuatridimensional a partir del cálculo del porcentaje acumulado de cada índice para determinar la tendencia de concentración y distribución de diversos índices de uso del suelo costero.

Conclusiones: El desarrollo por las partes interesadas y los residentes en cada pueblo muestra un valor de índice variado. Esto puede observarse en el valor del índice de diversidad. El valor más alto del índice de diversidad es el de la aldea de Talumolo con 14,53, seguido de la aldea de Leato Norte con 12,08, la aldea de Leato Sur con 11,34 y la más baja es la aldea de Pohe con 7,17. Esto indica una tendencia de desarrollo de la zona costera mediante el uso de la zona del borde costero de la bahía de Tomini, mientras que la zona marina sigue limitada a la construcción de puertos para carga y descarga de mercancías y servicios de pasajeros.

Limitaciones/implicaciones de la investigación: La investigación se limita a la mayor parte de las zonas costeras cultivadas a lo largo de la bahía de Tomini, lo que no permite dar cabida a muchos otros fenómenos de interés.

Implicaciones prácticas: La estrategia de desarrollo regional en las zonas costeras fronterizas debería contar con la aplicación de disposiciones técnicas para el desarrollo de los asentamientos, especialmente para la intensidad del trazado y el entorno de construcción.

Implicaciones sociales: El gobierno de la ciudad debería controlar el desarrollo de nuevos edificios en la zona fronteriza costera de la bahía de Tomini, proporcionando protección a la zona fronteriza costera de la bahía de
Tomini y proporcionando edificios de protección contra catástrofes alrededor de la zona fronteriza costera de la bahía de Tomini.

**Originalidad/valor:** La mayoría de las zonas costeras cultivadas a lo largo de la bahía de Tomini se han convertido en la principal preocupación, pero aún no se ha investigado la aplicación de disposiciones técnicas para el desarrollo de asentamientos. Esta investigación examina la aplicación de disposiciones técnicas para el desarrollo de asentamientos.

**Palabras clave:** Diversidad, Desarrollo, Región, Bahía de Tomini.

**INTRODUCTION**

Some area of Gorontalo City has access to coastal area. It can be said that Gorontalo City has a coastal city or water front city. Wen-Cheng Huang and Sun-Ken Kao (2014) stated that waterfront is the birth of culture and economy, started with development of settlements and villages beside water, which develop into trade routes. Waterfront City area is located near the water area where there are economic, social and gathering activities.

Coastal cities emerged from transportation facilities and defense strategies (Said, Sungkono and Nashrah, 2018). The development activities in Gorontalo City is consistent with city government development. High population growth requires additional space for various activities, such as residential, economic, social and development of urban infrastructure.

Most of coastal cultivated areas in Gorontalo City are undergoing a development process with a linear coastline pattern along the Tomini Bay. The urban activities development are trade, offices, port services, industry and settlements. This is reflected in rapid development of land usage for urban activities. This area should also be protected for the unique and diverse ecosystems involving flora and fauna. The rapid development and change functions of coastal area in Gorontalo City will affect on marine communities. Tomini Bay will slowly affect the lives of these people, who have historically been associated with sea, where the socio-economic conditions of people depend on marine life.

This condition is seen by more of land usage due to uncontrolled changes in land usage from agriculture/plantation to settlements, offices and other office buildings. It affect on more sedimentation of rivers and waters in Tomini Bay, coastal abrasion, and the growth of population settlements, offices and other buildings that are less organized and slums. Based on above description above, the research problem can be formulated below.

1. How the diversity level of development on coastline of coastal area at Teluk Tomini in Gorontalo City.
2. The development at coastal area of Teluk Tomini decrease the role and function of the area. It will examine the usage of Tomini Bay coastal area based on littoral, marine and anthropogenic aspects.

LITERATURE REVIEW

Concept of Urban Development

Urban development is an expression urban community activity (Zahnd, 2003). The city changes from time to time as the result of development. It is consistent with higher population and life demands in political, economic, social, cultural, and technological aspects, resulting in higher population activities (Yunus, 2004). The higher population activities increase the large space for accommodation. Zahnd (2003) explained three ways in basic development of a city namely horizontal, vertical and interstitial development. In addition to urban development, urban spread is also to show physical appearance of a city development (Yunus, 2004). The hinterland area IS slowly changing into urban. There are three forms of physical appearance spread of city, namely concentric, longitudinal, and jumping spreads.

A city is a place for thousand people, while an urban area is equipped with structures and roads, as a centered settlement in an area with a certain density. (Branch Melville, 1996). The spread and population density of a city is caused by more population, both natural and due to urbanization. This spread and population density requires urban space. There is a spread of residents to coastal area which causes changes in physical appearance of face city.

Tungka, et al (2012) stated that development of waterfront cities are an urban phenomenon in developed countries with certain concepts and principles. This development will relate with physical, economic and social issues, not only limited to visual aesthetics. Its development affect on physical and life quality of residents, as well as the economic activities.

Changes in coastal and marine areas are natural phenomena influenced by human activities. The coastal area is a gateway for various human development activities and at same time becomes a gateway for various impacts of these activities. In other words, coastal area receives the most pressure than others (Huda, 2008). The coastal area or waterfront is an area that is the goal of urbanization because the coastal area does not receive serious attention from the city government. This raises the desire of urbanists to carry out sporadic and illegal development to create slums. This happens at cities in developing and growing countries.

Yang (2014) stated that an urban can be assessed quantitatively from the beauty of landscape using quantitative methods. The results showed that factors such as the ratio of green
space, canopy cover area, amount of color and composition of vegetation, buildings, pieces of buildings and garden paths, vegetation planting patterns affect on the space quality.

A sustainable urban development approach is needed as a basis to address the crucial urban issues in Indonesia, namely: (a) a comprehensive and synergistic approach to city sector, and (b) meeting the challenges of decentralization. (Leiwakabessy, 2004).

**Urban Spatial Development**

Spatial planning and live environment have very broad meanings, but at same time they often have a narrow connotation to mere physical planning and design. There are lot of criticism to urban planning which emphasizes the physical meaning is deterministic, and puts humans at center of their unique behavior. The appearance and face of city is like a nightmare, singular in appearance, faceless, fitting from nature and often uncontrollable and inhuman. The water, air and streets are dangerously crowded with vehicles and distracting billboards and loudspeakers. Urban spatial planning is really complicated to avoid clash between commercial and humanist technocratic approaches (Budihardjo, 1997).

Budiharsono (2011) stated that spatial planning is a structural form and pattern of space utilization, both planned (artificial environment) and unplanned (natural environment). The planned layout includes residential areas, industrial areas, office and trade complexes, recreation areas and so on. Unplanned spatial planning includes watersheds, lakes, nature reserves, caves, mountains and hills that produce a human-made space. The space is made according to individual and social needs and both physical and non-physical needs within limitations of technological and natural capabilities, both human resources and the threats (Soetomo, 2009).

Kostof (1991) stated an urban space is formed by two processes, namely a planning process called planned settlement and an urban process called unplanned settlement. This means that urban planning can be done and realized perfectly. Urban space civilization has created a process of transforming urban space and the combination between the communally planned morphology and spontaneous development of individual buildings as unplanned settlements.

The structural form of space utilization is the arrangement of elements to create natural, social, and artificial environments that hierarchically and structurally related to one another to human urban spatial layout. The urban space creation is a community forum for gathering or
communal, basic infrastructure and economic and social service facilities to meet urban population needs that very large with their respective characteristics (Soetomo, 2009).

The large number and characteristics of cities need simpler models and patterns in preparation of plans and strategies for development and urban space usage that effective, accommodative and anticipatory (Adisasmita, 2018). The development strategy and utilization of urban space can be anticipated with participation of city residents to realize good and harmonious space usage with the applied rules. Other the hand, the city government interprets it by making a policy in managing the city.

The Potential and Role of Coastal Areas

Coastal areas are defined as land areas adjacent to the sea. Coastal ecosystems have a very important role and highest value on this earth in providing services to environmental balance (Sitorus, Citra, and Dyah, 2012).

The coastal area is a confluence area between land and sea. The land coastal area includes parts of land, both dry and submerged in water, which are still influenced by characteristics of sea, such as tides, sea breezes, and infiltration of salt water. The sea coastal area includes parts of sea influenced by natural processes occurred on land such as sedimentation and fresh water flow, and human activities on land such as deforestation and pollution (Supriharyono, 2012).

Mitchell et al. (2000) stated that natural resource management is an effort to preserve and protect biological diversity at genetic, species and ecosystem levels to ensure the natural wealth, animals and plants throughout the Indonesian archipelago. Sustainable natural resources can ensure the sustainability of production and community income which will ultimately affect on welfare improvement. Fauzi (2004) stated that good natural resources will improve the welfare of mankind and vice versa. Wise and sustainable natural resource management is needed to anticipate higher environmental degradation.

The potential and utilization of coastal resources is divided into three parts of biological resources; non-biological resources and marine services. Biological resources include fish, algae, and other marine organisms. Non-biological resources include petroleum, marine mining and others, including transportation. Based on results of potential utilization of coastal resources, the economic value and contribution to national development can be estimated. Overall economic activity from coastal resources contributes about 25% to Indonesia's GDP. In addition, coastal area has a function of conservation and cultivation area (Dahuri, et al, 2004).
The arrangement of city's coastal areas listed in RTRWK (City Spatial Planning). It is followed up with spatial use and zoning directions in RDTR (Spatial Detailed Plan) to determine whether a location is waterfront or not. There are several criteria to assess the location of an area. The waterfront criteria are follows: (1) located and on edge of a large water area (sea, lake, river, and so on), (2) an area of port, trade, settlement, or tourism area, (3) having the main functions as a place of recreation, settlement, industry, or port, (4) dominant with views and orientation towards the waters, and (5) the construction is done in a vertical and horizontal direction (Takwim, 2020).

Coastal Area Management

Dahuri et al. (2004) defined a coastal area as a transitional area between land and sea. Based on coast line, a coastal area has two boundaries: a boundary parallel to shoreline (long shore) and a boundary perpendicular to shoreline (cross shore). Soegiarto (1976) in Dahuri et al. (2004) defined coastal area in Indonesia as the confluence area between land and sea.

Indonesia has rich marine and coastal potential. This is consistent with designation of Indonesia as an archipelago country. The coastal resources potential is very wide ranging from biological resource, regional, mineral and energy resource, industrial, transportation and environmental services potentials. The coastal resources potential can be classified as renewable natural resources, non-renewable resources, and various kinds of environmental services. One great potential of the biological resources is fisheries (Andreas and Enni, 2016).

Coastal water resources included as recoverable resources are: (1) mangrove forest; (2) coral reefs; (3) seagrass and seaweed fields; (4) marine fishery resources and (5) bioactive ingredients contained in body of marine biota (Dahuri et al, 1996). The notion of recoverable resources such as marine fishery resources is misinterpreted and these resources are often exploited continuously without certain limits.

Scura (1992 in Cicin-Sain and Knecht, 1998) stated the characteristics of coastal areas are below.

- It Contains habitats and ecosystems (such as estuaries, coral reefs, seagrass beds etc.) to provide goods (e.g. fish, oil, minerals) and services (e.g. natural protection against storms and tidal waves) for coastal communities.
- It is characterized by competition for land, space and resources from various stakeholders and often creating conflict and damaging the integrity of resource system.
Development Diversity Study of Tourism Urban Area Function in Tomini Bay Coast-Indonesia

Wunarlan, I., Idji, B. (2023) Development Diversity Study of Tourism Urban Area Function in Tomini Bay Coast-Indonesia

- It is the backbone of national economy for coastal countries (Indonesia) where many gross domestic product depends on activities in this area such as shipping, oil and gas drilling, coastal tourism and so on.
- It is a dense population area and a destination for urbanization.

Based on descriptions above, management of coastal areas and their resources must be done properly and correctly (integrated) in order to achieve sustainable resource utilization. Indonesian people have agreed with concept of Environmentally Friendly Sustainable Development. Soemarwoto (2008) explained that concept of sustainable development that harmonizes economic development with environmental aspects is an alternative step towards the current world development direction.

Coastal Area Function

The coastal area has unique and complex characteristics. The complexity is indicated by various users and regional management entities that have different interests and perspectives regarding the use and management of coastal areas resources. It creates a concept of Integrated Coastal Zone Management. This approach is a mainstay approaches to manage various potentials and resource conflicts in coastal areas (Lasabuda, 2013).

The coastal and marine in maritime areas is a very important for human life as a place to find food, transportation, delivery of goods and recreation. In addition, coastal and marine areas also have an important role to control climate. Therefore, government concerns to improve governance and utilization of archipelago maritime areas potential. One government visions is to optimize the potential of Indonesia's maritime area to realize economic independence and maritime resources. The sectors concerned are infrastructure, sea transportation, fisheries and tourism. The government has issued programs and regulations such as sea tolls, a moratorium on fishing by foreign vessels and promotion of marine tourism (Bona, Rossi, Rudolf, 2017; Dong and Khan, 2023).

Anah (2018) stated that one spaces with considerable potential in regional development is the coastal and marine areas. Coastal areas have diverse natural resources, both renewable and non-renewable. In addition, this area also has excellent accessibility for various economic activities, such as transportation, ports, industry, settlements, and tourism. However, development of coastal areas must concerns to the balance between the level of development and carrying capacity of environment and the development balance between regions. Regional development must become an effort to grow the regional and local economy, so that region can
grow and develop independently by utilizing local resources (Arwani et al., 2023). This regional development strategy relies on local resources known as the concept of local economic development. One of ecosystem conservation efforts is to develop and establish conservation areas for waters, coastal areas and small islands managed with a zoning system, including sustainable fisheries zones utilized by community for environmentally friendly fish cultivation and fishing and utilization zones for marine tourism activities. This program is consistent with application of Blue Economy principles to support marine and fisheries industrialization. Zoning of Marine Conservation Areas is a form of technical engineering of space usage in a waters conservation area through the determination of boundaries functional consistent with potential of resources and carrying capacity and ecological processes in a unified ecosystem. The creation process is starts from a field survey, as a clarification or identification of an area feasibility to become as a conservation area (water). This field survey will involve biologists, ecologists and social scientists to assist resource & ecological value. Area management in Indonesia is done with a zoning system (Samba, et al, 2019).

Various economic activities in coastal area of Gorontalo City grow rapidly. This is consistent with higher economic development in urban areas near coastal areas. Within regional development, this coastal area is often used as a periphery of an urban area nearby. The two regions are functionally related to integration between the components of the region, but mismanagement of development strategies in past lead to inequality in development outcomes between the two regions. The coastal areas with all the components of resources are used as a buffer for poor who are unable to compete in urban areas. Poverty in this coastal area can further encourage more severe environmental damage which actually reduces the overall economic growth of the region without immediately controlled (Sudrajat, 2013).

RESEARCH METHODS

Research Object and Research Location

The research location is the coastal part of Gorontalo City in Gorontalo Province used as development centers. The object are two sub-districts, namely Dumbo Raya Subdistrict and Hulonthalangi Subdistrict.

The definition of coast is the area along the coastline of Tomini Bay and located in coastal area of Gorontalo City, namely with a limit towards the mainland approximately 300 m and from the highest coastline level towards the sea approximately 100 meters.
Types of Research, Data Collection Techniques and Data Sources

This study uses a quantitative descriptive method. The data is collected by interviews and observation to various aspects of each index to coastal areas. The data type are primary and secondary data.

Data Analysis Technique

The data analysis technique is three- and four-dimensional mapping based on calculation the cumulative percentage of each index to determine the tendency of concentration and distribution of various coastal land usage indices.

RESEARCH RESULTS AND DISCUSSION

Research Result

Geographical location and administrative area

Gorontalo urban is the administrative area of Gorontalo City and Gorontalo Province. This city has an area of 79.59 km\(^2\) with a population of 199,788 people. The city is located on of Tomini Bay coast at 0\(^\circ\) 28'17"- 35'36" North Latitude and 122\(^\circ\) 59'44"-123 \(^\circ\) 5'59 East Longitude (BPS, 2020). Gorontalo City has the following boundaries:

- North borders is South Bulango District, Bone Bolango Regency.
- South border is Tomini Bay
- West border is Bolango River, Gorontalo Regency
- East border is Kabila District, Bone Bolango Regency.

The Gorontalo City area consists of two sub-districts with four village of Pohe, North Leato, South Leato and Talumolo Villages. These four villages become research object and coastal areas in Gorontalo City have experienced many changes in land function and urban development programs. The administration map is shown in figure 1.
Population demographics

The people in coastal area of Tomini Bay are very open. Coastal communities generally become part of a pluralistic society but still have a spirit of togetherness. This means that average coastal community structure is a combination of urban and rural characteristics. The structure of coastal communities is very plural; they can create a system and cultural values from cultural acculturation of each component to makes up the structure of community. The history of natural resource management in coastal areas has existed since ancestors began to use these natural resources to support their lives. The natural resource management was still local, where the community structure and activities were still simple (Ningtyas, 2020).

The total population in three villages is 13,774 people. The details is shown in table 1.

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<th>No.</th>
<th>Villages</th>
<th>Subdistrict</th>
<th>Residents</th>
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<tr>
<td>1.</td>
<td>North Leato</td>
<td>Dumbo Raya</td>
<td>2,663</td>
</tr>
<tr>
<td>2.</td>
<td>South Leato</td>
<td>Dumbo Raya</td>
<td>2,933</td>
</tr>
<tr>
<td>3.</td>
<td>Talumulo</td>
<td>Dumbo Raya</td>
<td>5,703</td>
</tr>
<tr>
<td>4.</td>
<td>Pohe</td>
<td>Hulontalangi</td>
<td>2,475</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td></td>
<td><strong>13,774</strong></td>
</tr>
</tbody>
</table>

Source: BPS, 2020

This area was originally a protected area and has been converted into a cultivation area. The residential settlements have been established with various supporting facilities and
recreational areas such as two thousand stairs tourist area in Pohe Village, Hulontalangi District, Tomini Bay tourist area and White Sand Tourism in South Leato Village and Tamendao Beach in North Leato Village and there are several roads to connect the coastal area with other areas in Gorontalo City. Figure 2 until figure 5 show the tourism destination

Figure 2. Two Thousand Stairs, Pohe Village

Source: www/google.com

Figure 3. Tomini Bay Tour in South Leato Village

Source: www/google.com

Figure 4. Tamendao Beach at North Leato Village

Source: www/google.com
Infrastructure condition at Tomini Bay area

The coastal area development of Tomini Bay contributes to infrastructure development of Gorontalo City. It has changed the appearance of Gorontalo City in Tomini Bay areas. This infrastructure development transformed the protected areas into cultivated areas. The infrastructure of observed area is very diverse with certain wide. Table 2 shows the infrastructure of Tomini Bay.

Table 2. Infrastructure in Coastal Area of Tomini Bay

<table>
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<th>No.</th>
<th>Infrastructure</th>
<th>Observation Area</th>
<th>Amount</th>
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<tbody>
<tr>
<td>1.</td>
<td>Government and private offices</td>
<td>Pohe, Talumolo, North Leato, South Leato</td>
<td>25</td>
</tr>
<tr>
<td>2.</td>
<td>Residential house</td>
<td>Pohe, Talumolo, North Leato, South Leato</td>
<td>12</td>
</tr>
<tr>
<td>3.</td>
<td>Mosque for Worship Facilities</td>
<td>Pohe, Talumolo, North Leato, South Leato</td>
<td>14</td>
</tr>
<tr>
<td>4.</td>
<td>Market</td>
<td>Pohe</td>
<td>1</td>
</tr>
<tr>
<td>5.</td>
<td>School</td>
<td>Pohe, Talumolo, North Leato, South Leato</td>
<td>11</td>
</tr>
<tr>
<td>6.</td>
<td>Jasmine Hotel / Lodging</td>
<td>Pohe, Talumolo, South Leato, North Leato</td>
<td>4</td>
</tr>
<tr>
<td>7.</td>
<td>Restaurant and cafe</td>
<td>Pohe, Talumolo, North Leato, South Leato</td>
<td>224</td>
</tr>
<tr>
<td>8.</td>
<td>Sports field</td>
<td>Pohe, Talumolo, North Leato, South Leato</td>
<td>13</td>
</tr>
<tr>
<td>9.</td>
<td>Military</td>
<td>North Leato</td>
<td>1</td>
</tr>
<tr>
<td>10.</td>
<td>Harbor</td>
<td>Talumolo, North Leato</td>
<td>2</td>
</tr>
<tr>
<td>11.</td>
<td>Pertamina Gas Station</td>
<td>Talumolo</td>
<td>1</td>
</tr>
<tr>
<td>12.</td>
<td>Container Terminal</td>
<td>Talumolo</td>
<td>1</td>
</tr>
<tr>
<td>13.</td>
<td>Public health center</td>
<td>Pohe, Talumolo</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td>85</td>
</tr>
</tbody>
</table>

Source: BPS, 2021 (Processed)

Table 2 shows that most infrastructures in Tomini Bay are restaurants and cafes with 224 units and lowest infrastructure is market, naval military headquarters, gas stations and container terminal areas with 1 unit each. Restaurant and café infrastructure is a very prominent building
because the Tomini Bay is a public area that can be accessed by all Gorontalo City residents. It is a place of recreation and spend free time to have fun and relax for a while with family and friends. The restaurants and cafes become an arena for Gorontalo City residents to provide banquets to every guest or friend who comes to Gorontalo City. The rare infrastructures are Naval Military Headquarters, Markets, Pertamina gas stations, and Container Area. The Naval Military Headquarters is a limited area with functions to keep the Tomini Bay area stable and conducive to residents. This is a very strategic area for maritime security. Pertamina gas stations, markets and container areas are three important infrastructure facilities. Pertamina gas stations provides diesel and other fuels for local fishermen. Markets and container areas are spaces to maintain distribution of goods and other daily consumption.

This infrastructure development occupies urban space or the coastal area of Tomini Bay which very risky. The infrastructure building has been established in a protected area and it may disturb the animals and flora around the area as well as the impact of associated buildings that arise in supporting the existence of main infrastructure building. Urban development requires infrastructure development with strict supervision from the city government to maintain the sustainability and natural beauty of city as one of natural areas of green open spaces. This area also has several roads to connect with other parts of city in Gorontalo City and to facilitate the distribution of goods.

**Gorontalo City Development and Land Usage Pattern Plan**

Sustainable development is a government and society effort to uses the existing resources for prosperity of present and future generations. The development is an effort to make a better life for everyone (Peet and Hartwick, 2009). This means that development is an effort to bring people to follow a process to achieve a better life than before. The environmental development is a condition for sustainability of a city. The environmental requirements for urban planning documentation are established to ensure sustainable development of the area, early detection and recording of any consequences of negative environmental impacts in decisions making on regional urban development planning, and assessing the options of economic development feasibility. The integrated approach in urban planning can consider all components of urban environment in the interaction each other. The environmental protection issues are reflected in functional zoning, engineering training, proposals for organization of architecture and urban planning. The ecology of urban planning is also explained assessment
of the environmental performance of design solutions, options for development at decision-
making stage and development of a conceptual approach (Pozdnyakov, 2017).

Government Regulation Number 69 of 1996 on the Implementation of Rights and
Obligations, and Forms and Procedures for Community Participation in Spatial Planning, stated
that space is a container that includes land space, ocean space and air space as a unitary area,
where humans and other creatures live carry out activities to maintain its survival. The spatial
planning is a structural form and pattern of spatial use, whether planned or not. The spatial
planning is the process of space utilization and controlling. The spatial plan is the result of
spatial planning. Space consists of land, ocean and air spaces as a unitary area where humans
and other living things live and carry out activities and maintain their survival. There are three
environmental components of biotic and abiotic and cultural. The three components always
interact, integrate and interdependence in a space. Therefore, these three components should be
managed to optimize the function (Wantu and Imran, 2011).

Land usage in Gorontalo City is dominated by residential areas (47.74 %), agriculture
(20.1 %) and urban forests (32.16%). The conversion of agricultural land into non-agricultural
land continues to occur. There was a fairly large land conversion, which reached about ± 4.80
ha/year for housing, offices, education and shops. This has implications for adjustments to land
requirements for its development. Another problem of land usage is the emergence of dense,
slum and poor settlements along Tomini Bay. Land function changed significantly from swamp
land, green areas and catchment areas to residential, trade and office areas. The land usage
change affect on city's spatial structure and the carrying capacity of land and other living
environments.

The Regional Spatial Plan (RTRW) of City of Gorontalo defined as minimum of 100 m
coastal border area from highest sea tide towards the land, proportional to shape, location and
physical condition of beach in North Leato, South Leato and Talomolo Villages in Dumbo Raya
District and Pohe Village in Hulontalangi District. The area management policy in Regional
Spatial Plan (RTRW) of Gorontalo City defined coastal border area as a local protected area.
The strategy for coastal border areas is coastal border lines establishment, creating coastal
border lands, strengthening the status of area control, controlling the development of new
buildings in coastal border areas, providing protection for coastal borders, and providing
disaster protection buildings around coastal border area. The strategy for regional development
in coastal border areas is technical provisions for housing development, especially regarding
the intensity of building layout and environment. The plan for utilization of coastal border area
in Spatial Pattern Plan is done through increasing the diversity of hard plant species based on coastal morphology, spatial arrangement in coastal border area as a natural tourism and public recreation area without changing the ecological function of the area, arranging the placement of buildings to protect against earthquakes and/or tidal wave/tsunami, and development for other tourism and public recreation activities is determined based on results of feasibility study. The development plan of green open space (RTH) at coastal border include public green open space. The general provisions of green open space (RTH) at coastal border include public green open space. The public is allowed to use local protected areas on condition that they can provide greater benefits to city's economy, do not cause disruption of ecological functions and biodiversity and obtaining approval from the competent authority relating to land status. The cultivation activities that disturb the conservation functions are returned in order consistent with provisions of legislation. The coastal border usage is regulated with provisions that a minimum of 35 m is intended for absolute protection, above 35 meters to 100 meters is allowed for limited and conditional usage, based on provisions to support tourism and recreational activities which include service businesses and facilities businesses with KDB, KLB, and KDH are regulated in RDTL, semi-permanent or temporary buildings consistent with applicable regulations, and conduct feasibility studies and environmental studies. The spatial use permit in coastal border area ratify every designation built in coastal border area before the Regional Regulation. It will be maintained and not allowed to be developed until there is a policy for relocation. Activities inconsistent with provisions of their designation and do not have a permit must be eliminated. Gorontalo City is actually no longer consistent with concepts of regulation or regional arrangement. Deviations of spatial planning usage in Gorontalo City can be seen at coastal area, especially at North Leato and South Leato, lowlands to mountains around the Naval Base office and mountains, the local protected areas have turned into residential areas and buildings, cafes and other private buildings.

**DISCUSSION**

The observation locations are North Leato, South Leato, and Talumolo Villages in Dumbo Raya District and Pohe Village in Hulontalangi District. The four villages are part of Gorontalo City with various coastal developments in Tomini Bay, shown in table 3.
Table 3. Recapitulation of Index Values of Observed Locations

<table>
<thead>
<tr>
<th>Ward</th>
<th>Littoral</th>
<th>marine</th>
<th>Anthropization</th>
<th>Anthropization</th>
<th>Total Volume</th>
<th>Diversity Index</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>sea</td>
<td>Coastline</td>
<td></td>
<td></td>
</tr>
<tr>
<td>North Leato</td>
<td>19.52</td>
<td>18.45</td>
<td>20.17</td>
<td>17.46</td>
<td>6.74</td>
<td>16.47</td>
</tr>
<tr>
<td>South Leato</td>
<td>17.43</td>
<td>13.08</td>
<td>7.61</td>
<td>13.22</td>
<td>4.81</td>
<td>11.23</td>
</tr>
<tr>
<td>Pohe</td>
<td>12.94</td>
<td>7.48</td>
<td>9.92</td>
<td>6.81</td>
<td>3.14</td>
<td>8.85</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>3.009</td>
<td>4.319</td>
<td>6.059</td>
<td>3.998</td>
<td>1.548</td>
<td></td>
</tr>
</tbody>
</table>

Source: Processed data (2022)

Table 3 show that the developments by stakeholders and residents of each village have and varied index value, this can be seen from the diversity index value. The highest diversity index value is Talumolo Village of 14.53, followed by North Leato Village of 12.08, South Leato Village of 11.34 and the lowest is Pohe Village of 7.17. The value of diversity index based on area function is shown in Figure 6.

Figure 6 shows the diversity index value in four dimensions. Talumolo Village has first index value. This village has a container port that very crowded when loading and unloading goods from Gorontalo to various other areas in archipelago and has complete and varied infrastructure diversity. In addition, Talumolo Village has a population of 5,703 people with a
density of 5.96 people/ha. This figure is very dense than other urban villages so the residents need space to build settlements without pay attention to protected, tourist and public areas. The residents and stakeholders in developing this area build settlements haphazardly and sporadically without paying attention to rules of land usage and violating the rules of RTRW.

South Leato Village has second ranks in diversity index value of 12.08. The marine index value is prominent at 18.45 because Leato Utara village has a ferry port to serves passengers travel at Gorontalo - Pagimana, Gorontalo - Luwuk. North Leato Village also has a long coastline anthropization diversity index value of 17.46 than other villages. This value is supported by existence of Tamendao Beach as a beach tourism destination for city's residents. Tamendao Beach tourism object is a place to earn a living for local residents. This tourism object was originally a densely populated slum area due to very dense and irregular settlements that received less attention from the city government. The program without slums from city government converts this area into an attractive coastal tourist area.

South Leato Village has diversity index value of 11.34. It has white sand beach tourist attraction. The white sand beach tourism in South Leato Village is visited by many domestic and foreign tourists. This beach is a local protected area for flora and fauna. The development by local residents and stakeholders must pay attention to this area because more houses and government offices will disturb coastal area of Tomini Bay. Indirectly it will threaten the area existence as a media buffer for coastal area as a public area. The government should regulate it properly to keep the sustainability of the area. The infrastructure in South Leato Village is complete and varied. South Leato Village is a strategic area for city development because located within city border and has a population density of 234.04 people/ha. However, the haphazard and sporadic development does not accommodate all aspirations. There are many development deviations such as the construction of settlements towards the coast which penetrates the coastal area of Tomini Bay as a coastal border area and a green city area that functions as a green open area. This development it will gradually deviate from the land usage regulated in RTRW of Gorontalo City.

Pohe Village has lowest diversity index value of 7.17. Pohe Village is located close to Gorontalo City but like a remote area because it has minimal infrastructure because this area is very difficult to reach. The settlements developments in Pohe Village take the coastal border area of Tomini Bay and a small part of other infrastructure takes Tomini Bay coastal border area and green open area. The coastal border of Tomini Bay is a public area and a local protected area as a place for flora and fauna to grow. There has also been a two-thousand-stairs tourist
area as a tourist spot for city dwellers. The development is considered spontaneous and slum because it takes land for green area and some hilly areas are prone to landslides. This development must receive strict supervision from the city government because it violates the rules contained in RTRW of Gorontalo City.

CLOSING

Conclusion

The results of research and discussion above produce several conclusions below.

1. The Gorontalo City is a relatively flat area. Slightly hilly areas are located in North Leato Village, South Leato Village, Talumolo Village and Pohe Village. North Leato and South Leato Villages, Talumolo Villages and Pohe Villages as the research objects have flat area around Tomini Bay with slope about 15 degrees to 45 degrees and even above 45 degrees. Pohe Village is located in Bolango watershed, while North Leato, South Leato and Talumolo villages are located DAS Bone toward Tomini Bay, making this village fertile and overgrown with shrubs and grass.

2. Gorontalo City has problems related to land usage at dense, slum and poor settlements along Tomini Bay. Land usage shows a significant change function from swamp land, green areas and catchment areas into residential, trade and office areas. The land usage change affect on city's spatial structure and the carrying capacity of land and other living environments.

3. The area management policy of Regional Spatial Plan (RTRW) at coastal border of Gorontalo City is a local protected area. The strategy for regional development is implementation of technical provisions for settlement development, especially regarding the intensity of building and environmental planning (RTBL).

4. The coastal border usage is regulated with provision that a minimum of 35 m is intended for absolute protection, above 35 meters to 100 meters is allowed for limited and conditional usage to support tourism and recreational activities which include service businesses and facilities businesses based on RDRTK arrangements of Gorontalo City, a semi-permanent or temporary building consistent with applicable regulations, and conducts feasibility and environmental studies.

5. Development by stakeholders and residents at each villages show fairly varied diversity index value. The highest diversity index value is Talumolo Village at 14.53, followed by North Leato Village at 12.08, South Leato Village at 11.34, and the lowest
is Pohe Village at 7.17. This indicates that the development still oriented to littoral area by utilizing the coastal border area of Tomini Bay while the marine area is still limited to construction of a port to load and unloading goods and servicing the passengers. This area still limits development in mainland (littoral) area and does not make coastal reclamation.

**SUGGESTIONS**

Suggestions from this research are below.

1. The Gorontalo City Government should limit the city development in coastal area of Tomini Bay by implementing strict rules to maintain public area existence.
2. The city government should control the development of new buildings in coastal border area of Tomini Bay, providing protection to coastal border of Tomini Bay, and providing disaster protection buildings around the coastal border of Tomini Bay. The strategy for regional development in coastal border areas is technical provisions implementation for settlement development, especially for the intensity of building layout and environment.

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**REFERENCES**


