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STUDY OF MODEL OBJECT-BASED IMAGE ANALYSIS (OBIA) FOR DATA INTERPRETATION BASED MANGROVE VEGETATION LANDSAT 8 OPERATIONAL LAND IMAGER ON THE WEST COAST CITY OF BENGKULU

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ABSTRACT: Mangrove identification by using the image has been done with the classification model by pixel in the image value. But in this study see the interpretation of Landsat image data to the analysis of the object in the mangrove. Mangrove forests as major ecosystems support life activities in the coastal area and play an important role in maintaining the balance of the biological cycle in the environment. The potential of natural resources needs to be managed and utilized optimally to support the implementation of national development and improving people's welfare. So as to develop the coastal economic continuity with the management of mangrove forests as ecotourism. Identification observation and extensive distribution of mangrove forests in the western coastal city of Bengkulu was conducted in April 2019 by boat. Digital data Landsat 8 OLI (Operational Land Imager) parth / raw 125/63 used to map the mangrove forest. The method used in this study is a controlled multispectral classification Object-Based Image Analysis (OBIA) with the segmentation algorithm. Segmentation is performed using an algorithm Multiresolution Segmentation Segmentation and Spectral Difference. The results of the data analysis of Landsat 8 OLI and validation of field observation data, shows that the accuracy and wide distribution of mangrove forests in the coastal areas west of the city of Bengkulu is 255.24 ha. This method can be made an alternative to identifying information in mapping mangrove vegetation. Mangroves in the coastal areas west of the city of Bengkulu dominated by Rhizophora apiculata, Rhizophora mucronata and relatively good. Segmentation is performed using an algorithm Multiresolution Segmentation Segmentation and Spectral Difference. The results of the data analysis of Landsat 8 OLI and validation of field observation data, shows that the accuracy and wide distribution of mangrove forests in the coastal areas west of the city of Bengkulu is 255.24 ha. This method can be made an alternative to identifying information in pemetaanya mangrove vegetation. Mangroves in the coastal areas west of the city of Bengkulu dominated by Rhizophora apiculata, Rhizophora mucronata and relatively good. Segmentation is performed using an algorithm Multiresolution Segmentation Segmentation and Spectral Difference. The results of the data analysis of Landsat 8 OLI and validation of field observation data, shows that the accuracy and wide distribution of mangrove forests in the coastal areas west of the city of Bengkulu is 255.24 ha. This method can be made an alternative to identifying information in pemetaanya mangrove vegetation. Mangroves in the coastal areas west of the city of Bengkulu dominated by Rhizophora apiculata, Rhizophora mucronata and relatively good. This method can be made an alternative to identifying information in pemetaanya mangrove vegetation. Mangroves in the coastal areas west of the city of Bengkulu dominated by Rhizophora apiculata, Rhizophora mucronata and relatively good. This method can be made an alternative to identifying information in pemetaanya mangrove vegetation. Mangroves in the coastal areas west of the city of Bengkulu dominated by Rhizophora apiculata, Rhizophora mucronata and relatively good.

Keywords; Mangrove, Landsat, OBIA, Coastal

1. INTRODUCTION

Indonesia has a diversity of mangrove species are very high mentioned there were 92 true mangrove species. The mangrove vegetation in the form of trees, palms, vines, and ferns [1]. Size Indonesian mangrove in the world, at 27% or 75% of mangrove Asia Tenggara in 2010, the Agency of Information and Geospatial suspect mangrove area of about 3.2 million ha by 199 Landsat-7 satellite images ETM [2][3]. Size has become the official reference [4][5][6]. Low extreme spacious issued by Wetland International, which is only about 1.5 million ha. This difference indicates it difficult to determine the extent of mangrove in Indonesia. Mangroves can grow well because it is sheltered and supply of freshwater or grow over coral islands. Mapping and monitoring the condition of mangrove.

Geographically located in the coastal city of Bengkulu, whose territory borders the western coast of Sumatra and the Indian Ocean. The coastal area as a transition between terrestrial and marine ecosystems and natural mangrove forests can grow and thrive [7]. Mangrove forests as a major ecosystems support life activities in the coastal area and plays an important role in maintaining the balance of the biological cycle in the environment[8], The potential of natural resources need to be managed and utilized optimally to support the implementation of national development and improving people's welfare. So as to develop the coastal economic continuity with mangrove forest management as ecotourism [9].

The mangrove ecosystem has the benefit of disaster mitigation. The benefits obtained by the vegetation of mangrove ecosystems such as the damping of waves and wind storms to the area behind it, of coastal protection from abrasion, tidal wave, tsunami, mudguard and trap sediment transported by runoff, prevention citrus sea to the mainland, as well as a neutralizer water pollution to a certain extent [10]. Protecting the settlements located on the coast because of the mangrove ecosystem is the highest high tide level until level above sea level on average [7].

Besides the mangrove ecosystem as the biology of marine life. In biological a habitat for many species [5]. Mangrove forest as a place of life biota media fish, shrimp, shellfish and another biota [11]. The biological role of giving out a place as breeding, breeding and rearing children for several species of fish, crabs, clams, and shrimp. Mangrove forests are able to provide shelter and food in the form of organic matter and plankton [12]. In addition to the biota there is also life as wildlife animals and birds became the breeding of birds as their natural habitat [13].

Information on the existence of mangrove forests of the actual, factual and easily and quickly can be obtained via satellite based on GIS (Geographic Information System) to identify potential resources coastal and marine areas. It is due to this technology has several advantages, such as: the price is relatively cheap and easily available, their temporal resolution [14] so it can be used for monitoring purposes [6]. Broad scope and reach remote areas, the form of digital data that can be used for various purposes and displayed as desired. The utilization of remote sensing data in relation to the study of which many do to research on the development model of coastal and marine areas [11].

The development of remote sensing satellite technology increases with the advancement of technology today. These developments include the ability of vehicle sensors and satellites carry sensors to reach orbit so that it can detect objects that are on the surface of the earth [15][16]. Data produced from the recording sensor that has increased the resolution include spatial resolution [17][18]. Temporal resolution, spectral resolution and radiometric resolution [19]. These technological advances require the practitioners in the field of remote sensing to develop methods of extraction of image classification method to obtain timely and accurate information. Image classification includes the classification manually using imagery and multispectral classification one piece of remote sensing image processing to produce thematic maps and used as input in the modeling of spatial [4][20].

Remote sensing technology in the identification of the existence of mangrove can be used to interpret the value of forests and vegetation on Landsat. Identification observation and extensive distribution of mangrove forests in coastal areas of the west coast of Bengkulu. The use of Landsat imagery included in the category of resolution Landsat remote sensing for mapping land has become alternative for research use with medium resolution imagery [21]. Landsat imagery can identification well in the mapping of the coastal ecosystem of mangrove vegetation can be identified distribution [22] [48] [48] [50] [51].

This study identifies the area of the Bengkulu city Peisir mangrove ecosystem. the method used is a multispectral image interpretation on the classification of controlled Object-Based Image Analysis (OBIA) with the segmentation algorithm [23-26]. Segmentation is performed using an algorithm Multiresolution Segmentation and Spectral Difference Segmentation OBIA an object-based classification to define object classes on aspects of spectral and spatial aspects simultaneously [27] [28]. This method is able to overcome the weakness of classification methods for this too is per-pixel or pixels operating at the individual level with the object formed through a process of segmentation is the process of grouping adjacent pixels with the same quality [26] [29].

The utilization of remote sensing data or satellite imagery varies greatly according to the need and usefulness. One of the utilization of remote sensing data in the form of satellite image classification using an application or software image processing. Satellite image classification consists of unsupervised and supervised classification. Almost all digital image processing applications are tools or processes for classification

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either supervised or unsupervised. Both of these classifications are well suited for the image.

Not only supervised and unsupervised classification, but there is also a remote sensing image data classification called OBIA (Object Base Image Analysis). OBIA classification is a technique that is not only looking at the classification of hue and texture pixels but based on the unity of the object, the approach that the classification process is not only expensive but the spectral aspects of spatial aspects of the object [3] [30] [31]. Remote sensing image data used for this classification usually using remote sensing image data of high resolution such as QuickBird, Ikonos, World View, Landsat. Actually, this classification is similar to unsupervised classification, but the basis of the classification OBIA ie segmentation.

How to define an object with this segmentation is not only based on the pixel values, but the approach to segmentation also pays attention to the appearance of textural or spatial patterns. Segmentation of remote sensing data can be done with algorithms region growing/merging, detection limit, or with a combination of both, for example, the algorithm ECHO (Extraction and Classification of Homogeneous) and More (Mutually Optimum Region) [32-34]. The detection limit using the assumption that the two pixels adjacent to the large difference in value represent two different segments. Thus, an edge or boundary can be drawn between the two. Edge pixels thus can be combined with a similar segment. Thus, in this study interpret Landsat image data to spatially see mangrove area of Bengkulu [10][21][35][36].

Through the interpretation of Landsat image data is capable of describing the development of contribution in Bengkulu travel. Interpretation is done by looking at the data plotting d actual manner rocky field with spatial data remote sensing. This data is the source of contributions to the development of regional planning in the development of tourism travel Bengkulu.

2. RESEARCH METHODS

a. Time and Location

The experiment was conducted in March-May 2019 to identify studies on the distribution of mangrove coastal city of Bengkulu. Based on Landsat imagery data that are identified in the Coastal mangrove Bengkulu West Coast city of Bengkulu.

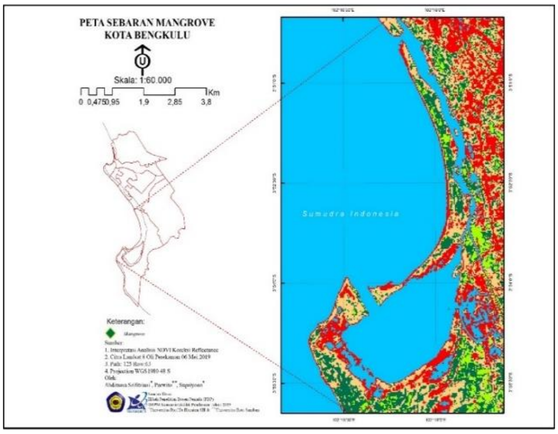

Figure 1. Map Location West Coast Coastal city of Bengkulu

b. Tools and materials

Tools and materials are used mainly in this study are the following materials and tools are needed in this research are: GPS, compass, camera, meter, tally sheet inventory data, stationery, calculators, computers with software ArcMap, machetes and tools other support. Later analysis of the data used is data Landsat imagery Landsat 8 OLI (Operational Land Imager) parth / raw 125/63 used to map the mangrove forest.

c. Processing Method And analysis Landsat Data

The phase of the research conducted digital image processing include geometric correction, radiometric correction, image classification. RBI maps Indonesia (RBI) is used to correct geometrically Landsat imagery that will be described in detail in image processing. Determination of the sample plots in the form of shape, size and number of plots to be used for data collection in the field of forest fisionomi.

The study began by downloading Landsat 8 at https: // earth explorer. usgs.gov, after the image data is already available, the image data is processed by software Geographical Information System (GIS), composed image by Red, Green, Blue (RGB), then do the grouping of pixels the image commonly called image classification. Through the image classification, mangrove and non-mangrove vegetation will separate validation needs to be done is to check the actual situation and with mangrove conditions obtained from Citra Landsat 8 OLI. Information display mangrove distribution can already be displayed based on a process that has been carried out [37-39].

The scope of this study only on the top surface so that the tree roots are not counted. For example, mangrove tree diameter is used by 1.1 - 67.1 cm up to 10 cm where the trees found in biomass allometric models for other types of origin planting mangrove trees after felling or rehabilitation. Tall trees in the measure that the total tree height is the shortest distance from the point to point treetop projection on a plane and height of the tree bole is the shortest distance from a point to point bole projection on a horizontal plane. Measuring the horizontal distance between the tree should be measured carefully and thoroughly [10].

Landsat 8 OLI processed analyzed by the mangrove forest object identification process using the segmentation method. Segmentation method used is to apply an algorithm Multiresolution Segmentation where segmentation method is based region growing which is run by five (5) parameters: scale (scale), color (color), form (shape), fineness (smoothness) and cohesion (compactness). Parameter 'scale' is used to influence the number of segments generated where the greater value scale of the fewer number of segments that form and vice versa. Parameter 'form' 'affects the color produced on the object, whereas the parameter' compactness' affects the smoothness of an object [8].

3. RESULTS AND DISCUSSION

OBIA method is one method of image classification. This classification method using segmentation process. The differences contained in this method the image analysis process in the form of image objects or segments, not on a single pixel. The application of this classification is proven to increase the accuracy of the mapping of mangrove. Stages used in OBIA method is the process of image segmentation (pixel level) into segments/objects (object level) is homogeneous in accordance with the parameters. OBIA method of use is expected to increase the accuracy of the results to map the mangrove forest areas using methods OBIA can be seen in Figure 2.

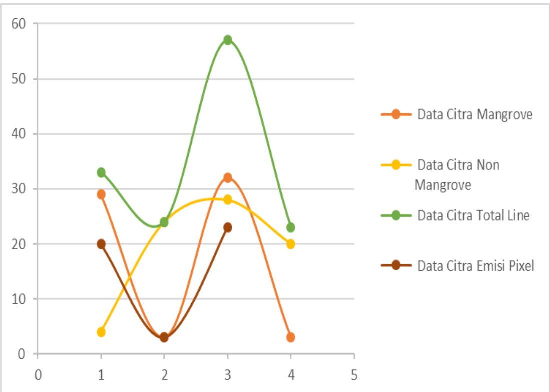

Figure 2. Accuracy test calcification and Groudcek Field

The results obtained it is clear that mangrove mapping using object-based classification techniques (OBIA) is a good alternative in the interpretation region of mangrove ecosystems. The results showed mangrove class can be mapped very well. Additionally, high scores on the resulting accuracy are greater than 83% can be seen in Table 2. The high value indicates that the accuracy of the object-based classification technique is excellent to be used as an alternative in the mapping of mangroves and land cover in the vicinity. Nevertheless, they found an error in the separation of mangrove classes against other classes. There are several possibilities to explain the closure of land located around the mangrove areas and occupy the same morphology region. This leads to difficult to distinguish similarities. Mangrove forests identified in accordance with the results of the analysis of Landsat 8 OLI. Peisisir West Coast city of Bengkulu identification mangrove vegetation adjacent to the value of segmentation in Mangrove and spruce. Accuracy in interpreting the results should be the data field and vegetation adjacent to mangrove ecosystems[7],

Accuracy results obtained have a range similar to previous studies such as [42]mangrove mapping using an object-based classification technique, using Landsat 8 OLI with 6 classes of land cover segmentation provides a clearer picture of the object. Mangrove was seen around the coastal region and a small portion at a location farther away from the mainland. Interpretation of vegetation in common with the homogeneity of the objects in the image. In addition to the mangrove, mangrove aside non-class non-mangrove vegetation and open spaces, the segmentation result, most streams are described as non-mangrove.

Identifying the distribution of mangrove with OBIA method (object-based classification) where there is two (2) important step which must be done is the segmentation and classification. Image segmentation aims to separate the image into separate regions or objects based on predetermined parameters so as to minimize the variability between objects. While the classification is used to distinguish the mangrove and non-mangrove so as to facilitate further analysis. The result of the segmentation process on Landsat 8 shown in (Figure 2) generates a segment that is able to separate objects well enough between the mangrove and non-mangrove. In addition, the results of the segmentation of Landsat 8 looks a lot more, it is influenced by the number of bits in the image segmentation process is done [5] [43].

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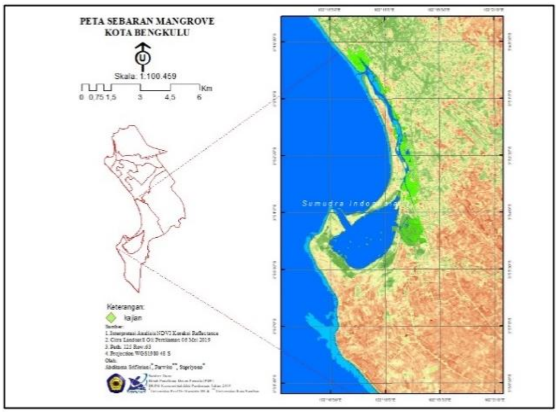

Figure 3. Distribution Mangrove West Coast Coastal city of Bengkulu

Interpretations made on mangrove land cover class classification results show that mangrove spread information on the West Coast Peisisr city of Bengkulu. Interpretation as mangroves are able to live in conditions of meetings between the estuary and the regional meetings coastal area or tide [44]. Results of natural mangrove identification is corroborated by the natural growth of mangrove communities in the region also provide additional information about why the region remained well and did not experience any degradation [45]. When viewed from the appearance of the satellite imagery in areas dominated by mangrove green visible light. The color indicates the area of wetness so that the level in the area very well. This species usually lives in tidal zones.

Generally, people around just utilize mangrove ecosystem as one of the locations for the object of tourism in supporting the government's vision Wonderful Bengkulu Bengkulu for 2020 Mangrove (Figure 3) is visible from the ship encountered several services for mangrove tours around mangrove Bai Island waters, mangrove Treking located in the Nature Park (TWA) Long Beach and Mangrove Park Badrika located in Sempedan sunga Jenggalu Bengkulu City West Rim Region [10], Bengkulu province is geographically located on the west coast of Sumatra, Bengkulu makes rich mangrove forests that used as a tourist beach one Nature Park (TWA) Long Beach and Pulau Baai (Figure 3). Backed with the location being in the capital of Bengkulu province, the potential of tourism in Long Beach TWA and high Baai Island. Especially for the city of Bengkulu and surrounding areas who want to enjoy the natural atmosphere of the beach with pine forests and mangrove forests that grow in it and do not spend their money are great to visit, then this TWA solution.

The results of the field survey show that groups mangrove forests in the tidal area. Mangrove forests can form pure stands (major) or dominate in the mangrove community, has its roots breath and viviparous and taxonomically different from terrestrial vegetation (eg Avicennia, Rhizophora, Bruguiera, Ceriops, Sonneratia, Kandelia, Lumnitzera and Nypa) [46]. While the mangrove association group is generally associated (follow-up) with a true mangrove species (example: Acanthus, Derris, Hibiscus, Calamus and so on) [41][47]. Distribution of true mangrove species Rhizophora Apiculata and Rhizophora Mucronata with conditions very tight density and height above 5 meters. In the surrounding area overgrown with mangrove apparent condition of the land is inundated by seawater so that it can be said the level of salinity in the region is quite high [8].

Research shows that this type of mangrove forest located in Bengkulu City persist the West Coast with this type Bruguiera gymnoriza Sonneratia alba, Rhizophora apiculate, Xylocarpus granatu, Acrostichum aureum (Figure 4). Mangrove Mangroves in coastal areas west of the city of Bengkulu dominated by Rhizophora apiculata, Rhizophora Mucronate and relatively good.

4. CONCLUSION

Based on the results and discussion can be concluded that the object-based classification (object-based) was able to identify the distribution of mangrove well. Distribution of mangrove on Landsat 8 OLI with the determination of the value of the parameters in the process of segmentation greatly affects the separation of objects from each segment. Distribute distribution of mangroves in the coastal area west of the city of Bengkulu. Mangroves in the coastal areas west of the city of Bengkulu dominated by Rhizophora apiculate with a very good condition. Mangrove forests provide their own power in the development of tourism in Bengkulu. thereby providing and improving the public indirectly with the cultivation of mangrove forest development. Mangrove Bengkulu Attraction used fishing boats to enjoy the beauty of the mangrove forest ecotourism.

Conclusion Mangrove has been mapped using Landsat satellite image sensor. The field survey showed that mangrove Mangrove study locations with a high diversity of species and dominated by Rhizophora. Mangrove field survey data in this study proved to be effective and efficient mapping, monitoring and evaluating the mangroves for the benefit of sustainable mangrove management without having to go down again to the field. Landsat image data was available in the future can directly be used to create new maps by applying training mangrove areas and the maximum likelihood supervised classification algorithms that have been developed in this study. Extensive mangrove though fluctuating, but relatively stable, because of most of the mangrove protected by local wisdom, and not due to the utilization/conversion of mangroves to another land. The average width of mangroves on the coast around the mangrove should be the green line (green belt) to protect the islands of the Banda Sea blow big waves in certain seasons, in addition, to support seagrass and coral reefs on the front. In the future, other classification methods, such as OBIA need to try to get a map of mangrove with a higher level of accuracy.

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