MANGROVE REFORESTATION AS ABRASION PREVENTION IN BREBES REGENCY, CENTRAL JAVA

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Abstrak

Issu degradasi mangrove dan abrasi pantai secara ekologis, sosial, ekonomis senantiasa aktual . Penelitian ini bertujuan untuk mengetahui kondisi vegetasi mangrove dan tingkat abrasi pantai di wilayah Kabupaten Brebes. Penelitian menggunakan teknologi GIS (Geographic Information System) dan inderaja melalui interpretasi dan analisis citra satelit Landsat 7 TM. Hasil intepretasi data satelit menggunakan metode NDVI (Normalized Difference Vegetation Index) menunjukan bahwa luasan mangrove di wilayah pantai Kabupaten Brebes tinggal 243.20 hektar tersebar di wilayah pantai Kecamatan Losari 26.56 ha., di Kecamatan Tanjung 5.60 ha., di Kecamatan Bulakamba 35.42 ha., di Kecamatan Wanasari 14.31 ha. dan di Kecamatan Brebes 161.31 ha.. Nilai kerapatan vegetasi mangrove secara total untuk Kecamtan Losari, Tanjung, Bulakamba, Wanasari dan Kecamatan Brebes (Kaliwlingi dan Randusanga Wetan) berturut-turut 10.79 ; 19.46 ; 18.50 ; 13.03 ; 36.43 dan 22.79 individu/ha. dengan kategori berturut-turut : sangat jarang, jarang , jarang, jarang, sedang dan jarang. Di wilayah penelitian dijumpai tiga jenis vegetasi mangrove dalam jumlah layak hitung yakni : Rhizophora mucronata, Rhizophora apiculata , Avicennia marina dimana Rhizophora mucronata memiliki kepadatan paling tinggi (35.73 individu/ha). di Kaliwlingi, Kecamatan Brebes.Degradasi mangrove dan abrasi di wilayah pantai Kabupaten Brebes masing-masing 68 ha./tahun dan 63 ha./tahun. Vegetasi mangrove yang dianjurkan ditanam adalah jenis Rhizophora spp. dan Avicennia spp. dengan cara mengikatkan profagul (benih mangrove) ke bambu ijiran yang ditancapkan ke dasar perairan pantai dengan kedalaman penancapan minimal 1.07 m.

Kata Kunci : *Degradasi, mangrove, abrasi, NDVI, Rhizophora*

Abstract

Mangrove Reforestation as Abrasion Prevention in Brebes Regency, Central Java

The issue of degradation of mangrove and coastal erosion are always actual . This study aims to determine the condition of mangrove vegetation and coastal erosion rate in the Brebes Regency. Research using GIS technology (Geographic Information System) and remote sensing through satellite imagery interpretation and analysis of Landsat 7 TM . Determination of the relationship model of the dynamics of ecological factors in the degradation of mangroves and coastal erosion is done through the analysis of a dynamic system with the help of soft ware Power Sim 2.0 . The results of the interpretation of satellite data using NDVI (Normalized Difference Vegetation Index) shows that the extent of mangroves in the Brebes coastal area 243.20 hectares live scattered in the Sub District of Losari 26.56 hectares , in the Sub District of Tanjung 5.60 hectares, 35.42 hectares in Sub District Bulakamba , in Sub District Wanasari 14.31 hectares and 161.31 hectares in Brebes Sub District . Mangrove vegetation density value in total for the Sub District of Losari , Tanjung , Bulakamba , Wanasari and Brebes District (Kaliwlingi and Randusanga Wetan) row 10.792 ; 19.466 ; 18,500 ; 13.034 ; 36.431 and 22.797 individuals per hectare with NDVI in a row : 0.096367 ; 0.173824 ; 0.165197 ; 0.116388 ; 0.295315 and 0.203568 with successive categories

: very rare , rare , rare , rare , medium and rare . Furthermore, in the coastal region Brebes obtained 4 groups namely mangrove vegetation density : 0.1 < NDVI (vegetation is very rare) : 60.80 acres , 0.1 ≤ NDVI < 0.2 (rare) : 80.34 acres , 0 , 2 < NDVI ≤ 0.3 (moderate) : 72.92 acres and 0.3 ≤ NDVI < 0.4 (meetings) : 29.16 hectares . In general, there is harmony between the NDVI data obtained from field observations at each station . In the area of research found three types of mangrove vegetation in the number of viable count : Rhizophora mucronata , Rhizophora apiculata , Avicennia marina and overall Rhizophora mucronata has the highest density of 35 731 individuals / ha . at station 5 (Kaliwlingi , Brebes Sub District). Mangrove degradation and coastal erosion in the area Brebes each 68 ha./year and 63 ha./year. The recommended mangrove vegetation planted is kind of Rhizophora spp. and Avicennia spp. by tying profagul (mangrove seeds) to bamboo ijiran anchored to the coastal waters with a minimum embedding depth of 1:07 m.

Keywords : degradation , mangrove , abrasion , NDVI , Rhizophora

Introductory

Ecologically , mangrove ecosystem acts as a protective of coastal tsunami hazard , as retaining abrasion , nutrient recycling , coast guard and fisheries productivity biodiversity , dampening the rate of sea water intrusion and other coastal ecosystems cantilever (Tuwo , 2011) . Excessive utilization of mangrove forests as a preservative for the manufacture of nets and decision by certain people to sell that do have an impact on the condition of mangrove forests diminishing the quality and impact of its area smaller decline in the quality of coastal resources and increased coastal erosion. In 1983, along the 65.48 km of Brebes coastal areas covered an area of 2,327 ha. of mangrove vegetation (Anomimus , 2001) . In 2008 an area of 257.11 ha. of mangrove stay . By 2000, coastal erosion area of 789 ha. in Brebes Regency and acretion while covering 310 ha . Furthermore, from 2000 to 2008 , coastal erosion in the Brebes Regency reached 640.45 ha . with a length of 27.04 km shoreline accretion occurred while 815.76 27.14 km long coastline (Brebes Fisheries and Marine Department, 2008).

One of the efforts to restore mangrove forests through reforestation of mangroves where the success rate is determined by the mangrove reforestation techniques . The accuracy of both types of mangrove vegetation and planting depth according to soil texture and the amount of wave energy that slammed the coast is very important in the success of mangrove reforestation . For the study of the reforestation techniques need to be done as the cornerstone methods / policies handling damage mangrove ecosystem and coastal erosion . Based on the identification of these problems , the formulation of the problem posed is how effective the technique of mangrove reforestation in the Brebes coastal areas. This research is expected to benefit academically in the field of science in developing methods of handling the degradation of mangroves and coastal erosion and practically can generate recommendations for local governments and communities in addressing Brebes degradation of mangroves and coastal erosion in the region.

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Material and methods

This research was conducted in Brebes Regency, Central Java for 7 months in May - November 2013. Stage first broad assessment of mangrove areas using GIS technology (Geographic Information System) and remote sensing (satellite imagery) then performed the inspection phase of the interpretation of the results and analysis of satellite imagery . Landsat TM satellite image data taken on May 31, 2013 and direct field observations conducted in May-July 2013. Observation station is determined by the number of districts that have a mangrove forest vegetation purposively based on the condition of the mangrove ecosystem , and obtained 5 stations sequentially from west to east namely : Sub District of Losari (Karangdempel Village) , Tanjung (Krakahan Village) ,

Bulakamba (Grinting Village) , Wanasari (Sawojajar Village) as well as the Brebes Sub District (Village of Kaliwlingi and Randusanga Wetan).

The data were obtained either from direct observations in the field and Landsat TM Data citrasatelit processed to obtain the structure of mangrove communities . Input data derived from Landsat data format conversion is done space agency, classification , analysis and incorporation of vegetation index classification results with Normalized Difference Vegetation Index (NDVI) . Data capture in the field of mangrove ecosystems along the transect method 100 meters or 500 meters with a width of 10 m to 20 m, on each transect was established at each observation station , hereafter devised plot graduated sizes 10 m x 10 m to rate trees ; 5 m x 5 m for saplings and 1 m x 1 m to the level of the seedlings , then note all the kind and amount of mangroves in the area of the plot (Kusmana, 2005) . Soil texture data covering the beach and wave height and wave velocity obtained through direct measurements in the field at the beach of Karangdempel (Sub District of Losari) for the West Brebes region, Krakahan Beach (Tanjung Sub District) for the Central Brebes region and Kaliwlingi Beach (Brebes Sub District) for the East Brebes region. Processing field data using Microsoft Excel.

Results and Discussion

Characteristics of Brebes Coastal Areas

Brebes coastal waters are shallow coastal alluvial plains and is due to some activities large and small rivers that flow into the waters . Sedimentation and erosion that occurred along the coast of Brebes influenced by the changing nature of the river and its estuary . Conditions coastal waters Brebes West region where the relatively shallow depth of 5 meters to reach is approximately 2.25 km from the coastline due to the level of sedimentation in waters coastal of West Brebes region higher than the East Brebes region. According to Judge (2004) , Brebes Regency coastal areas are divided into two types of beaches . Type the first beach scattered from coast to about estuary Kawad (Sub District of Losari), Pulogading Village (Sub District of Bulakamba). In this type of coastal, mangrove vegetation often found on its coastline . Part beaches composed of alluvium sediments with low relief . Characteristics of the beach is generally in the form of mud flats interspersed with mangrove and there are also sand . Mud flats in the area of Losari Sub District showed rapid advancement coastline very intensive , which is caused by a very active process of sedimentation of rivers in Losari . Similarly, around the estuary of Kluwut (SubDistrict of Bulakamba), beaches undergo a process of accretion is indicated by the presence of mangroves growing in the direction of the sea .

The second type of beaches scattered from around the mouth of the Kawad estuary to about Kaligangsa in the Sub District of Brebes. Beach type is characterized by a coastal sediment deposition as well as the relief of the coastal plain alluvium . The sandy beach is found in several places Randusanga beach , Kaliwlingi , Sawojajar , Krakahan and Karangdempel beach. The coastal area is characterized by sand beaches as coastal boundary . Sandsized is smooth , brownish color , wide sandstone beach varies from 5 - 50 meters and beach slope of about 4º - 14º. The main characteristic of this beach type is the presence of sand/sandbank as the sandbank in the estuary of Pemali the protrudes toward the Southwest - Northeast and in the sandbank near to the Sub District of Losari . Sandbank in the region of Kaliwlingi and near to the Sub District of Losariand directly adjacent to Cirebon Regency West Java is the accretion/sand dune that appears in which is about 1-2 miles from the coast with a width of about 15 meters stretches about 5 km.

On the eastern Pemali estuary (Sub District of Brebes) , in Krakahan (Sub district of Tanjung) and near to Karangdempel (Sub District of Losari) experiencing shoreline erosion . This makes the reduction of the abrasion area or loss of beach area/plot aquaculture farms so that activities can not be carried out again . Some farmers tried to work around this by creating a bulkhead in the dike pond using nets/bamboo . Vegetation in coastal areas of Randusanga , Kaliwlingi , Sawojajar , Krakahan and Karangdempel consists of various types of plant specific

plants both onshore and terrestrial. Specific plant species that are often found in beach of Randusanga include hibiscus and casuarina . Mangrove communities are often found along the beach of Randusanga to several points along the coast until near to Karangdempel.

Changes in Mangrove Conditions

Changes in the extent of mangroves in the coastal area of Brebes Regency in 1983 to 2013 are presented in Table 1 . Trend of decline in mangrove area in the coastal areas of Brebes Regency with 1983 as the year calculation to zero following the regression equation Y = 2,019.08 - 68.46 X.

Table 1 . Development conditions in the mangrove coastal areas in Brebes Regency

	Mangrove area (ha.)						
Sub District	1983	2000	2002	2008	2010	2011	2013
Losari	--	--	46.26	52.63	39.00	30.24	26.56
Tanjung	--	--	25.56	18.97	5.00	7.50	5.60
Bulakamba	--	--	31.95	39.55	59.00	47.23	35.42
Wanasari	--	--	48.06	27.29	37.00	18.57	14.31
Brebes	--	--	94.41	145.89	134.00	154.50	161.31
	2,327	505.00	246.24	284.31	274.00	258.04	243.20

Source: Anonymous (2001) , Department of Fisheries and Ocean Department, Bradford (2008) , Provincial Development Planning Agency Central Java (2012) , and the results of the study (2013).

The density of mangrove forests

The density of mangrove species namely the total number of stands of a particular mangrove species per unit area . *Rhizophora mucronata* has the highest density at station 5 (35.731 ind./ha.) and the lowest at station 1 (10.162 ind./ha.). *Rhizophora apiculata* has the highest density at station 6 (420 ind./ha.) and relative is not found at stations 3 and 4 . Levels highest density of *Avicennia marina* is at station 5 with a value of 500 ind./ha. and can not be found in station 4 .The density of trees , saplings and seedlings at each station are presented in Table 2 .

Table 2 Density of trees , saplings and seedlings in each station

Station	Lokation	Di trees (Ind/Ha.)	Di sapling (Ind/Ha.)	Di seedling (Ind/Ha.)	Total (Ind/Ha.)
1	Kec.Losari	562	3,510	6.720	10.792
2	Kec. Tanjung	980	6,453	12.033	19.466
3	Kec. Bulakamba	700	5,850	11.950	18.500
4	Kec. Wanasari	915	3,895	8.224	13.034
5	Kec Brebes Kaliwlingi	2,360	9,070	28.001	36.431
6	Kec BrbsRdsanga wtn	1,145	6,402	15.250	22.797

Source: Results of the study (2013)

Mangrove density according to satellite imagery can be seen from the results of analyzes using the normalized difference vegetation index (NDVI) . NDVI is a formula that can separate non- object vegetation with vegetation . To distinguish between mangrove vegetation with other vegetation (land) is to look at the vegetation distance to the beach . Vegetation found around the coast assumed as mangrove vegetation (Fiazia , 2006) . From the analysis using NDVI in coastal areas Brebes obtained four groups of mangrove vegetation density as listed in Table 3 . Area of mangrove vegetation is greatest at the level of density is 80.34 ha. rarely and the smallest is extensive mangrove density is 29.16 ha. meeting.

Table 3 Area of mangrove vegetation based on density levels

Sub District	Area of mangrove vegetation (ha.)				
	Very rarely	Rarely	Moderate	Meeting	Total
Losari	6.50	9.14	7.80	3.12	26.56
Tanjung	1.50	2.15	1.25	0.70	5.60
Bulakamba	7.70	10.22	12.25	5.25	35.42
Wanasari	4.85	5.39	3.30	0.77	14.31
Brebes	40.25	53.44	48.30	19.32	161.31
	60.80	80.34	72.90	29.16	243.20

Source: Results of the study (2013)

Mangrove vegetation in coastal of Brebes sub-district has the greatest density levels for all categories . Comparison of the results with the calculated image processing field data are presented in Table 4 . Categories density of mangrove stations observed only consists of three categories , namely category mangrove densities are very rare , rare and medium density.

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Table 4 . Mangrove density and value NDVInya on the image for each station

Sta.	Sub District	Mangrove density (ind/ha.)	NDVI	Category
1	Losari)	10.792	0,096367	Very rare
2	Tanjung)	19.466	0,173824	Rare
3	Bulakamba)	18.500	0,165197	Rare
4	Wanasari)	13.034	0,116388	Rare
5	Brebes (Kaliwlingi)	36.431	0,295315	Moderate
6	Brebes (Rdusanga Wtn)	22.797	0,203568	Rare
	Average	20.170		

Sources : The results are processed (2013)

Category level for the rare mangrove density at station 1 , rare category at station 2, 3 , 4 and 6 , while the medium density level can be found at station 5 . Generally NDVI values with values proportional to the density of mangrove vegetation .

Frequency of mangrove vegetation types (Fi)

Frequency indicates the type of value opportunities in the discovery of a particular kind of plot in the observation station (Bengen , 2002) . The number of plots in each observation station is 3 plots so kind that has the value of Fi is equal to 1,00 ; it means that type can be found on the third sample plot observation stations , for example, *R. mucronata* at stations 3 , 5 and 6 . Fi value equal to 0.6667 shows that the two types are found in the sample plots in one station , for example R. mucronata at station 1 , 2 and 4 . Fi value of 0.3333 indicates that the mangrove species found only in one sample plot in the observation station , for example R. apiculata at stations l , 2 , 5 and 6 as well as *A. marina* at stations 2 , 3 , 5 and 6 . Fi is equal to 0 means not found the species concerned at all three plots that exist , for example *R. apiculata* at stations 3 and 4 and *A. marina* at stations 1 and 4.

Closure of mangrove vegetation types (Ci)

Closure of mangrove species is widespread stem / basal mangrove in a given area . Based on the analysis of field data , the highest closure of mangrove species in .brebes coastal areas is *R. mucronata* in the station 5 at 11.61 . Closure of mangrove species can also be described from the stand diameter of mangrove vegetation .

Important Value Index (IVI)

IVI (Importance Value Index) indicates the existence of a role or influence of mangrove vegetation types in the community. IVI range is 1-300 . Generally *R. mucronata* has the largest IVI at all stations . Of all the existing stations, *R. mucronata* at station 4 has the highest IVI with the value is 300 and that *R. apiculata* at stations 3 and 4 and *A. marina* at station 4 with a lowest value of 0. Thus the classification to see an important role in any type of mangrove communities are : $0 \leq$ IVI < 100 : low ; $100 \leq$ IVI > 204.3159 : medium and 204.3I59 $\leq$ IVI $\leq$ 300 INP : high . Based on the above classification can be explained that the station has a low role of the community are: *R. Apiculata, A. marina and R. mucronata* while having a high role in ham apears all stations except at station 1 that IVI its being categorized . NDVI value < 0.1 is dominated by the type of *R. mucronata and A. marina* ; 0.1 - 0.4 is dominated by *R. mucronata*. Based on observations in the field , there are 3 types of mangrove vegetation that can be found in Brebes coastal areas namely : *R. mucronata , R. apiculata and A. marina* . Type of *R. mucronata* which locals called *bakau* and almost evenly spread and dominate along the coast , drainage and embankment ponds in the Brebes sub district and *R. apiculata* and *A. marina* are not always found in every station. *A. marina* is a pioneer in the mangrove community and is found in the outer zone of the shoreline of the mainland . This is caused by *Avicennia* root system capable of trapping sediment as his medium so as to form the mainland . The spread of mangrove vegetation based on the type of substrate where his life according to Bengen (2002) , *Rhizophora* spp . can grow well on the substrate and can tolerate muddy silt soil – sandy, and *Avicennia* spp . can grow well on muddy sand substrate . This is consistent with observations in the field.

Abrasion and Accretion

Abrasion occurs when the amount of sediment transported by sea is greater than the amount of sediment that is deposited so that the shoreline will be on the skids . Abrasion can occur due to weathering of rock or due to increased wave energy , or because decrease durability cliff by chemical weathering , physical or biological (Bengen , 2001) . Meanwhile , the accretion occurs when the amount of sediment deposited is greater than the ability of marine sediment transport , so it will increase coastal plain (coastal forward) .

Until 2000 , abrasion in Brebes Regency is 789 ha., while acretion 0ccurs covering310 ha., as stated by the Brebes Regency Environment Office (2003) . From 2000 to 2008 , coastal erosion in the Brebes Regency reached 640.45 ha. with a shoreline length of 27.043 km , which means an average erosion of the coastal as far as 236,83 m within a period of 8 years or 29.60 m per year , while accretion occurs covering 815.76 ha. with a coastline length of 27.147 km (Department of Fisheries and Marine Brebes, 2008) . The area of abrasion and accretion through 2008 are presented in Table 5 .

Table 5 . Abrasion and accretion in Brebes coastal areas (ha)

Sub District	Until 2000		2000 - 2008		Until 2008	
	Abrasion	Akretion	Abrasion	Akretion	Abrasion	Akretion
Losari						
a.Prapag Lor	20	15	21,34	0	41,34	15,00
b.Prapag Kidul	50	20	10,16	11,37	60,16	31,37
c.Karangdempel	50	10	23,65	0	73,65	10,00
d.Limbangan	70	10	170,74	61,09	240,74	71,09
Tanjung						
a. Krakahan	5	0	14,36	0	19,36	0
b. Pengaradan	10	0	-		10,00	0
Bulakamba						
a. Bangsri	10	25	120,67	-	10,00	145,67

b. Grinting	10	25	79,46	-	10,00	104,46
c. Pulogading	20	30	102,42	-	20,00	130,42
d. Kluwut	-		3,64	0	3,64	0
Wanasari						
Sawojajar	248	45	58,17	106,52	306,17	151,52
Brebes						
a. Kaliwlingi	200	50	185,98	295,77	385,98	345,77
b.Rdusanga Kln	125	75	106,92	27,54	231,92	102,54
c.Rdusanga Wtn	-	-	1,64	10,92	1,64	10,92
	789	310	640,45	815,76	1.429,45	1.125,76

Source: Brebes Regency Environment Office (2003), and the Department of Fisheries and Marine, Brebes (2008).

Reduction of mangrove area is also heavily influenced by public economic activities , especially farming land clearing . Besides the land accretion also appeared embossed with a total area 64.147 ha., separated in Kaliwlingi and Sawojajar villages (Sub District of Wanasari) and Karangdempel village (Losari Sub District) (Brebes Fisheries and Ocean Department, 2008) . Mangrove forest loss will lead to coastal erosion and abrasion otherwise instrumental in the reduction of the mangrove area . By 2000 coastal erosion area of 789 ha. in Brebes coastal areas while acretion covering 310 ha . Furthermore, from 2000 to 2008 , coastal erosion in the Brebes Regency reached 640.45 ha . with 27.043 km long coastline , which means an average erosion of the coast to coast inland as far as 236.83 m within a period of 8 years or 29.60 m per year , while 815.76 ha. of accretion that occurs with 27.147 km long coastline . Based on direct observation in the field in areas such as around the mouth of abrasion suffered, shown by the fallen tree and coastal protection (fencing) which was built by the community . Symptoms of coastal accretion in Brebes Regency can be seen the burnt - scorched sand and mudflats are covered by mangrove vegetation seedling as seen in the Kabuyutan estuary.

Ardani (2004) stated that during the period 1991-2002 , abrasion that occurs in the Brebes coastal area 696.848 ha or approximately 63.35 ha . per year and accretion area of 1.115.847 ha. or 101.441 ha per year and there are 38.09 ha / year of sediment from the stream that carries the charge and mass of suspended sediment from the surrounding area . The area is experiencing erosion , among others : the mouth of Pemali River in Sub Distric of Wanasari , the eastern mouth of the river and surrounding estuary of Kaligangsa river . Accretion occurs in Cisanggarung estuaries , bays in Sub District of Bulakamba.

Mangrove Forest Rehabilitation

Mangrove rehabilitation activities in Brebes coastal areas realized since 2004 . Until December 2004 planting mangrove vegetation along the Brebes coastal area of 500 ha . Land has been replanted consists of an area of 325 ha and a stretch of dike embankment measuring 175 ha in 13 villages in five sub districts in the Brebes coastal area (Fiazia , 2006) . Mangrove vegetation type is *R. mucronata* planted at a spacing of 1 m x 1 m. One hectare of land planted with 2000 ± *R. mucronata* seedling stems. According Jusoff and Dahlan (2008) , associated with physical function as absorbers waves smash coastal habitats and biological functions of marine life as the rehabilitation of mangrove areas that directly deal with the sea as green belt is very important .

Based on a satellite image of the delineation of May 31, 2013 , obtained a long coastline of Brebes Regency 56.68 km . Based on the Agreement of the Minister of Agriculture and Minister of Forestry No. KB.550/264/kpts/4/1984 and No. 082/Kpts-H/1984 , dated 30 April 1984 , the width of the green belt of mangrove forest is 200 meters , so area beaches Brebes should have a belt of

mangrove forest area of 113.36 km or 1133.60 ha . Extensive mangrove forests in Brebes coastal areas based on analysis of Landsat TM imagery dated May 31, 2013 amounted to 243.20 ha . and results of rehabilitation activities undertaken since 2004 is 746.24 ha , so it is necessary to increase mangrove rehabilitation area of 387.36 ha again .

Direction Brebes beach space utilization in 2012 focused on mangrove reforestation in Sub District of Wanasari , Bulakamba and Tanjung. The area of mangrove reforestation proposals contained in three areas , namely in the mouth of the Cisanggarung river in Losari Sub District, the estuary of Kluwut River in Bulakamba Sub District , and to the east of the mouth of the Pemali river in the Sub District of Brebes. Mangrove rehabilitation to restore ecological functions and economic need to pay attention to the factors supporting and inhibiting , including the selection of the mangrove vegetation in accordance with the type of soil beaches (Amri , 2005) . Based on the type of substrate and the condition of the beach (accretion or erosion) , the mangrove species that can be planted for mangrove rehabilitation activities in the Sub District of Losari until Wanasari types *Rhizophora* spp. and *Avicennia* spp. Meanwhile, around the Kaligangsa estuary types *Rhizophora* spp. According Bengen (2002) , mangrove species planted for retaining abrasion is *Rhizophora* spp. and for greening any kind of *Avicennia* spp. Planting mangrove vegetation types *Rhizophora* spp. in Brebes coastal areas by tying profagul (mangrove seeds) to '*ijiran*'. *Ijiran* isthe place of profagul (mangrove seeds) tied , in the form of four split bamboo with a diameter of 2.5 cm , a length of 1.5 m and a weight of 0.25 kg which is plugged into the subgrade coastal waters as deep as 50-75 cm. In some observation stations looks *ijiran* collapsed currents crashing ocean waves. This is likely due to the lack of proper site selection and embedding depth *ijiran* less than optimal . To streamline the mangrove reforestation should be carefully taken into account the current energy waves that slammed coastal ocean . This is attributed to the depth of planting mangrove seedlings or embedding bamboo place of mangrove seedlings (profagul) tied . Energy holding the bamboo must be balanced with energy waves that hit him as the result of the calculation. The third highest value of h is 1.07 m observation station so ijiran should plugged into the subgrade coastal waters as deep as 1.07 m minimum in order not to fall with the waves of the sea.

Conclusion

Extensive mangrove areas in the Brebes coastal region 2.327 ha. in 1983, and at the end of 2013 stayed 243.20 ha . spread in the Losari beach Sub district 26.56 ha. , Tanjung 5.60 ha. , Bulakamba 35.42 ha., Wanasari 14:31 ha. and in the Sub District of Brebes 161.31 ha. The density of mangrove vegetation in Brebes coastal areas in the category of very rare , medium rare and the rate of destruction of 68.46 ha./year . In the area of research found three types of mangrove vegetation , namely : *Rhizophora mucronata , Rhizophora apiculata* and *Avicennia marina*. Overall *Rhizophora mucronata* has the highest density is 35 731 ind./ha. at Kaliwlingi area , Sub District of Brebes which is a mangrove reforestation area .

During the period 1991 - 2008 abrasion that occurs in Brebes coastal areas covering 1,337.29 ha. And the abrasion rate of 63.35 ha./year .. The area is experiencing erosion , among others : the mouth of the Pemali river in Wanasari Sub District , the eastern mouth of the river and surrounding Kaligangsa estuary. To comply with the mangrove forest green belt width of 200 meters is necessary to increase mangrove rehabilitation area of 144.16 ha . again with the type recommended for planting mangrove Rhizophora and Avicennia by embedding into a minimum ijiran 1,07 m .

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