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Changes in Coastline with Landsat Imagery Approach and Its Impact on the Pattern of Development of Coastal Settlement Areas (Case of Indramayu Regency)

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ABSTRACT

This research is entitled Changes in Coastline with Landsat Imagery Approach and Its Impact on the Pattern of Development of Coastal Settlement Areas (Case of Indramayu Regency). Problems Changes in the coastline in the coastal residential area of Indramayu Regency have an average abrasion rate of 23.64 Ha/year and an average accretion rate (sedimentation) of 4.81 Ha/year, making it difficult to develop the area for residential areas. This condition results in frequent changes in the area and policies on the development of coastal settlement areas in Indramayu Regency. The changes in the coastline can be seen spatially by using images such as Landsat images. Analysis method used is; land capability unit analysis (land capability), analyst is land physic, accessibility analysis, environmental infrastructure analysis, and GAP analysis (Gap Analysis). Changes in the coastline in Indramayu Regency, researchers used time series image data, namely by using Landsat imagery in 2000, 2005, 2010, 2015 and 2020. The largest shoreline changes occurred in 2020, namely with abrasion of 950.71 Ha and Accretion of 1,329.41 Ha; The results of the SKL analysis show that the land capability at the research location is obtained which has the widest proportion of the classification of development of low development capability, which is 55,277.00 Ha; The results of the analysis of land suitability for coastal settlements in Indramayu Regency, obtained a very suitable land area of 8.35% or an area of 5.591.24, while the one with the largest designation area is at the level of suitability according to which is 30,867.46 Ha or about 46.09 %; Suitability The designation of coastal settlements is carried out by comparing the results of the analysis of land suitability for coastal settlements with the spatial pattern plan of the RTRW of Indramayu Regency which exists. For the suitability of the designation of coastal settlements that are NOT COMPATIBLE, it has an area of 29,298.94 Ha or about 43.75%. As for the suitability of the settlement designation that is NOT COMPATIBLE based on the results of the study covering an area of 1,215.40 Ha or about 1.8%.

Keywords: Coastal Area, Coastline, Landsat Image, Settlement Development.

INTRODUCTION

The coastal area is a meeting area between land and sea, towards the land covering parts of the land that are still influenced by the characteristics of the sea such as tides, sea breezes and sea water instructions, while towards the sea includes parts of the sea, each of which is influenced by existing natural processes. On land such as sedimentation and freshwater flow as well as areas affected by human activities on land (Ferdiansyah, 2017). Meanwhile, according to Law Number 27 of 2007 concerning Management of Coastal Areas and Small Islands, coastal areas are transitional

areas between land and sea ecosystems that are affected by changes on land and sea.

The coastal area of Indramayu, West Java Province with a coastline length of approximately 114 km, is one of the northern coastal areas of West Java which is very strategic and developing in its activities as a buffer zone for industrial areas that have natural resources and the main transportation infrastructure route to Central Java via the toll road as well as the Pantura highway. This area as a coastal area with beautiful and attractive panoramas and abundant sources of marine life has a fairly high economic activity. On the other hand, the logical consequence of coastal and marine resources as shared resources and open to the public is that the utilization of coastal and marine natural resources is currently increasing in almost all regions.

At this time the coast of Indramayu Regency has been eroded as far as 70 km from the existing coastline. This abrasion occurs due to the influence of natural factors and development activities. For natural factors, including due to the characteristics of the coast in Indramayu Regency in the form of all uvial thus that the soil layer is loose. This condition causes the beach to be eroded (abrasion) if exposed to waves. Another factor causing abrasion is the reduced damage or loss of mangrove forests which function as abrasion barriers.

The problem of abrasion and loss of mangrove plants that damage coastal ecosystems in Indramayu Regency, the author is interested in conducting research. This research is entitled The Impact of Coastline Changes on the Development of Residential Areas (Case Study: Coastal Areas of Indramayu Regency).

LITERATURE REVIEW

1. Beach and Coast

The seafront area or land area that is directly adjacent to the sea is called the beach. The beach can also be defined as a meeting area between land and sea. Furthermore, the notion of "coastal" can be described from two opposite aspects, namely:

1) In terms of land, the coast is a land area to a sea area that is still influenced by land characteristics (such as land breezes, freshwater drainage from rivers, sedimentation).
2) In terms of the sea, the coast is an area from the sea to the land area which is still influenced by the characteristics of the sea (such as tides, salinity, sea water intrusion into land areas, sea breezes).

In general morphology (Principle profile) of the seabed can be described as follows:

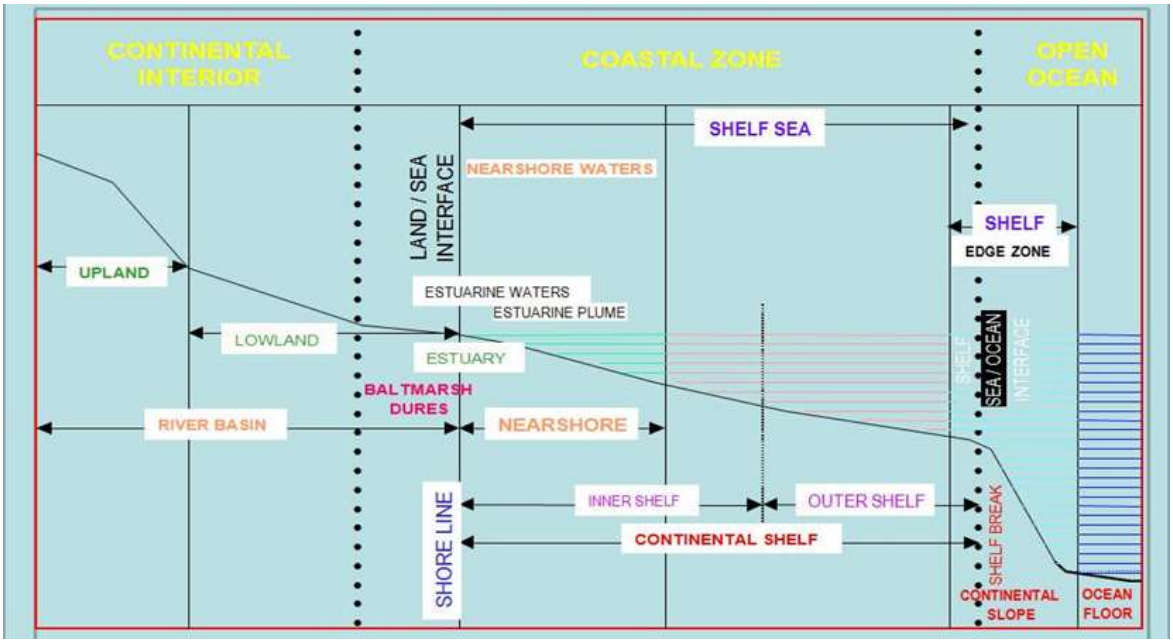

Figure 1. General Profile of the Seabed

The position of the sea trench is usually located not far from the island arcs and its existence is a zone from the epicenter, which if an earthquake occurs, it will cause sudden large waves in a relatively short period of time which is often referred to as an earthquake tsunamis.

2. Typology of Coastal and Ocean Ecosystems

Poernomosidhi, in Supriharyono, (2009) on "Conservation of Biological Resources Ecosystems in Coastal and Tropical Marine Areas"). In a coastal and oceanic area there are one or more coastal environmental systems (ecosystems) and coastal resources. Some coastal ecosystems are continuously inundated with water and some are only temporary. Based on the nature of the ecosystem, coastal ecosystems can be natural (natural) or artificial (manmade). Natural ecosystems found in coastal areas include: coral reefs, mangrove forests, seagrass beds, sandy beaches, rocky beaches, pescaprae formations, barringtonia formations, estuaries, lagoons and deltas. While the artificial ecosystems include: ponds, tidal rice fields, tourism areas, industrial areas and residential areas.

3. Residential Activities

Daily residential activities related to waste include bathing, washing, cooking, defecating large and small, spraying pests (mosquitoes), gardening (cultivating soil, spraying pests, fertilizing). Waste from these activities is often known as domestic waste. However, the definition of domestic waste is often widened in terms of discussion, which is liquid and solid waste originating from urban communities, including municipal (municipal) waste and industrial activities, which enter the city sewer system (Source: HAPPI, Technical Guidance on Typology and Ecosystem).

RESEARCH METHODOLOGY

1. Land Capability Unit (SKL)

Land Capability Unit (SKL) Against Erosion is a unit to determine the level of soil erosion in the planning area or area, determine the vulnerability of land to erosion, and obtain an overview of the limits on each level of coastal land capability to erosion. Knowing areas that are sensitive to erosion and the estimated deposition of the erosion products in the downstream. There are several maps needed in the analysis, surface maps, geological maps, morphological maps, slope maps. Hydrological

and climatological data and land use. After the data is analyzed, it will produce an SKL map against erosion. This approach is carried out using Landsat time series images in 2000, 2005, 2010, 2015 and 2020.

2. Soil Physical Analysis

This analysis discusses the physical condition of the land at the research site in relation to land use as a residential location.

3. Environmental Infrastructure Analysis

Analysis of infrastructure in the form of electricity networks and clean water networks are the two main things that are considered to have an effect on the development of settlements in an area. The following is a classification of the clean water network and electricity network.

Table 1. Classification of Clean Water and Electric Networks

No	Land Distance from Clean Water Network	Land Distance from Electric Grid	Description
1	< 500 m	< 500 m	Very close
2	500 – 1000 m	500 – 1000 m	Close
3	1,000 - 1,500 m	1,000 - 1,500 m	Currently
4	1,500 – 2,000 m	1,500 – 2,000 m	Far
5	> 2,000 m	> 2,000 m	Very far

Source: Taufiqurrahman, Diponegoro University Semarang, 2015

4. Accessibility Analysis

Accessibility analysis is in the form of a road network that connects existing residential areas and is related to the possibility of reaching to and from residential areas with the parameters of the arterial and collector road network.

5. GAP analysis

GAP analysis (gap analysis) is an analysis to see land suitability from the results between the analysis of land suitability for coastal settlements in Indramayu Regency and the Spatial Pattern of the Regional Spatial Plan (RTRW) of Indramayu Regency.

This is done to find out whether the results of the suitability of coastal settlement land that have been carried out in the analysis of this study will later find differences in the designation of functions with the Spatial Pattern that has been determined by Indramayu Regency.

RESEARCH RESULTS AND DISCUSSION

1. Results of Analysis of Coastline Changes

The coastline is the meeting line between land and sea which is influenced by tides. The coastline is also always changing very dynamically and interacting with each other in response to the impact of the dynamics of oceanographic processes and human activities around the coastal area.

The ability of the beach is a natural response of the coast to the sea so that the beach has an area that is always experiencing changes in the beach profile, this occurs sooner or later depending on the power balance between the topography of the beach, hydro-oceanographic processes, sediment particles entering and leaving the beach and human activities on the coast around the beach area.

The coastline always experiences changes in position that take place continuously, this change is due to the process of land erosion which is commonly called abrasion and the addition of land called accretion. Basically the process of coastal change includes the process of erosion and accretion. Erosion around the coast can occur if the sediment transport out or moving out of an area is greater than the

incoming sediment transport, if the opposite happens, sedimentation will occur.

In monitoring shoreline changes, remote sensing technology and Geographic Information System (GIS) can be used. Here the researcher uses Landsat time series image data obtained from https://eartheexplorer.usgs.gov/ and obtained images for the last 20 years with a range of 5 (five) years starting from 2000, 2005, 2010, 2015 and 2020.

To view the Landsat image data obtained, it can be seen in the following table:

Table 2. Landsat Image Data Row 2000

Wed. Feb. 8, 2017 LANDSAT 7 Time: 14:18
Image Assessment System
GCP Residual Report

WOID: L25126147 Path/Row: 121 / 064

L0R Reference Image: L71SGS1900347100300_HDF.170391906
Acquisition Date: Dec 12, 2000

Band Number: 5

GLS date for each WRS-2 path/row used:

Path	Row	Date
121	064	06-22-2001
121	065	09-05-1999
122	064	07-15-2001

Point_ID	Latitude (deg)	Longitude (deg)	Height (meters)	Across Scan Residual (meters)	Along Scan Residual (meters)	Residual In y dir (meters)	Residual in x dir (meters)
1210640008_01	-6.441427	108.285066	27.181	-0.585	1.350	-0.768	1.256
1210640014_01	-6.395111	108.191556	23.133	1.382	-2.673	1.742	-2.456
1210640015_01	-6.313565	107.822528	27.245	-0.696	-2.809	-0.299	-2.882
1210640031_01	-6.289173	108.303747	21.961	0.271	-1.548	0.484	-1.496
1210640077_01	-6.548691	108.530910	25.145	-3.404	-0.161	-3.350	-0.633
1210640305_01	-6.520304	108.492554	25.746	-1.455	0.613	-1.527	0.405
1210640314_01	-6.286644	108.286421	21.647	-0.207	-1.432	-0.006	-1.448
1210640410_01	-6.481926	108.305177	32.934	-2.031	-0.756	-1.907	-1.032
1210640420_01	-6.310476	108.230485	22.177	-1.272	-3.604	-0.759	-3.748
1210640421_01	-6.399061	108.073672	26.845	-1.464	0.926	-1.579	0.714
1210640423_01	-6.333231	108.079463	20.312	-1.601	-0.578	-1.506	-0.796
1210640425_01	-6.303386	108.326161	23.199	0.670	-6.343	1.547	-6.192
1210640433_01	-6.409351	107.888035	39.784	-2.605	-1.458	-2.379	-1.808
1210650120_01	-6.399972	108.289079	28.075	4.141	3.055	3.679	3.604
1210650139_01	-6.441426	108.284795	26.825	1.839	1.128	1.666	1.374
1210650166_01	-6.544975	108.334387	37.474	4.561	4.614	3.878	5.207
1210650314_01	-6.464415	107.809134	48.147	-0.329	3.226	-0.775	3.152
1210650370_01	-6.530565	108.539132	25.267	0.183	1.719	-0.058	1.728
1220640067_01	-6.313715	107.822542	27.408	0.613	-0.080	0.618	0.006
1220640179_01	-6.464499	107.809277	49.021	1.932	4.098	1.345	4.331
1220640437_01	-6.313303	107.897580	28.263	0.021	0.744	-0.083	0.740

Source: https://eartheexplorer.usgs.gov/

Figure 2. Landsat Image of 2000

Table 3. Landsat Image Data Row 2000

```
Thu. Jan. 12, 2017              LANDSAT 7                    Time: 12:01
                          Image Assessment System
                            GCP Residual Report
--------------------------------------------------------------------------------
WOID: L23866279             Path/Row: 121 / 064

L0R Reference Image: L71EDC1105280050300_HDF.170121559
Acquisition Date: Oct 07, 2005

Band Number:  5

GLS date for each WRS-2 path/row used:
Path  Row   Date
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121   065   09-05-1999
122   064   07-15-2001
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Point_ID	Latitude (deg)	Longitude (deg)	Height (meters)	Across Scan Residual (meters)	Along Scan Residual (meters)	Residual In y dir (meters)	Residual in x dir (meters)
1210640003_01	-6.472375	108.450506	25.457	-3.721	-1.166	-3.524	-1.674
1210640005_01	-6.474707	108.429081	27.067	-4.878	-0.381	-4.780	-1.058
1210640008_01	-6.441427	108.285066	27.181	0.999	3.024	0.568	3.136
1210640111_01	-6.313479	107.943866	27.473	-0.298	-0.323	-0.250	-0.362
1210640410_01	-6.481926	108.305177	32.934	-4.407	-4.098	-3.795	-4.675
1210640420_01	-6.310476	108.230485	22.177	-1.187	-0.897	-1.051	-1.054
1210640423_01	-6.333231	108.079463	20.312	0.968	2.977	0.543	3.086
1210640433_01	-6.409351	107.888035	39.784	-0.260	0.003	-0.258	-0.033
1210650120_01	-6.399972	108.289079	28.075	4.441	-1.290	4.580	-0.659
1210650139_01	-6.441426	108.284795	26.825	3.427	-1.085	3.547	-0.597
1210650254_01	-6.472375	108.450506	25.457	-2.101	1.191	-2.248	0.887
1210650314_01	-6.464415	107.809134	48.147	-2.800	0.404	-2.832	0.010
1210650370_01	-6.530565	108.539132	25.267	6.781	2.489	6.371	3.411
1210650406_01	-6.460919	107.770418	60.849	0.607	4.446	-0.019	4.492
1210650414_01	-6.458597	107.788854	51.250	1.060	0.452	0.987	0.596
1220640137_01	-6.276585	107.821529	27.851	1.380	-5.732	2.169	-5.489

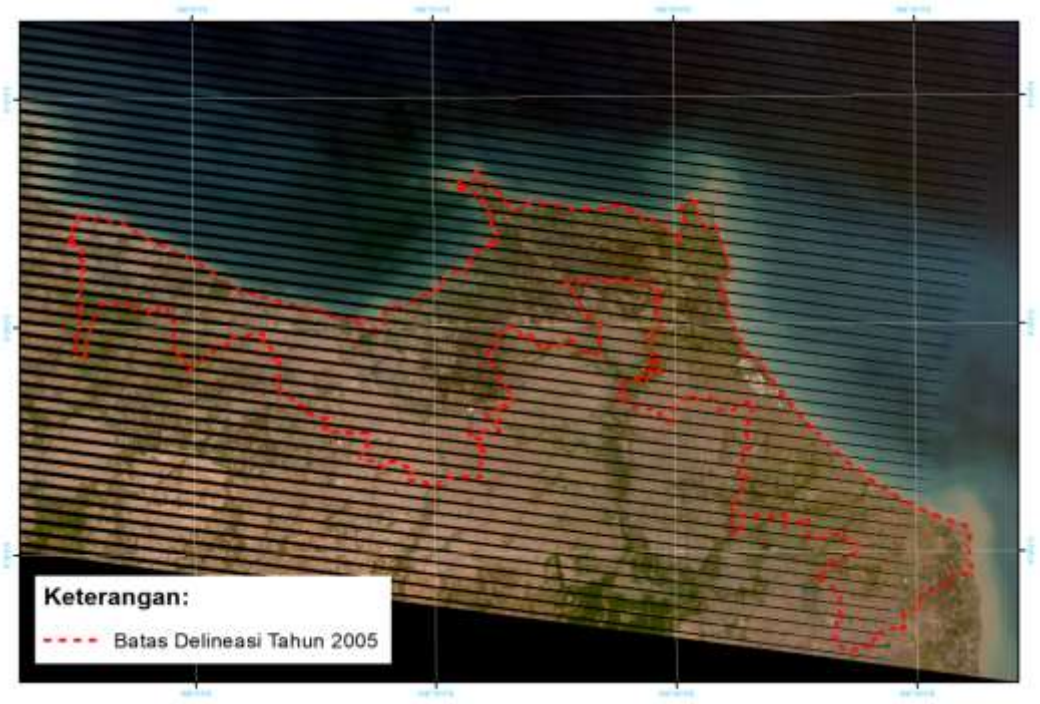

Figure 3. 2005 Landsat Image

Table 4. Landsat Image Data Row 2010

Sun. Dec. 11, 2016 LANDSAT 7 Time: 08:36
Image Assessment System
GCP Residual Report

WOID: L22542950 Path/Row: 121 / 064

L0R Reference Image: L72EDC1110358050100_HDF.163461330
Acquisition Date: Dec 24, 2010

Band Number: 5

GLS date for each WRS-2 path/row used:

Path	Row	Date
121	064	06-22-2001
121	065	09-05-1999
122	064	07-15-2001

Point_ID	Latitude (deg)	Longitude (deg)	Height (meters)	Across Scan Residual (meters)	Along Scan Residual (meters)	Residual In y dir (meters)	Residual in x dir (meters)
1210640007_01	-6.333942	108.061308	22.454	-4.700	-2.055	-4.372	-2.693
1210640014_01	-6.395111	108.191556	23.133	-2.160	-1.354	-1.951	-1.643
1210640015_01	-6.313565	107.822528	27.245	2.549	-1.406	2.723	-1.038
1210640077_01	-6.548691	108.530910	25.145	-0.936	3.033	-1.349	2.875
1210640111_01	-6.313479	107.943866	27.473	-3.334	-2.253	-2.990	-2.699
1210640314_01	-6.286644	108.286421	21.647	2.659	2.787	2.246	3.133
1210640410_01	-6.481926	108.305177	32.934	-0.635	1.368	-0.820	1.267
1210640412_01	-6.371614	108.207399	22.596	-0.906	-1.235	-0.726	-1.350
1210640415_01	-6.274596	107.876115	29.160	-2.417	-1.879	-2.133	-2.200
1210640420_01	-6.310476	108.230485	22.177	3.183	-0.263	3.190	0.184
1210640423_01	-6.333231	108.079463	20.312	0.700	0.101	0.680	0.198
1210650370_01	-6.530565	108.539132	25.267	1.852	-2.544	2.189	-2.262
1220640067_01	-6.313715	107.822542	27.408	5.305	5.359	4.510	6.054
1220640137_01	-6.276585	107.821529	27.851	6.091	1.076	5.887	1.918
1220640179_01	-6.464499	107.809277	49.021	-5.412	4.896	-6.048	4.098
1220640205_01	-6.276476	107.841574	28.305	-0.008	-3.467	0.476	-3.438
1220640430_01	-6.260937	107.907312	23.028	-1.863	-2.144	-1.547	-2.385

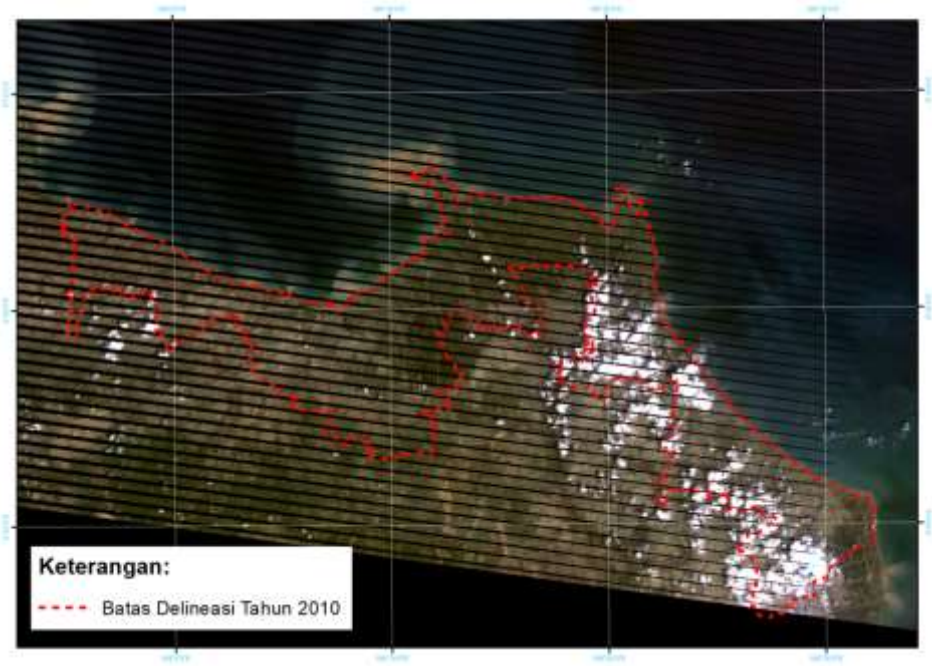

Figure 4. 2010 Landsat Image

Table 5. 2015 Landsat Imagery Raw Data

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  SPACECRAFT_ID = "LANDSAT_8"
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  BAND_LIST = (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11)
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GROUP = PROJECTION
  ELLIPSOID_AXES = (6378137.000000, 6356752.314200)
  MAP_PROJECTION = "UTM"
  PROJECTION_UNITS = "METERS"
  DATUM = "WGS84"
  ELLIPSOID = "WGS84"
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                           0.000000, 0.000000, 0.000000, 0.000000, 0.000000)
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  UR_CORNER = ( 368100.000,  -524400.000)
  LL_CORNER = ( 140700.000,  -756000.000)
  LR_CORNER = ( 368100.000,  -756000.000)
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GROUP = EPHEMERIS
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  EPHEMERIS_EPOCH_DAY = 300
  EPHEMERIS_EPOCH_SECONDS = 10413.716067
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Figure 5. 2015 Landsat Images

Table 6. Landsat Imagery Raw Data 2020

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  BAND_LIST = (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11)
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GROUP = PROJECTION
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  MAP_PROJECTION = "UTM"
  PROJECTION_UNITS = "METERS"
  DATUM = "WGS84"
  ELLIPSOID = "WGS84"
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  LL_CORNER = ( 140100.000,  -756300.000)
  LR_CORNER = ( 367500.000,  -756300.000)
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GROUP = EPHEMERIS
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  EPHEMERIS_EPOCH_DAY = 138
  EPHEMERIS_EPOCH_SECONDS = 10373.716063
  NUMBER_OF_POINTS = 54

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Figure 6. Landsat Image of 2020

Based on data sources from Landsat images for 2000-2020 above, for 20 years there has been abrasion and accretion in coastal areas in Indramayu Regency. For more details can be seen in the following table:

Table 7. Coastline Changes at the Research Site

No	Landsat Image	Large (Ha)	Change (Ha)		Total Change (Ha)
			Abrasion	Accretion	
1	year 2000	67,552.15	-	-	
2	2005	67,262.06	561.66	272.57	834.23
3	The year 2010	67,196.36	566.18	210.44	776.62
4	2015	67.335.12	930.25	721.75	1,652.00
5	2020	67,931.29	950.71	1,329.41	2,280,12

Source: Analysis Results for 2020

2. Results of Analysis of Land Capability Unit (SKL) Against Erosion

Based on the Minister of Public Works Regulation No. 20 of 2007 in this analysis requires input in the form of hydrogeological maps, soil texture maps, rainfall maps and maps of existing land use. However, the main input parameters are the slope, morphology, and soil type maps which contain the characteristics of the existing soil.

SKL analysis of erosion is carried out to determine areas that are experiencing soil erosion, so that the level of land resistance to erosion can be known and the anticipated impact on areas that are more downstream. The results of this erosion SKL analysis will show a class of low erosion potential which indicates a level where the potential is low to high potential. While the high potential means that the area has the possibility of peeling or eroding large soil. For more details can be seen in Table 8 Criteria and SKL Weighting against Erosion.

Table 8. SKL Criteria and Weighting against Erosion

Rainfall	Score	tilt	Score	Morphological Map	Score	Type of soil	Score	SKL Against Erosion	Score
3500 - 4500	3	0 - 2	5	plain	5	Regosol, Litosol	5	Height (13 - 16)	5
			4	Sloping	4	Andosol	4	Enough (10 - 12)	4
3000 - 3500	2		3	Medium Hills	3	Brown Forest	3		
		15 - 40	2	Steep Hills	2	Latosol	2	Less (7 - 9)	3
2500 - 3000	1	> 40	1	Very steep hills	1	alluvial	1	Low (4 - 6)	2

Source: Ministry of Public Works Regulation No. 20/Prt/M/2007

Based on the results of the analysis by taking into account the above criteria, the results of the analysis of the ability of SKL land against erosion using the superimpose method at the research site are as follows:

Table 9. Results of SKL Analysis on Erosion

No	SKL Against Erosion	Area (Ha)	Proportion (%)
1	Enough	60,691.09	90.60
2	Tall	6,281.97	9.40
Total		66,973.07	100

Source: Analysis Results, 2020

For more details, it can be seen in Figure 7. Map of SKL on Research Locations.

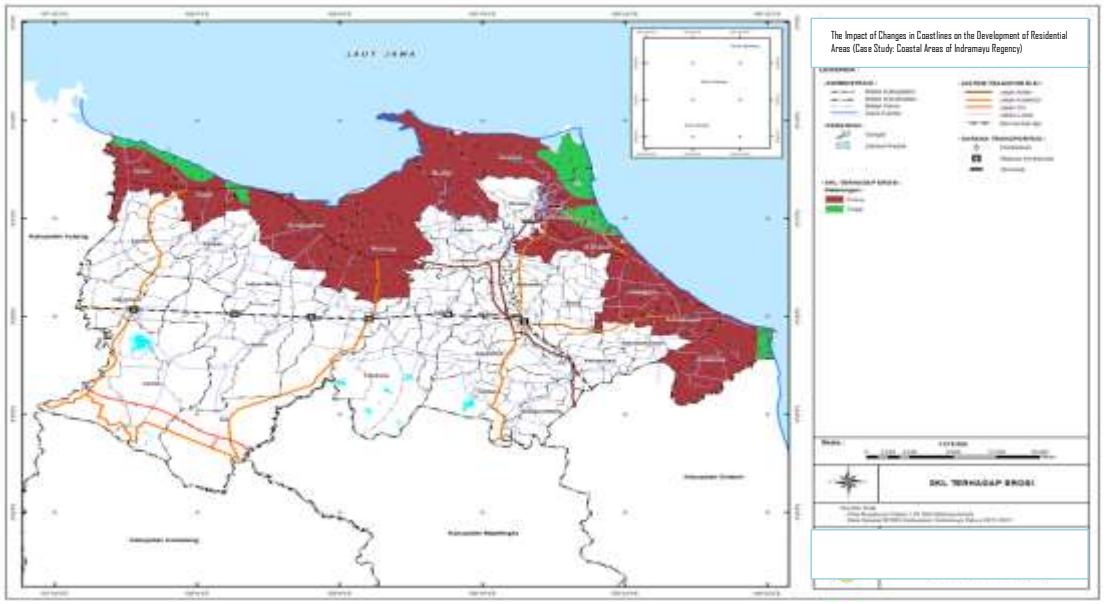


Figure 7. SKL against Erosion

3. Accessibility Aspect Analysis Results

This accessibility aspect analysis is carried out with an analysis tool in the form of buffering a road network map as a form of accessibility. Collector and arterial road networks are used as

the basis of analysis in this study because they have a high level of accessibility. So the road network used is only the arterial road network.

This study classifies the distance of land from the collector road network into five classes, namely less than 1000 m "very close" with a very suitable level of suitability, 1000-1500m "close" with a suitable level of suitability, 1,500-2,000 m "medium" with a high level of suitability. Less suitable, 2,000-2,500 m “far” with a temporary non-conformity level, and more than 2,500 m described as “very far” with a permanent non-conformity level.

Thus, it can be concluded that the closer the road distance to the residential area, the higher the quality of accessibility.

The following table shows the classification and scoring of the arterial road network for an analysis of the suitability of land accessibility aspects. For more details can be seen in the following table 10:

Table 10. Classification and Scoring of Accessibility Aspects

No	Parameter	Classification and Scoring				
		S1=5	S2=4	S3=3	N1=2	N2=1
		Very close	Close	Currently	Far	Very far
1	Arterial Road Network	<1,000 m	1,000-1,500 m	1,500-2,000 m	2,000-2,500 m	>2,500 m
Score Interval		9-10	8	6-7	5	2-4

Source: Analysis Results for 2020

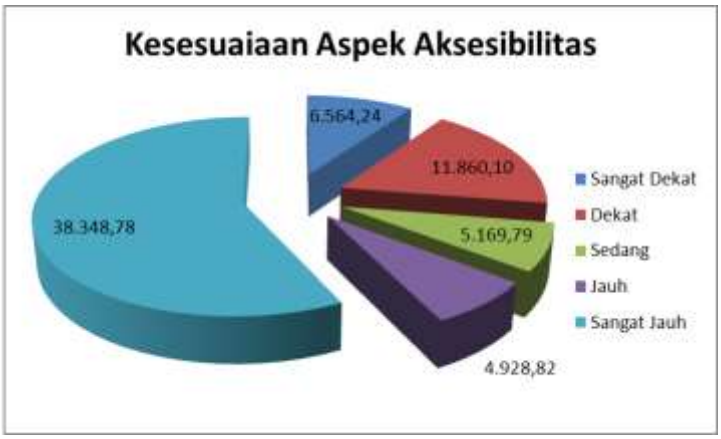


Figure 8. Area of Suitability Aspects of Accessibility

Thus, based on the parameters of the arterial road network and through an analysis step in the form of a buffer, the results of the analysis of the suitability of residential land in terms of accessibility can be seen in Figure 9 below.

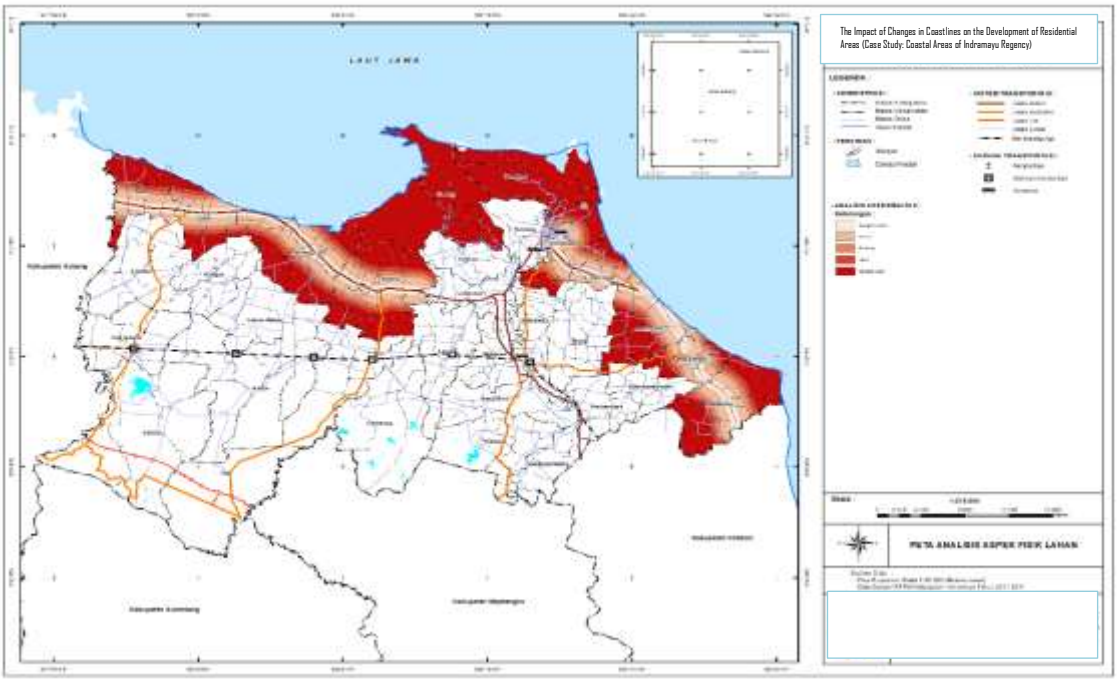


Figure 9. Map of Suitability of Accessibility Aspects of Coastal Areas in Indramayu Regency

Figure 10. Environmental Infrastructure Analysis Results

Figure 11. Results of the Aspects of the Suitability of Settlement Land in the Coastal Area

The analysis of land suitability for coastal settlements in Indramayu Regency above is an overlay of all the above aspects by considering coastal and river boundaries which are important considerations in determining residential areas. Based on the results of the analysis above, the land area that is very suitable is 8.35% or an area of 5.591.24, while the area that has the largest designation area is at the level of suitability, which is 30,867.46 ha or about 46.09%.

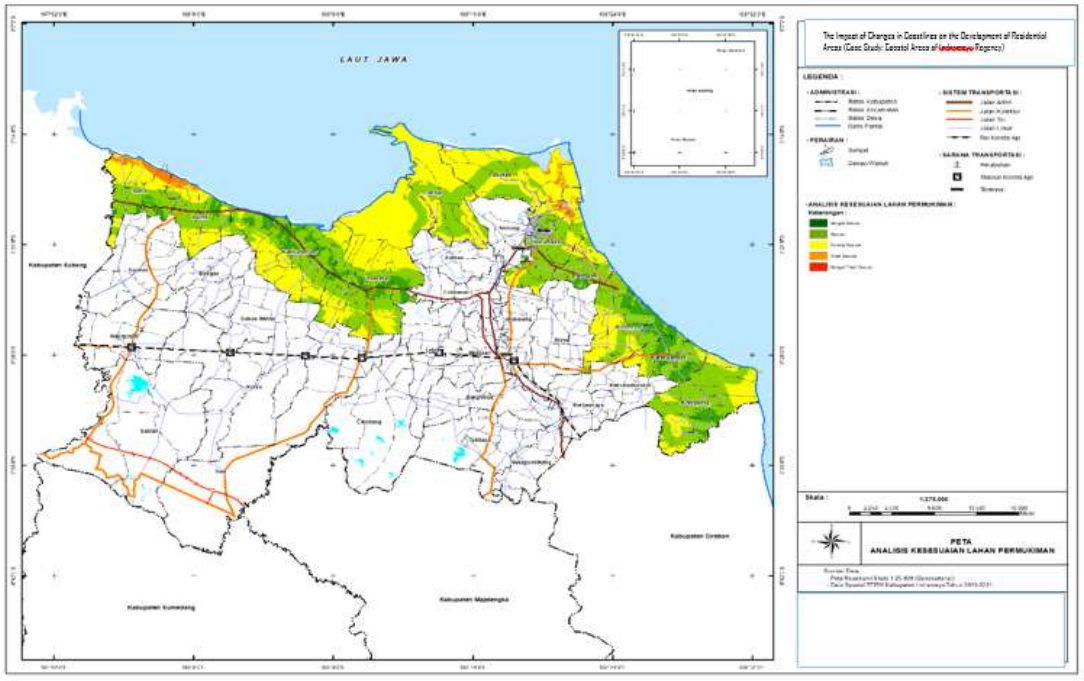
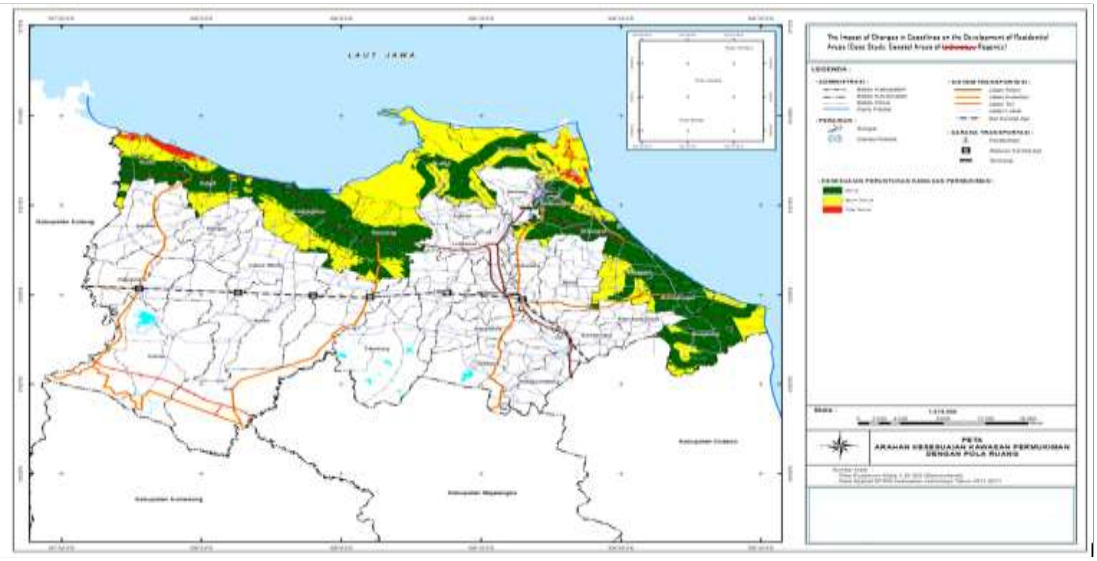


Figure 12. Land Suitability Direction for Settlement in Indramayu Regency



CONCLUSION

Based on the results of the analysis that has been carried out on the Directions for the Development of Coastal Settlement Areas Due to the Effect of Coastline Changes in Indramayu Regency, among others:

1. To see changes in coastlines in Indramayu Regency, researchers used time series imagery data, namely by using Landsat images in 200, 2005, 2010, 2015 and 2020. The largest coastline changes occurred in 2020, namely with abrasion of 950.71 Ha and Accretion of 1,329, 41 Ha;
2. Based on the results of the SKL analysis, it is obtained that the land capability at the research location is obtained which has the widest proportion, namely the classification of low development capability development, which is 55,277.00 Ha;
3. The results of the analysis of land suitability for coastal settlements in Indramayu Regency, obtained a very suitable land area of 8.35% or an area of 5.591.24, while the one with the largest designation area is at the level of suitability according to which is 30,867.46 Ha or about 46.09 %;
4. The suitability of the designation of coastal settlements is carried out by comparing the results of the analysis of the suitability of coastal settlements with the spatial pattern plan of the RTRW of Indramayu Regency.

Existing coast. For the suitability of the designation of coastal settlements that are NOT COMPATIBLE, it has an area of 29,298.94 Ha or about 43.75%. As for the suitability of the settlement designation that is NOT COMPATIBLE based on the results of the study covering an area of 1,215.40 Ha or about 1.8%.

RECOMMENDATION

1. Provide explanations and directions to community members regarding regulations and provisions for appropriate land use for residential areas. Especially for people living in coastal areas of Indramayu Regency;
2. The construction and development of residential areas in Indramayu Regency should be directed at lands that are truly in accordance with the criteria for suitability of residential land;

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