Sumatra Journal of Disaster, Geography and Geography Education, December, 2020, Vol. 4, No. 2, pp. 225-233
DISASTER, GEOGRAPHY, GEOGRAPHY EDUCATION http://sjdgge.ppj.unp.ac.id/index.php/Sjdgge
ISSN : 2580 - 4030 (Print) 2580 - 1775 (Online), Indonesia

ASSESSMENT OF BEACH ABRATION VULNERABILITY LEVELS AND DIRECTIONS FOR SPACE UTILIZATION IN CENTRAL PARIAMAN DISTRICT PARIAMAN CITY

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ABSTRACT: The coastal area of West Sumatra Province from 2003-2016 there has been a disaster of coastal abrasion and accretion at 32 points. During the 13 years, there was beach abrasion covering an area of 732.69 ha and coastal accretion covering an area of 55.4 ha. Coastal abrasion disaster causes a significant reduction in coastal land, namely an average of 56.3 ha / year, while the addition of coastal / coastal land is only 4.26 ha/year. This study aims to find the level of vulnerability of coastal abrasion in Central Pariaman District, Pariaman City. Physical, social, economic, and environmental parameters were analyzed using the scoring method according to Perka BNPB No. 2 of 2012. The results showed that the index of coastal abrasion vulnerability in Karan Aur, Lohong and Pasir villages had a moderate index, while Pauh Barat village had a high vulnerability index. Coastal abrasion mitigation is carried out by means of active mitigation and passive mitigation. Passive mitigation includes directional use of space where in the zone of 100-150 m from the highest tide and the growing beach is directed as a conservation area by planting mangroves and Pinago trees and agro-tourism (limited tourism). The cultivation zone is a zone that is located> 150 m from the highest tide inland, which is a safe zone for coastal abrasion for settlements and trade.

Keywords: Vulnerability, Coastal Abrasion, Mitigation, Spatial Use Directions

1. INTRODUCTION

The territory of Indonesia is very at risk of hydro-meteorological disasters, which is 80% of the occurrence of disasters. Compared to the number of disasters in 2015, disaster events in 2016 increased by 35%, of which 92% were hydrometeorological disasters (Haryani, 2018). In Indonesia in 2016 there were 766 floods, 612 landslides, 669 tornadoes, 74 combinations of floods and landslides, 178 forest and land fires, 13 earthquakes, 7 volcanic eruptions, and 23 tidal waves and abrasion. In Indonesia, the risk of abrasion and extreme waves occurs in an area of 1,888,085 hectares, with the number of people exposed to 4,917,327 people and can cause physical losses of Rp. 22,042,350 billion, economic loss of Rp. 1,290,842 billion and environmental damage of 460,252 ha [1].

Disasters that .have occurred in West Sumatra based on the highest percentage order include floods 43%, landslides 18%, fires 7%, floods and landslides 7%, earthquakes 6%, tidal waves / abrasion 3% and other disasters 7 %. Based on BNPB data. [2-5], the disaster-prone index of West Sumatra Province (score 154) is number 6 out of 33 Provinces and Provinces which are included in the high vulnerable class. This fact adds to the belief that the vulnerability of the coastal areas in West Sumatra is very high. [3] [6-10] from 1918 there has been erosion of the coast of Padang, one of the cities in West Sumatra Province an average of 2.20 m / year.

[4] coastal area is an intermediate area between marine and terrestrial ecosystems. Disasters in coastal areas are the biggest threat to the sustainability of the people's socio-economic activities [5].The main systems that will experience the impact of a disaster are the physical, social, demographic and built environment. The social condition of the population shows the character of rural communities on the coast that are relatively vulnerable to disaster exposure [6] [11-15].

[17-20] in the coastal area of West Sumatra Province from 2003-2016 there has been a disaster of coastal abrasion and accretion at 32 points. During the 13 years, there was beach abrasion covering an area of 732.69 ha and coastal accretion covering an area of 55.4 ha. Coastal abrasion disaster causes a significant reduction in coastal land, namely an average of 56.3 ha / year, while the addition of coastal/coastal land is only 4.26 ha/year.

Disasters in coastal areas make people vulnerable to disaster exposure, this is due to the very high dependence of communities on coastal resources [21]. Most of the people in the coastal areas work in the fisheries or tourism sector (marine and coastal) which are highly dependent on available natural resources [22-24]. This condition causes coastal communities to be directly or indirectly dependent on the sustainability of coastal natural resources [23]. This is what causes people in coastal areas to be socio-economically vulnerable and sometimes even incapable of living adaptation.

The definition of disaster in disaster management law (UURI No.24/2007) is an event or series of events that threaten and disrupt the life and livelihoods of the community caused, either by natural factors and/or non-natural factors or human factors, resulting in casualties. human, environmental damage, property loss, and psychological impact. Disasters in coastal areas often occur where coastal disasters are events due to natural events or due to actions of people who cause physical and/or biological changes in the coast and result in casualties, property and / or damage in coastal areas and small islands (PPPRI No. 2010 Concerning Disaster Mitigation in Coastal Areas and Small Islands).

The effort that needs to be done in post-disaster management (before a disaster occurs) is disaster mitigation. Disaster mitigation is an effort to reduce disaster risk, both structurally (physically), namely through natural and/or artificial physical development as well as non-structural (non-physical) mitigation, namely through increasing the ability to face disaster threats in coastal areas and small islands. Disaster vulnerability level assessment is one of the non-structural mitigation efforts so that the community and government are ready to be prepared in the face of disaster threats.

Regulation of the Head of the National Disaster Management Agency (Perka BNPB) No. 4 of 2008 concerning Guidelines for Preparing Disaster Management Plans, vulnerability is a condition or nature/behavior of humans or communities that causes the inability to face danger or threats. Physical, social, economic and environmental vulnerability are conditions that are determined by physical, social, economic and environmental factors or processes that increase the susceptibility of a community to the impact of hazards (ISDR, 2004 in MPBI, 2007). Vulnerability places more emphasis on the human aspects at the community level who are directly faced with threats (dangers). Vulnerability is a major factor in a social order that has a higher risk of disaster if it is not supported by capacity, such as lack of education and knowledge, poverty, social conditions, and vulnerable groups including the elderly, toddlers, pregnant women and physically or mentally disabled. Capacity is a combination of all the strengths and resources available in a community, community or institution that can reduce the level of risk or impact of a disaster.

Regulation of the Minister of Marine Affairs and Fisheries of the Republic of Indonesia Number 21/Permen-Kp/2018 concerning Procedures for Calculating Coastal Boundaries, vulnerability is a condition of a community or society that leads to or causes inability to face the threat of disaster. The Vulnerability Index is an index that shows the level of vulnerability to disasters which is classified into high, medium and low levels.

One of the cities that are threatened with high coastal abrasion in West Sumatra is Pariaman City, especially Central Pariaman District, which is the center of Pariaman City, which is a very dense area of government and trade. As the center of government which is very dense and with a high level of threat of abrasion, it is necessary to conduct a study on the vulnerability of coastal abrasion disasters, then mitigation efforts are made to reduce the risk of abrasion disasters. The problem in this study is how the vulnerability of coastal abrasion in Central Pariaman District, Pariaman City. The purpose of this study was to determine the level of vulnerability of coastal abrasion in Pariaman Tengah District, Pariaman City and mitigation efforts, especially in spatial planning directions.

2. METHODS

This research is a quantitative research. The approach in this research is to study the level of vulnerability to coastal abrasion, namely; a) assessing the level of physical vulnerability, the indicators used are the age and construction of buildings, building materials, road infrastructure and available public facilities and critical facilities, b) assessing the level of social vulnerability, the indicator used is population density, sex ratios, poverty ratios, disabled people ratios and age group ratios, c) assessing the level of economic vulnerability (economic vulnerability) the indicators used are productive land and GRDP, d) assessing the level of environmental vulnerability (environmental vulnerability) the indicators used are broad protected forest, natural forest, mangrove forest, shrubs and swamps and e) mitigation efforts by carrying out spatial planning directions.

The types of data used in this study are primary data and secondary data. Secondary data is data that is carried out through literature reviews, agency surveys, document review, while primary data is through interviews and direct observations in the field. Primary data collection methods are obtained by making observations, measurements and field observations. Secondary data is carried out by visiting related institutions and institutions such

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as Pemko Pariaman, Bappeda, Marine and Fisheries Office, BPS, BPBD, BPM, Sub District/village, District Pariaman Tengah to obtain data related to the substance/research material.

The analytical techniques used to support this stage of analysis are as follows. The social vulnerability analysis method is as shown in the following table.

Table 1. Social Vulnerability Parameters

Parameter	Weight (%)	Class			Skor
		Low	Moderate	High	
Population density	60	<500 people / km2	500-100 people / km2	> 1000 people / km2	
Sex ratio (10%)					
Poverty ratio (10%)	40	<20%	20-40%	>40%	Class/ Class Max Value
Disability ratio (10%)					
Age group ratio (10%)					
Social Vulnerability = (0.6 * log ((population density) / 0.01) / (log(100 / 0.01))) + (0.01 * sex ratio) + (0.01 * poverty ratio) + (0.01 * disability ratio) + (0.01 * age group ratio)					

The method of economic vulnerability analysis is as follows.

Table 2. Economic Vulnerability Parameters

Parameter	Weight (%)	Class			Skor
		Low	Moderate	High	
Productive land	60	<50 juta	50-200 juta	>200 juta	Class / Max Grade Value
PDRB	40	<100 juta	100-300 juta	>300 juta	
Economic Vulnerability = (0.6 * score of productive land) + (0.4 * score of GRDP)					

Table 3. Physical Vulnerability Parameters

Parameter	Weight (%)	Class			Skor
		Low	Moderate	High	
House	40	< 40 juta	400-800 juta	> 800 juta	Class / Max Grade Value
Public facilities	30	<500 juta	500 juta-1 M	>1 M	
Fasilita Kritis	30	<500 juta	500-1 M	>1 M	
Physical Vulnerability = (0.4 * home score) + (0.3 * public facilities score) + (0.3 * critical facilities score)					

The environmental vulnerability analysis method is as follows.

Table 4. Environmental Vulnerability Parameters

Parameter	Weig ht (%)	Class			Skor
		Low	Moderate	High	
Protected forest	10	<20 Ha	20 – 50 Ha	>50 Ha	Class / Max Grade Value
Natural Forest	30	<25 Ha	25 – 75 Ha	>75 Ha	
Mangrove / Mangrove Forest	40	<10 Ha	10 – 30 Ha	>30 Ha	
Check the bush	10	<10 Ha	10 – 30 Ha	>30 Ha	
Very	10	<5 Ha	5 – 20 Ha	>20 Ha	
Environmental Vulnerability = (0.1 * protected forest score) + (0.3 * natural forest score) + (0.4 * mangrove score) + (0.1 * scrub score) + (0.1 * swamp score)					

Table 5: Classification of Vulnerability Levels

No	Total Value Range	Class
1	1,0 – 1,66	Low
2	1,67 – 2,34	Moderate
3	2,35 – 3,0	High

Source: Perka BNPB No.2 of 2012

Vulnerability index

*Wave and abrasion threat susceptibility = (0.4 * social vulnerability score) + (0.25 * economic vulnerability score) + (0.25 * physical vulnerability score) + (0.1 * environmental vulnerability score).*

3. RESULTS AND DISCUSSION

Central Pariaman District is one of the 4 Districts in Pariaman City with an area of 1229.61 Ha, has 16 Kelurahan and 6 Villages with a population of 30,628 people. Geographically, Pariaman District is located at 0 ° 37 '29,464" south latitude and 100 ° 07 '49" - 109 East Longitude at an altitude of 2 m above sea level. Administrative boundaries are in the north bordering North Pariaman District, south side with South Pariaman District, East side with Padang Pariaman Regency and west side with Indian Ocean. The research area consists of 3 sub-districts and 1 coastal village, namely Karan Aur, Lohong, Pasir and Pauh Barat villages.

Fig. 1. Coastal Villages and Kelurahan, Central Pariaman District

3.1 Physical Vulnerability

Physical vulnerability analysis in determining the level of vulnerability to abrasion, consists of physical buildings located in Central Pariaman District, especially 4 kelurahan and coastal villages. The physical building in question consists of parameters for houses, public facilities and critical facilities which are calculated in rupiah and converted into index values.

There are quite a lot of settlements (houses for residents) as far as 200 m inland, with 123 units of Pauh Barat Village, 70 units of Pasir Village, 47unit Lohong and 50 units of Aur Village with temporary, semi-permanent and permanent housing conditions. Public facilities, in this case there are road infrastructure scattered throughout the Kelurahan and Desa both the collector road classification and environmental roads with a Low vulnerability

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index. Meanwhile, the existence of critical facilities can be measured by the existence of trade facilities, offices and places of worship where in Karan Aua there are 2 units, Pasir Subdistrict 3 units and Pauh Barat Village 2 units.

The results of the analysis can be concluded that the physical vulnerability in Karan Aur and Lohong sub-districts is in the moderate classification, while Pasir and Pauh Barat villages are classified as high-class physical vulnerabilities. This is in line with the function of space as the center of government and trade, so the Pasir and Pauh Barat villages have economic and office facilities scattered along the coast. The results of the analysis show that the coastal abrasion vulnerability of Pariaman Tengah District from the physical aspect is in the Medium category.

Table 6. Physical Vulnerability of Central Pariaman District

No	Village/ sub-district	House	public facilities	critical facilities	Skor	Class
1	Kelurahan Karan Aur	1,2	0,6	0,3	2,1	Moderate
2	Kelurahan Lohong	1,2	0,6	0,3	2,1	Moderate
3	Kelurahan Pasir	1,2	0,9	0,3	2,4	High
4	Desa Pauh Barat	1,2	0,9	0,3	2,4	High
	Result	1,2	0,75	0,3	2,25	Moderate

Source: Analysis Results,2020

Fig. 2. Map of Physical Vulnerability Due to Coastal Abrasion

3.2 Economic Vulnerability

Economic vulnerability is measured by the parameters of the contribution of GRDP and productive land. The rupiah value of productive land is calculated based on the value of the GRDP contribution in sectors related to productive land, such as agricultural land in Central Pariaman District, especially urban villages and villages located on the coast. The productive land in the form of mixed gardens in Aur Village is not very wide, only 2.37 ha, Lohong Village is 6.24 ha while Pasir Village has absolutely no productive land while the largest is in Pauh Barat Village.

Pariaman City Gross Regional Domestic Product based on the prevailing price according to the business sector in 2018 is IDR 4,386,767.7 including Class 3 (high) x Weight 40% = 1.2. Based on the analysis, it can be concluded that the economic vulnerability in Karan Aur, Lohong, Pasir and Pauh Barat villages with a score of 2.1 is included in the Medium Economic Vulnerability Class classification with an interval range of 1.66.– 2,34.

Table 7. Economic Vulnerability Analysis

No	Subdistrict / Village	Productive land	PDRB	Score	Class
1	Kelurahan Karan Aur	0,6	1,2	1,8	Low
2	Kelurahan Lohong	0,6	1,2	1,8	Low
3	Kelurahan Pasir	0,6	1,2	1,8	Low
4	Desa Pauh Barat	1,8	1,2	3	High
	Result	0,9	1,2	2,1	Moderate

Source: Analysis Results,2020

Fig. 3. Economic Vulnerability Map Due to Coastal Abrasion

3.3. Environmental Vulnerability

Environmental vulnerability analysis consists of parameters of protected forest, natural forest, mangrove forest / mangrove forest, shrubs and swamps. In Aur Kelurahan there is only 1.02 ha of scrub, while in Lohong and Kelurahan Pasir, no forest, scrub or swamp is found, but in Pauh Barat Village, only 3.99 ha of swamp is found. Based on

the environmental vulnerability analysis, it can be concluded that the coastal abrasion vulnerability from environmental aspects in Central Pariaman District has a total score of 1.0, including the total V value range, namely 1.0 - 1.66 with the Low category of Environmental Vulnerability Class.

Table 8: Environmental Vulnerability

Sub-district / village	Protected forest	natural forest	mangrove forest	Bush	Too	Score	Class
Kelurahan Karan Aur	0,1	0,3	0,4	0,1	0,1	1,0	Low
Kelurahan Lohong	0,1	0,3	0,4	0,1	0,1	1,0	Low
Kelurahan Pasir	0,1	0,3	0,4	0,1	0,1	1,0	Low
Desa Pauh Barat	0,1	0,3	0,4	0,1	0,1	1,0	Low

Source: Analysis Results,2020

Fig. 4. Map of Environmental Vulnerability Due to Coastal Abrasion

3.4 Social Vulnerability

Social vulnerability analysis is an attempt to analyze a situation or a social problem objectively. Social analysis is directed to obtain a complete picture of the social situation in areas threatened by coastal abrasion, including the parameters of population density, sex ratio, ratio of vulnerable age groups, ratio of poor people and ratio of disabled people.

The population density in Kelurahan Karan Aur is 1,250 people/km^2, Kelurahan Lohong 2,611 people/km^2, Kelurahan Pasir 2,769 people/km^2 and Desa Pauh Barat is 2,460 people / km which on average are categorized as high class social vulnerability. Likewise with the average sex ratio in Central Pariaman District in the High Class. The vulnerable age group measured for children aged 0-15 years and seniors over the age of 65 years. The results of the analysis concluded that in Karan Aur Village (13.63%) was included in the Low Class social vulnerability category, Lohong Village (40.7%) was included in the High social vulnerability class, Pasir Village was 44.5% included in the High vulnerable age group while in Kelurahan Pauh Barat 40.41% is also included in the High vulnerable class social vulnerability group. The conclusion from the social vulnerability analysis in Pariaman Tengah District due to coastal abrasion is included in the High Social Vulnerability.

Fig. 5. Map of Social Vulnerability Due to Coastal Abrasion

3.5 Analysis of Coastal Abrasion Vulnerability Index

The vulnerability of the coast of Central Pariaman District to coastal abrasion is the accumulation of physical vulnerability, economic vulnerability, social vulnerability and environmental vulnerability with different weighting factors for each threat. The conversion parameter for the vulnerability index is shown in the equation (40% x social vulnerability score) + (25% x economic vulnerability score) + (25% x physical vulnerability score) + (10% x environmental vulnerability score).

Fig. 6. Map of Vulnerability Due to Coastal Abrasion Central Pariaman District

Based on the table above, it can be concluded that the vulnerability index of coastal abrasion in Karan Aur, Lohong and Pasir has a moderate vulnerability index, while Pauh Barat village has a high vulnerability index.

3.6 Mitigation of Coastal Abrasion in Kota Pariaman

The index of vulnerability caused by coastal abrasion in Central Pariaman District is in the High, Medium and Low categories in both the physical, social, economic and environmental aspects. The index of coastal abrasion vulnerability in Karan Aur, Lohong and Pasir is included in the Medium Vulnerability Index category, while Pauh Barat Village is included in the High Abrasion Vulnerability Index. It is necessary to address this condition, especially the village that has a high vulnerability index, namely the village of West Pauh.

Mitigation efforts against Kelurahan or Desa in Central Pariaman District which are included in the category of high vulnerability index are carried out in the form of Passive Mitigation and Active Mitigation. Active Mitigation is an action taken to reduce the impact of a disaster before a disaster comes both physically and physically, including providing counseling and increasing awareness of coastal communities about the threat of coastal disasters and disaster knowledge continuously and consistently, providing training, education / knowledge to community regarding mitigation efforts, making embankments / krip stones and or planting Pinago trees.

Active mitigation that must be carried out in Pauh Barat Village includes preventing (not allowed) migration of residents to the coastal area. For residents who already live in areas prone to coastal abrasion disasters, they should be relocated to a safer area at least 100 m inland from the highest tide. In addition, it can also be given information to the community on the importance of continuously increasing awareness of coastal abrasion disasters. Pariaman City Government should have thought of areas as relocation places for coastal communities who live on beaches that have a high abrasion vulnerability index, such as Pauh Barat Village to a safe area.

Passive Mitigation Efforts that must be carried out by both the community and the Pariaman City government include strengthening the Disaster Care community/organization so that it makes a sub-district/village ready for disasters with all clear technical and organizational rules, including making a disaster hazard map of a coastal village/ village/village maps of problems related to potential disasters that will occur in coastal areas, compiling sub-district / village regulations regarding disaster mitigation, what can and cannot be done or built in coastal areas. Apart from that, regulations can also be made regarding building requirements in accordance with the design law, monitoring the compliance of communities living along the coast, imposing penalties, fines or terminating / closing off construction violations. Control of land use that must be in accordance with the RTRW and reject the construction of facilities and infrastructure that are not in accordance with their designation.

In a Kelurahan that has a High Category of coastal abrasion vulnerability in Pariaman Tengah District, the following things can be done. Mitigation of Physical Aspects; a) Utilization of land use is adjusted to RTRW/RDTR, b) Regulation of building density in areas that are permitted or prohibited, c) Making buildings or houses that are suitable for habitation with structures and construction of strong buildings and under houses, d) Critical facilities such as hospitals or market in relocation to the location of an abrasion safe zone (> 200 m) and e) Simulation of abrasion disaster response to the community.

Mitigation of Social Aspects; the density of residential buildings or settlements in the coastal area is in line with the high population density. Population density and the poor generally live on illegal lands (“pasia mahelo” / squatter areas) or growing land caused by coastal accretion. On growing land (“pasie mahelo”) many buildings were erected by local people because the land status was unclear. Even if there is sale and purchase on the land the price is very cheap so that the poor generally live in the area.

The status of growing land is actually owned by the State in accordance with Government Regulation No.16 / 2004 article 12; land originating from arising land or the result of reclamation in coastal waters, tides, swamps, lakes and former rivers is directly controlled by the State. However, so far many settlements have been built by the community. There is a need for socialization and dissemination to the people living along the coast regarding the status of land and the number of disasters that threaten life and property.

Mitigation of Economic Aspects; In accordance with the indicators of economic vulnerability, where the land that functions as rice fields, plantations, agricultural land, especially fishponds, which is widely developed in coastal areas, has a high risk of vulnerability. Therefore, it is recommended that this productive land use be kept away from the coast to avoid greater losses. By keeping rice fields, plantations and agricultural land from developing along the coast will reduce the risk of vulnerability due to coastal abrasion in Kota Pariaman.

Mitigation of Environmental Aspects; Environmental vulnerability indicators can be seen from the presence of protected forests, natural forests, mangroves/mangroves, shrubs and swamps. This means that the more available or maintained forests along the coast, the lower the level of coastal vulnerability. To reduce the level of abrasion threat from environmental aspects, among others, is

planting vegetation that has a strong root system and is suitable for spilling on sandy beaches such as the Pinago tree. Coastal communities are encouraged to participate in cultivating and planting Pinago trees so that they can reduce environmental vulnerability due to coastal abrasion.

3.7 Guidelines for Coastal Space Utilization

In accordance with the spatial pattern of Kota Pariaman, the protected area of Kota Pariaman is divided into local protected areas consisting of river borders, railway lines, SUTET and RTH (Green Open Space). Presidential Regulation Number 51 of 2016 concerning Coastal Boundaries mandates that Regency/City Governments that have coastal boundaries are obliged to determine their coastal boundaries as stipulated in Regional Regulations concerning Regency/City Regional Spatial Planning (RTRW). Coastal Boundary is land along the coastline, whose width is proportional to the physical shape and condition of the beach, at least 100 (one hundred) meters from the highest tide point towards the land, while the Coastal Boundary is a coastal boundary space determined based on a certain method.

The determination of coastal boundaries is carried out with the aim of protecting and preserving: the preservation of ecosystem functions and all resources in coastal areas and small islands; community life in coastal areas and small islands from the threat of natural disasters; allocation of space for public access through the coast; and space allocation for drains and sewage. The determination is carried out based on calculations adjusted to topographic, biophysical, coastal hydro-oceanographic characteristics, economic and cultural needs, and other related provisions.

The calculation of coastal boundaries must also take into account: protection against earthquakes and / or tsunamis; coastal protection from erosion or abrasion; protection of artificial resources on the coast from storms, floods and other natural disasters; protection of coastal ecosystems, such as wetlands, mangroves, coral reefs, seagrass beds, sand dunes, estuaries and deltas; public access arrangements; and arrangements for sewerage and sewage.

In the coastal area of Pariaman City as far as 100 meters, there are various public buildings, housing and tourism objects. Based on the guidelines above the coastal boundary line in residential areas, the physical area of a beach that is stable and experiences accretion with a wave height of less than 2 meters can be defined as a 30 meter beach boundary, while an unstable beach with deposition with a wave height of more than 2 meters can be determined. 150 meter coastline. In connection with this, the coastal boundary in Central Pariaman District is 100 m - 150 m from the highest tide towards the land.

Table 12. Criteria for Determining Coastal Border Width

No	Type of Activity	Form the beach	The physical condition of the beach	Border width (meter)
1	Residential Area (housing)	lsuppose with waves < 2 m	stable by deposition	30
			stable without deposition	50
			unstable with deposition	50
			unstable without deposition	75
		ramps with waves > 2 m	stable by deposition	50
			stable without deposition	75
			unstable with deposition	75
			unstable without deposition	100
2	Non-Settlement Areas (industry, trade and services, tourism, ports)	suppose with waves < 2 m	stable by deposition	100
			stable without deposition	150
			unstable with deposition	150
			unstable without deposition	200
		ramps with waves > 2 m	stable by deposition	150
			stable without deposition	200
			unstable with deposition	200
			unstable without deposition	250
		steep with waves < 2 m	stable	200
			un stable	250
		steep with waves > 2 m	stable	250
			un stable	300

Source: Ministry of Public Works on Guidelines for the Use of Coastal Space in Urban Areas

The City green open space area aims to improve the quality of the environment in the city which aims to increase the beauty and beauty, provide social and cultural space for the community, improve the quality of the micro climate and provide city facilities. One of them is green open space on the coast of the tourism area. Along the coast, Central Pariaman District is green open space with a tourism function.

The distribution of settlement area density arrangements in Central Pariaman District until 2030 in the RTRW Pariaman is high density

housing with an area of 218.4 Ha (8.4%) of the area of the area and trade (fish market) in Karan Aua village. The area allocated for space for the informal sector is a special space provided to accommodate street vendors along the coast as tourist facilities in the form of culinary tours and souvenir tours.

4. CONCLUSION

The conclusions that can be drawn from this study are as follows. a) Kelurahan Karan Aur is categorized as moderate coastal abrasion vulnerability where Physical and Economic vulnerabilities are in the Medium vulnerability category while Social and Environmental vulnerability is Low. b) Kelurahan Lohong is included in the moderate coastal abrasion vulnerability, where the Physical and Economic vulnerabilities are in the Medium vulnerability category, Social vulnerability is in the High category while the Environmental vulnerability is Low. c) Kelurahan Pasir is included in the moderate coastal abrasion vulnerability, where the Physical and Social vulnerabilities are in the High category, the Economic vulnerability is in the Medium vulnerability category, while the Environmental vulnerability is Low. d) Pauh Barat Village is the only village that is included in the High coastal abrasion vulnerability, where Physical vulnerability, Social vulnerability and Economic Vulnerability are in the High category, while Environmental vulnerability is Low.

Coastal abrasion mitigation is carried out by means of active mitigation and passive mitigation. Passive mitigation includes directional use of space where in the 100-150 m zone from the highest tide and the growing beach is directed as a conservation area by planting mangrove forests and Pinago trees, coastal tourism areas or agro-tourism (limited tourism). The cultivation zone is a zone located> 150 m from the highest tide inland, which is a safe zone for coastal abrasion for settlements and trade.

5. ACKNOWLEDGEMENTS

Thanks to LPPM Bung Hatta University, Urban and Regional Planning Study Program, Faculty of Civil Engineering and Planning, Bung Hatta University and Pariaman City Government for their assistance and participation so that this research can be completed.

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