Planning Of Post-Disaster Residential Restoration Area In Tanah Hitam Village, Paloh District (Disaster Mitigation Of West Kalimantan Coastal)

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Abstract. Post-Disaster Settlement Recovery Area Planning is a study that aims to find out the appropriate concept for the Tanah Hitam Village area in an effort to become a disaster response village. Based on information about the coastal area of West Kalimantan, including the area that will be submerged by sea water in the next 30 years. One thing that can be done is by preserving mangroves as a green area in coastal areas. Several targets were carried out in the form of identification of areas related to the physical and non-physical conditions of Tanah Hitam Village and the area's macro scale. In addition, an analysis of the physical conditions of the area adjusts to existing regulations and policies. The final goal to be achieved is to be able to make a concept that is appropriate to the physical conditions of the area and the space requirements of the area. The regulations and the number of literature studies are references in the formulation of this restoration concept. Reference to Ministerial Regulation on Building and Environmental Planning is the main discussion in determining plans carried out in the area.

1. Introduction
The coastal area in Tanah Hitam village is currently still in the form of reforestation even though some rice fields are also quite close to the coastal boundary of the area, but over time it is not impossible if the settlements will creep closer to the coastal area of the area. Meanwhile, in BBC News Indonesia about the projection of sea level in West Kalimantan (2050), which comes from Climate Central, it is estimated that in the next 30 years some of the coastal areas in West Kalimantan will be inundated by sea water. This is one of the reasons why it is necessary to formulate a design concept for coastal areas in West Kalimantan and one of them is in Tanah Hitam Village. Another supportive thing is that the Tanah Hitam Village area has a coastal area that extends in the form of an unspoiled beach and based on the information of the villagers that Tanah Hitam Village also has problems with rising sea water although it is not as severe as problems in other villages.
However, this has become a consideration for early planning in order to deal with predictions of disasters that might occur, especially due to sea level rise in coastal areas in West Kalimantan. How the concept fits into the post-disaster settlement recovery planning in Tanah Hitam village, Paloh District, Sambas Regency is a problem that must be resolved with designs that aim to compile a post-disaster settlement recovery area plan in Paloh District, Sambas Regency, West Kalimantan Province. The theoretical basis used is the Theory of Urban Design Elements, Theory of Settlement and Disaster Mitigation and the function of coastal areas. In addition, there are references to regulations and policies regarding coastal areas and disaster management as well as several scientific journals on coastal disaster mitigation as a literature study.

An appropriate comparative study of the planning area is about Post-Disaster Urban Settlement Planning in Realizing a Tropical City, presented by Diponegoro University, Semarang, 2008. The content of the presentation is How a tropical environment-responsive residential environmental planning concept can be a comprehensive part of the concept rearrangement of a post-disaster settlement. Identifying Tsunami-prone areas, especially in Aceh and the South Coast of West Java. As well as applying the principles of designing a tsunami disaster response city for the tropics. Looking at the scale of the building, the factors taken into consideration include building materials, physical characteristics of the building and from the environmental scale related to the layout of the area, variations in building height in one site, environmental roads, open spaces, and vegetation, public facilities and artificial or natural channels.

- The principle of designing a city that is responsive to tropical environments by reducing the energy consumption of its residents for driving and cooling the space with a strategy to reduce CO2 levels in the area. Furthermore, related to building materials used with the selection of local building
materials, reducing CO2 emissions for transportation and selecting building materials that do not produce much CO2 to produce them.

- Physical Characteristics of buildings by reducing as much as possible household energy use by utilizing natural lighting, through building openings, minimizing direct solar radiation entering inside. The smaller the KDB, the bigger the green space that is and can absorb CO2.
- Environment scale related to building layout regarding compaction, disperse (related to GSB regulation), building height in one site between building height and low, the road is a hierarchical grid layout type and is supported by other street furniture.
- Open spaces and vegetation i.e. plants and large bodies of water.

The expected design concepts include:

- Multi-storey mixed use buildings with inter-buildings are sparsely placed so that there is space between buildings that can minimize damage and reduce temperature.
- There is a building height composition where there is a mixture of high and low buildings in one building site. Tall and sturdy buildings are located in a way that protects the smaller buildings.
- A road that also functions as an evacuation route with a grid system. Make it easier for residents to orientate themselves when a disaster occurs and to save themselves. The road is equipped with a comfortable pedestrian path.
- Between the coast and the residential area is planted with strong coastal trees and has a dense volume of leaves.
- Public facilities are located at a safe distance and in a central position from the housing so that they are easy to reach. Provided a number of public facility centers for a number of housing it serves.

Provision of water bodies that can protect the environment and housing and livelihood assets of residents such as boats from disasters. This water body can also function to clean the air. The directions for the use of space for flooding in the District of East Rasanae are divided into two treatment programs for flood-prone areas into two, namely the structural method with a flood control building and a drainage repair system. Meanwhile, the non-structural method is to improve the hydrological conditions of the watershed so that it does not cause flooding in the rainy season and dryness of the dry season and to reduce the excessive rate of erosion of river basins.

### Table 1. Data on Disaster Level in Sambas Regency

| Type of Disaster               | Level of risk |
|--------------------------------|---------------|
| Flood                          | High          |
| Flash floods                   | High          |
| Extreme weather                | High          |
| Earthquake                     | High          |
| Forest and Land Fires          | High          |
| Dryness                        | High          |
| Landslide                      | High          |
| Extreme Waves and Abrasion     | High          |

Source: Data and Information on Indonesian Disasters (DIBI) from 1999-2016 in DRPB Kab. Sambas 2018-2022 in RKPD Kab. Sambas, 2020

Some of the master plans for the Tanah Hitam Village area contained in the Sambas Regency Spatial Plan number 17 of 2015-2035 consist of a flood control system: a. river normalization; b. construction
of a flood control canal if the existing river does not allow the channel dimensions to be enlarged; c. construction of embankments and control dams. d. Water construction; e. early warning system development; and / or f. procurement of fresh water pumps. The coastal protection system is realized through the development of natural coastal protection and artificial coastal protection, along with the management of coastal ecosystems.

The protected area consists of: a. coastal borders; b. river borders; c. the area around the lake; and D. the area around the spring. Coastal border areas are scattered along the coast in the districts of Selakau, Salatiga, Pemangkat, South Jawa, Jawai, Tangaran, and Paloh Flood-prone areas are scattered in areas around large river flows. There are regional programs for Sambas Regency, including the Program for Prevention and Management of River Conservation Areas in the Paloh River, Sambas Besar River, Bantanan River, Sambas River, Kumba River, Sen Tujuh River, Small Sambas River, Sebapai River, and Selakau River.

2. Method
The analysis method that will be used is a descriptive qualitative method, namely the elaboration of the area analysis by explaining descriptively and accompanied by a picture as a description of the area analysis. In addition, the analysis method that will be explained is based on the objectives described in the previous chapter. And other references that will be used in the analysis process are referring to the SNI 03-1733-2004 Regulation on Urban Housing Environmental Planning Procedures.

3. Discussion
Based on the data obtained, there are several summary problems in the Tanah Hitam Village area.

Table 2. Problems Mapping in the Tanah Hitam Village Area

| Design Problems | Non-Design Problems | Policy Study |
|-----------------|---------------------|--------------|
| Road conditions that are damaged and cut off | People still think of it as normal | Sambas Regency RKPD regarding the program |
| Disconnected Drainage Network | Related to sea wave disasters that threaten the existence of coastal areas | Disaster management in the area |
| Plantation areas in coastal areas | There is no plan that has been realized so that the abrasion occurs every year and gets higher, so that it is at risk of eroding the coast of Tanah Hitam Village. | RTRW of Sambas Regency regarding the protection of the local area along the coast of Paloh District |
| There is no waste facility | There is no Evacuation Facility Program in the event of a disaster in the Tanah Hitam Village area | Tanah Hitam Village as PPL Sambas Regency |
| There is no disaster management facility yet | | Village Data on Tanah Hitam Village as the Paloh Gate |
Coastal areas that are threatened with abrasion | Village Data on the potential for the coastal area of Tanah Hitam Village
---|---
The absence of a clean water network | Perda on the management of coastal areas and small islands with the concept of an integrated system

Sources: Analysis, 2020

The handling strategy includes:

- Forming a systemized road network plan as well as adding road networks for access to settlements and new routes as area evacuation routes.
- Forming a sustainable drainage network plan and turning the network into a water body for irrigation both for rice field activities and as water flow in the area.
- Make plans for security for residential and plantation areas that may be affected by disasters from sea waves and rainwater puddles. The intended safeguards can be in the form of embankments or the like in order to prevent high and large sea waves that threaten land areas close to coastal areas.
- Making solid waste network plans, especially in certain parts such as market complexes, coastal areas and areas such as primary collector roads. Solid waste networks to tackle the amount of waste generated by various sectors, both from settlements and market areas and others. The solid waste network plan will be made referring to SNI which regulates settlement arrangement both placement and provision of solid waste models to be applied.
- Create a new area plan as a disaster management area in the event of a disaster, both in anticipation and after a disaster, equipped with existing facilities as well as a plan for handling waves of sea water in the coastal area of the area. This new area is the core concept of post-disaster recovery area planning where this area functions as an area that can be used as a temporary area during repairs if several settlements or other areas are affected by a disaster. The design of this new area will refer to the regulations on disaster response villages that have been described in the previous policy study. Where in determining the location, it will look for locations that may not be affected by rising sea water or severe inundation if affected by high tides and high rainfall.
- Make a clean water network plan to distribute clean water to local residents' settlements. The clean water network will follow the existing road network and drainage network in the area with a piping system.

Regional Strategy Design Simulation:

There are 2 design focuses in the area, namely the design of the coastal area in anticipation of sea waves by providing retention pools as an obstacle to inundation towards the land and designing a recovery area as a solution to the area against disasters.

Settlement planning is carried out by calculating population projections with reference to SNI 03-1733-2004 concerning URBAN ENVIRONMENTAL PLANNING PROCEDURES regarding urban settlement environmental planning. with a population of 4,676 inhabitants.
Based on SNI regarding housing environment planning with a population of approximately 4000 is as follows. The needs to support the activities of the Tanah Hitam Village settlement:

- Citizen meeting hall: 1 unit
- Security post: 1 unit
- Electrical substations: 1 substation
- Public telephones: 1 public telephone (according to conditions of need)
- Small trash bin: 2 units
- Public parking: 1 area or made 2 by dividing the area and adjusting the function needs of the area.
- MCK: units according to needs both in new areas and residential areas and other functions.
- Kindergarten - Kindergarten: 4 units provided that they are not far from a residential area and not in the center of the main road.
- Elementary School: 3 units provided that they are not far from the housing area and not in the center of the main road.
- Junior High School: 1 unit provided that it can be reached by public transportation and does not have to be in a residential area.
- Senior High School: 1 unit provided that it can be reached by public transportation and does not have to be in a residential area.
- Posyandu or Polindes: according to needs and distance in residential areas.
- Shops: 18 units and there are already several shops and market activities that support the area.
- There are 18 RT parks located in the neighborhood complex.
- Environmental scale garden as a means of gathering residential areas.
- The collector road is 7 meters wide and the number of vehicles in and out is limited.
- Local roads or residential roads with a width of 3 - 7 meters connected to the collector road.

4. Conclusion

The coastal area is an area that is vulnerable to several activities and disaster risks. Because of this, the coastal area is included in the local protected area, especially on the coast in West Kalimantan. Some of the literature used and several policy studies, especially in the Regional Work Plan in West Kalimantan, states that the coastal area in Tanah Hitam Village is an area designated as an area that is included in the disaster management and coastal protection program in Sambas Regency. The high level of risk to settlements adjacent to the coastal area has made the Tanah Hitam village area one of the villages threatened with disasters and the need for disaster management planning.

Based on the physical data and analysis carried out in the previous chapter, the Tanah Hitam Village area is directed at the development of an area that is directed towards residential environmental planning. This is based on the possibility that a house affected by a disaster in a coastal area could one day have an evacuation room or temporary shelter in anticipation if this area is affected by a disaster. Some of the plans carried out include the following. Forming a systemized road network plan as well as adding road networks as residential access and new routes as area evacuation routes. The road network will be made towards the green open space area which is still empty and the road network will also be made towards the coast to make access to the coastal areas in the area.

Forming a sustainable drainage network plan and turning the network into a water body for irrigation both for rice field activities and as water flow in the area. Addition of drainage networks and make some of them as water bodies to accommodate the overflow of water that falls on the area and drain the area towards the coast as the last runoff. Make plans for security for residential and plantation areas that may be affected by disasters from sea waves and rainwater puddles. The intended safeguards can be in the form of embankments or the like in order to prevent high and large sea waves that threaten land areas close to coastal areas. Plans for coastal areas to withstand rising land waters and anticipating possible damage to settlements and to the plantation areas of the surrounding community. Make a solid waste network plan, especially in certain parts such as market complexes, coastal areas and regional areas such as the primary collector road. Solid waste networks to tackle the amount of waste generated by various sectors, both from settlements and market areas and others.

The solid waste network plan will be made referring to SNI which regulates settlement arrangement both placement and provision of solid waste models to be applied. The concept of a solid waste system
plan will be placed in areas that have a high level of activity such as coastal areas as public spaces, especially at certain events, then the solid waste system in the market area and the solid waste system for the settlement environment itself. Making a plan for a new area as a disaster management area in the event of a disaster, both in anticipation of disasters, equipped with settlement supporting facilities. This new area is the core concept of post-disaster recovery area planning where this area functions as an area that can be used as a temporary area during repairs if several settlements or other areas are affected by a disaster.

The design of this new area will refer to the regulations on disaster response villages that have been described in the previous policy study. Where in determining the location, it will look for locations that may not be affected by rising sea water or severe inundation if affected by high tides and high rainfall. The placement of this new area will follow the security protocol in the concept of a disaster response village both in terms of evacuation routes, infrastructure systems and facilities as well as the shape of the buildings to be made and other equipment such as vegetation and so on. Creating a clean water network plan as a distribution of clean water to local residents' settlements. The clean water network will follow the existing road network and drainage network in the area with a piping system. Meanwhile, some plans carried out based on the area design components include: The land designation structure in the area consists of several functions and refers to the previous regulation. Some of the functions implemented include the function of the main settlement, the function of the new settlement as a recovery area, the function of open space and the function of the coastal area. Broadly speaking, there will be 4 land uses in the area, but each land designation will have several functions defined in one area.

The intensity of land use in the area adjusts to the land use function that has been directed previously. In general, the concept of land use intensity by providing open space in every development in the area. Each land allocation will be directed to have different rules. Most of the areas that will be applied are 70-80% built-in space and 20-30% green open space as infiltration areas. This is different from the application in certain areas such as green open spaces and coastal areas. There are several parts of the building that will be directed to this area. Among them are: Existing commercial and residential areas: The buildings that will be applied are existing existing buildings and additional spaces or water bodies in order to anticipate disasters from both sea waves and puddles that can occur due to high rainfall. In addition, the space of the water body can be used as an open space or additional storage area in the environment. Meanwhile, the building height in the area is conceptualized not to exceed 2 floors. New residential areas or post-disaster recovery areas: In this area the building will be implemented using a stilt system. In addition, areas will also be created with variations in elevation in the area following previous precedents. It is hoped that a building with a stilt system will give added value to the area, such as the use of the building under the building as additional open space for the area itself. Environmental quality management by raising one of the crops as a characteristic display of the area, namely oil palm plants. In addition, such as gates and other markers will be designed by taking part of the produce. Some that are applied in the area regarding the area's environmental quality system are the entrance gate to the Tanah Hitam Village area, area markers, the design of the lights at certain points. As for the coastal area, a marker will be made by lifting turtles as a characteristic of tourism or including protected animals in Paloh District.

The infrastructure and utility system conceptualized in the area consists of adding several environmental roads, creating new road networks, making evacuation routes by considering the distance traveled by the affected area to the recovery area, adding other facilities and infrastructure according to the population count that has been carried out as support for settlement activities in area, making natural channels by placing several bodies of water around the land area to accommodate water in the area. Environmental Conservation. There are no buildings that are protected as cultural heritage buildings in the area. However, coastal areas that are protected areas must be considered. The coastal area will be added to withstand waves so that the coastal area which is used as a local tourist location is protected from the threat of abrasion. Large tree planting is also applied in areas close to the coastal area of the area to withstand waves from reaching the land area of the area.
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