WATER QUALITY ANALYSIS FOR THE REGION SEAWEED USING REMOTE SENSING TECHNOLOGY (REMOTE SENSING) AND GEOGRAPHIC INFORMATION SYSTEMS IN WATER ISLAND DISTRICT PURA ALOR

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ABSTRACT
Pura Island is one of the districts in Alor Regency NTT between by two large islands and many smaller islands in the west bordering Pantar Island in the east, the Alor Island in the north bordering with Retta Island/Ternate and the south side of the island Tereweng. Community life on the island Pura dependent on dry land and fishing traditional therefore the need for land clearing new work of which is seaweed farming, it is necessary analysis land suitability for cultivation of seaweed for cover Economic Community Sector in Pulau Pura effective and efficient. The purpose of this study was to determine the carrying capacity of the waters on the island temple, knowing non-technical factors in the waters of the island temple, analyze the conformity of the waters of the technical aspects of using remote sensing data. The method primarily used in analyzing the suitability of the waters is a method of remote sensing with algorithm approach. Menujukana research results that the water quality (nitrates, phosphates, current speed and brightness) sting appropriate to serve as a regional development of seaweed cultivation in the island temple.

Keywords: Islands Pura, Seaweed, Remote Sensing

ABSTRACT
Pura island is one of the sub-districts located in Alor NTT Regency flanked by two large islands and Several small islands in the west by Pantar island in the east, Alor Island in the north, Retta/Ternate Island and south of Tereweng Island. Community life depends on Temple Island on dry land and traditional fishery, therefore need to open a new work area such as seaweed cultivation area, need analysis of conformity of marine aquaculture cover economy with society at Island Effectiveness and Efficient. The purpose of this research is to know the carrying capacity of waters in Pura Island, to know the non-technical factors of Pura Island waters, to analyze the water suitability value from the technical aspect by using remote sensing data. The method used in analyzing water suitability is the remote sensing method with the algorithm approach. The results Showed that water quality (nitrate, phosphate, current velocity, and brightness) sting is suitable for the development of seaweed farming in Pura island.

Keywords: Pura island, Seaweed, Remote Sensing
I. INTRODUCTION

Fisheries and aquaculture provide great food and income for the state - the state that has the coast and is the source of life than 3 billion people (Amosu and Alberto, 2012 in Gilani et al, 2015). Seaweed is a potential plant the sea and is a very useful plant. Seaweed grows in shallow waters 2013, (Mohammed, Gilani et al, 2015). Seaweed can also be used as an absorbent excessive nutrient from effluent ponds as revenue community fisheries and coastal economic improvement (Yousef, 2012 in Gilani et al, 2015). Seaweed cultivation is one of the solutions in improving the economy of coastal communities once revenue (PAD). In response, the Regional Government of East Nusa Tenggara Regency Alor particular, continue to improve itself from fisheries and marine sector to sustain coastal economic communities. Settling himself in question is the government’s attempt to analyze coastal areas which are potentially in the development of seaweed farming a small island in East Nusa Tenggara is located in Alor district is Pura Island.

In Sub island Pura there are 5 villages (Pura South, Maru, Pura East, Pura West and Pura North and one village (temple) with the lives of people still very bergatung on pengkapan fish and dry land management (farming) to prop up the economy, a lot of obstacles faced by the people of the island Pura manage dryland attributable to the lack of fresh water (fresh water), it is becoming kedala heavily in dryland management so that the island of Pura spend their time with pengkapan fish and manufacture of gin (a local drink beralkohol tebuat of fruit palm) due largely to 85% dry land temple overgrown Lontar. this impact is very harmful to the surrounding environment. Therefore, it is necessary to attempt to clear land a new job in supporting the local community economy by way of determination of the area of marine aquaculture (mariculture) in Pura Island.

Based on the history of farming in various world, it can be concluded that the selection of the right location is an important factor in determining the feasibility of cultivation (Milne, 1979). Despite the efforts and technology, some units are not suitable to be converted into a profitable or even had to be abandoned after spending large sums. Therefore, the choice of location is fundamental to the success of aquaculture (Muir and Kapetsky, 1998, in Kangkan, 2006).

II. METHODS

This study is a quantitative research. A survey method was used through observation approach (Nasution, 2012) and direct measurements and the use of data. remote sensing The approach spatial used in order to present the modeling the spatial aspects of a phenomenon that occurs in nature (Budiyanto, 2005).

1. Data analysis

Analysis Data in this study, consisting of a stage of making the contour and spatial modeling, which is based on a geo-statistical model, which refers to Hartoko (2011). The following stages are aquatic suitability analysis by making suitability matrix. The next step forming zones at the location with the overlay (Hartoko 2011 in Kangkan, 2006).

Development of this model is based on data transfer Geodetic/position (Degree, Minute, Second/DMS) to obtain a single value, the formula: The numerical value (Lat; Long) = Degree + (Minute + (second/60}}/60.

Software Arc Gis 10.2 used as a data processing facility. To obtain data regarding the supporting factors used interview techniques where the people are fishermen who really know and recognize the circumstances and conditions of coastal waters concerning Pura Island.

Preparation of water suitability matrix is the basis of spatial analysis through the scoring and weighting factors according to the instructions (Bakosurtanal, 1996 in Kangkan, 2006).

2. Materials and equipment

The materials and tools used during the study: Ingredients: Aqua Modis Satellite Imagery
3. Time and Place of Research

Research has been carried out in March and in September 2016 in Pura Island waters. Where are divided into 6 stations with twelve points sampling randomly? Map Location Research Shown in Figure 1.

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3. Spatial Distribution Parameters of Physics, Chemistry, and Biology in the waters of Pulau Pura

Decrease parameter of physics, chemistry, and biology at Temple Island waters is done by adopting the model Geodetic/position that was developed by Hartoko (2011).

1. Water Depth

Measurement results in water depth at the sampling point in Pura Island waters ranging between 6 m to 20 m, with an average of 12.58. The highest depth value is at coordinates 124 373 -8 278 LS and BT, while the lowest is at coordinates - latitude and 124 315 8287 BT. Differences depth Pura Island waters at the sampling location thought to be caused by the relief of the seabed. Topographical Pura Island coastal marine area of land generally sloping towards the sea, followed bluff (a local language called “steep”) which juts sharply into the seabed. According to Kangkan, (2006) the relief of the seabed affect the depth of the waters. The depth of water above shows the range of values that support for seaweed farming activities. Distribution of sampling depth is shown in Figure 2.
2. Bodies Brightness

Brightness Pura Island waters range from 4 m to 17 m with an average of 0.08. The distribution of the highest brightness 124 377 -8 278 LS and BT; 10 09 '32.4 “latitude and 123 28' 46.6” East. While on the coordinates of latitude and -8 273 124 334 BT, showed the lowest brightness values. The big difference in brightness in Pura Island waters at any location take samples were related to the depth of the location and time of observation. Hutabarat (2000) says that the light intensity will decrease along with the greater depth. Another estimation of the researchers is the observed time difference. Effendi (2003) Having said that, the reflection of light on an intensity that varies according to the angle of incidence of light. Seaweed cultivation requires waters that have high brightness. This is due to the energy of sunlight to penetrate the water needed in photosynthesis mechanism. Spatial distribution of brightness in Pura Island waters is shown in Figure 3.

3. Temperature

Water temperature in Pura Island has a range of between 28 °C to 31 °C with an average value of 29.79 °C. The temperature range was lowest for the coordinates of latitude and -8 326 124 368 BT and the highest temperatures are found at coordinates 124 321 -8319 latitude and longitude. The difference was unexpected because the time difference measurement situ of these variables. Effendi (2003) stated that the water temperature associated with the ability of the heating by the sun, time of day and location. This is supported by Exterminate (1999) and Hutabarat (2000) Having said that, the water is slower to absorb heat but will retain heat longer than the mainland. In the spring or enclosed areas, generally will increase the water temperature as there was no mass movement of water. Temperature fluctuations will exhibit a more varied, in coastal areas that have a relatively shallow depth due to contact with the substrate is exposed (Kinne, 1964 Supriharyono, 2001).

In general, the average temperature in Pura Island waters shows the value of supporting seaweed farming activities, a spatial distribution of water temperature in Pura Island is shown in Figure 4.

4. Flow velocity

Measurement results of the flow velocity in Pura Island vary between 0.255 m/s up to 0.732 m/sec with an average value of 0.48. Low flow velocities occur at locations 124 379 -8 288 LS and BT, while the highest value contained in location 124 334 -8 273 LS and BT. The speed difference may be related to the location of the current location. At other times turbulence and waters are quite open, the other there is a difference estimation current strength. Wibisono (2005) says
that every process activity and ebb tides produce currents. For permanent current factually cannot be known. This is due to the research conducted within a short period and only once. Thus concluded that the resulting current is a local current due to the tides.

Speed plays an important role in the water flow, for example, mixing water period, the transport of nutrients, oxygen transport. At the same time important for cultivation in terms of anchoring systems, installation destruction (attachment of biofouling, changing position keramba), water circulation and transport of feed residue. The measurement results average flow velocity in the data Pura Island waters are still at the recommended values, although not in the ideal range. Spatial distribution of flow velocity in Pura Island waters is shown in Figure 5.

5. Salinity
Salinity waters in Pura Island have a range of 32 ppm to 33.5 ppt with an average value of 32.66. Salinity range was lowest for the location -8319 LS, 124.321BT, -8272 LS, 124 362 BT, -8288 LS, 124 379 BT, and -8278 LS, 124 373 and highest salinity found in the location -8303 LS, 124 314 BT, -8287 LS, 124 315 BT, and -8273 LS, 124 334 and 123 42 ‘38.5 “East. salinity Pura Island waters from the average value were not different when compared to the assessment Hutahaen et al (1996) of 34 561 ppt at a depth of 25 meters.

The difference in the range of salinity especially in the east of the island temple (in the bay). These conditions, coupled with the deep waters of the bay, relatively closed and turn the water masses tend to be small.

Salinity affects the osmotic pressure of the media (Jaylani et al, 2015) thus, the importance kept the balance of osmolarity internal and externally. Fluctuations in salinity great cause kidney and gills of fish are not able to regulate body fluid osmosis. In general, the average salinity of the waters of Pura Island shows the supported range ng seaweed farming activities. Spatial distribution of salinity waters in general use zone Pura Island is shown in Figure 6.

6. Phosphate
The content of phosphate in Pura Island waters has a value that varies between 0.043 mg/L to 0.063 mg/l, with the average value of 0.052. Phosphorus content was lowest for the coordinates of latitude and -8 271 124 348 BT and the highest is at coordinates 124 368 -8326 latitude and longitude. The range of the value of research results is higher compared to the assessment Utojo et al (2005) on the island temple which has a range between 0.0217 - 0.0701 mg/land

Tarunamulia et al (2001) in the Bay of Pare-Pare ranging from 0.02 to 0.07 mg/l. The difference is caused by the time and the area under investigation. While the difference in phosphate content in the suspect is caused by the input of organic matter in the form of domestic wastewater (detergents), agricultural waste or phosphorus rock erosion by flowing water. In the geological structure making up the coast is also seen there are differences between the north and the south bay and allows the erosion of rocks. According to Effendi (2003) and Supriharyono (2001) said that most of the phosphate derived from an organic material input through the land in the form of industrial and domestic waste (detergent). Added by Brotowidjoyo et al (1995) and Hutabarat (2000) that, the source of phosphate in the water also comes from the erosion of rocks on the beach.
The content of phosphate in Pura Island waters shows the range still support farming activities, although not within the ideal value. Phosphate itself in the waters act as a nutrient. However, the high content of phosphate in the water may have an impact on blasting plankton. Spatial distribution of the phosphate in Pura Island waters is shown in Figure 7.

**Figure 7**
Distribution of Phosphate in Water Island Pura

7. **Nitrate**
Measurement results to show nitric variable values vary between 0.012 mg/L to 0.016 mg/l with an average value of 0.015. Nitrate was lowest for the coordinates - latitude and 124 321 8319 BT and the highest in the coordinates of latitude and -8 326 124 368 BT. Differences in nitrate content in several locations suspected, caused by high nitrate in bottom waters. Bodies enough to allow the decomposition of the particles sinks into organic nitrogen. Hutabarat (2000) that the nitrate concentration will be greater with increasing depth. Normatively presence of nitrates in the water supported on nitrate transport to the area, the oxidation of ammonia by microorganisms and primary productivity needs. Nitrates and phosphates an element that jointly affects the growth of phytoplankton. In addition, the settlements on the coast of the island Pura allows the entry of nitrate into the water. Effendi (2003) found, nitrate levels in waters heavily influenced by anthropogenic pollution originating from human activity and animal feces. In accordance with the matrix matching, shows an approximation of the average nitrate content in Pura Island, still support marine aquaculture activities. Spatial distribution of nitrate in Pura Island waters is shown in Figure 8.

**Figure 8**
Distribution of Nitrate in Water Island Pura

8. **Chlorophyll-a**
Measurement result to variable chlorophyll-a showed a value that varies between 0.08 mg/l to 0.15 mg/l with an average of 0.11 mg/l.

**Figure 9**
Distribution of Chlorophyll-a in the waters of Pulau Pura

Chlorophyll concentrations highest in LS and 124 314 -8 303 locations BT and the lowest for the -8326 and 124 368. Differences in chlorophyll-a value that is contained in Pura Island waters thought to be caused by the presence of phytoplankton, both abundance and species composition of the pigments they contain. Nontji (2005) argues that the chlorophyll-a is different based on the location and amount of plankton. This opinion is supported by Yusuf et al (1995) who said that the concentration of chlorophyll-a is generally associated with the density of phytoplankton, especially for phytoplankton were still alive. Possible to be made, to the analysis of chlorophyll-a in water are phytoplankton in good health condition or death.
Phytoplankton is dead, causing the chlorophyll-a will turn into another pigment, namely phaeofitin-a. The content of chlorophyll-a is not directly related to the cultivation of organisms but these variables play a role in water balance, especially as a constituent of fertility waters. The results show chlorophyll-a have a range that does not support the activities supporting seaweed farming activities. Spatial distribution of chlorophyll-a in Pura Island waters is shown in Figure 9.

IV. COVER

The results ia fisiki parameter analysis, water chemistry (Depth, Speed Flow, Brightness, Salinity, Phosphate, and Nitrate) using satellite images show the value that is suitable for the cultivation of seaweed while Chlorophyll-a attribute value is not suitable for cultivation of seaweed.

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