

LAND COVER OF MANGROVE ECOSYSTEM IN MARINE TOURISM INTEGRATED MANDEH SUB-DISTRICT KOTO XI TARUSAN, PESISIR SELATAN REGENCY

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ABSTRACT: Mangrove is a plant that can live in tidal areas and form a community of independent vegetation, ranges to various disorders, especially marine resource management that is not environmentally friendly causing damage to the Mangrove forest. Thus researched to know the condition, the rate of change in land area and public response to the mangrove ecosystem implemented in August 2019 using Phantom 4 Drone data and a descriptive method Quantitative. The results were adopted, namely, the condition of the mangrove ecosystem was declared normal (0.22) in the year 2009 using NDVI value classification, as well as the year 2019 NDVI value of 1 in the condition is very good. The area on land cover amounted to 406.61 ha in 2019, while the year 2009 amounted to 406.69 ha with a change of -0.08 ha. Mangrove conditions with an area of 79.13 ha in 2009, a decline in 2019 of 60.01 ha, a change of -19.12 ha (-24.16%). The mangrove ecosystem is getting worse because of the road construction that causes some material to fall into the mangrove area that makes the sedimentation wider, as occurs in the segment 3 The change of mangrove overflow from the year 2009 (21.60 ha) 19.83 ha in the year 2019. People are still promoting the economy compared to the survival of mangroves because the existence of mangroves is considered economically beneficial for them.

Keywords: Mangrove Damage, Drones, Land Change, NDVI, Mandeh Region

1. INTRODUCTION

Mangrove ecosystems are found in many coastal areas protected from wave-bending. The mangrove ecosystem is a community of tropical coastal vegetation dominated by several types of Mangrove trees that grow and thrive on muddy coastal tidal areas [1]. The vast Mangrove ecosystem in Indonesia in 1982 is recorded at 5,209,543 ha. The area shrinks to 46.96% or the remaining 2,496,158 ha in 1993 [2-7]. Given the economic value of beaches and mangrove forests, this area is the target of various exploitative activities. Mangrove land was triored for ponds, starting from the north coast of Java, then propagating to Papua, Sumatra, and Kalimantan.

According to [8], damage mangrove forests caused by two things, namely human activity and natural factors. Poor coastal community behavior causes damage to the mangrove ecosystem where human behavior can determine the sustainability of environmental conditions [9].

Geographic Information System (GIS) is a system consisting of software and hardware, data and users and institutions to store data relating to all existing phenomena on the Earth. Data in the form of fact details, conditions and information are stored in a database and will be used for various purposes such as analysis, manipulation,

presentation and so on. GIS has been introduced in Indonesia since the mid-1980s, and this has been utilized by various central and local government agencies [10,11].

2. METHODS

The research time is in July – August 2019 and the research site is Mandeh integrated marine tourism area. The research site division is randomly divided into 3 segments. The method used quantitative research approached the descriptive.

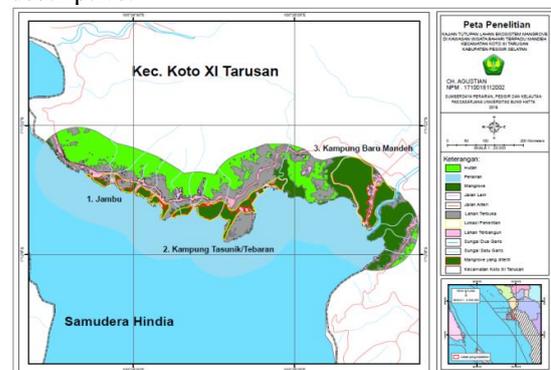


Fig 1. Research location

Drone data is used to analyze the latest data on

the mangrove ecosystem area. The condition of the mangrove ecosystem is seen by calculating NDVI value.

The analyst used in conducting this research in the form of land cover area calculation, calculation of land cover change and NDVI (Normalized Difference Vegetation Index) to see the condition of land cover ecosystem at the research site [12, 13]. As well as an interview with the surrounding community to know the opinions of activities or changes in the mangrove ecosystem at some point of research location in Bungus, Teluk kabung sub-district.

Land cover extension Calculation

$$L = \sum p \times r \times 0,0001$$

Description:

- L = Area (ha)
- $\sum p$ = number of pixels
- r = Landsat Special resolution 30×30 m
- 0,0001 = Conversion of m2 into (ha) [13-17]

Calculation of land cover extension Change

$$V = \frac{N2 - N1}{N1} \times 100\%$$

Description:

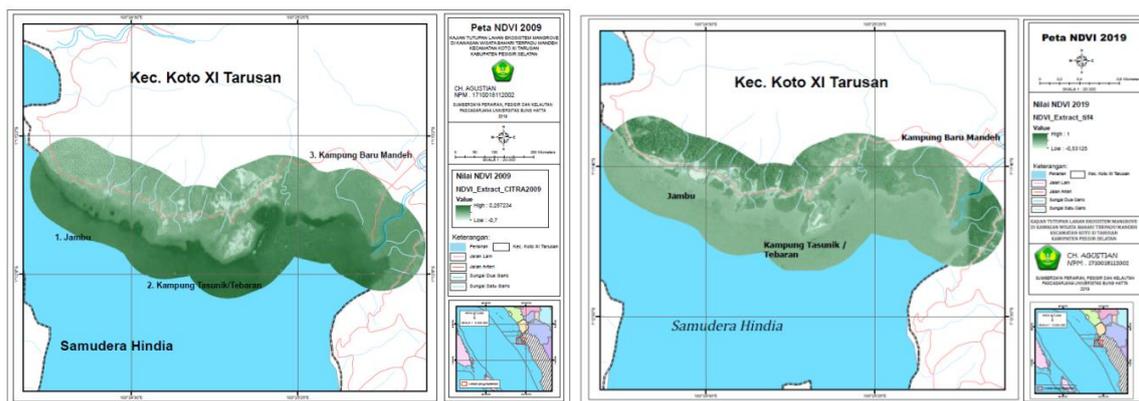


Fig 2. NDVI in 2009 and 2019

3.2 Land cover Change in 2009 – 2019

The change of land cover occurred within 10 years, especially on land awakened from 2009 with a land area of 0.42 ha to 21.95 ha in 2019, the addition of 21.53 ha, occurred due to the clearing of land Made into the shortcut of Padang City to

- V = Change rate (%)
- N1 = first year area (ha)
- N2 = n-year size (ha) [13-17]

Mangrove Ecosystem conditions

$$NDVI = \frac{NIR - Red}{NIR + Red}$$

Description :

- NIR = *Nerar – Infrared* (infrared canal)
- Red = Red (red canal) [13-17]

3. RESULTS AND DISCUSSION

3.1 Condition of Mangrove ecosystem with NDVI value

Table 1. Mangrove density category based on NDVI values

Vegetation density	NDVI values
Excellent	0,72-0,92
Good	0,42-0,72
Normal	0,22-0,42
Bad	0,12-0,22
Very bad	-0,1-0,22

Source: <http://endeleo.vgt.vito.be/dataproducts.html>

The NDVI value in 2009 shows the number 0.22 in the Normal category, while the NDVI value in 2019 shows the number 1 in the category very well. Here's an image of the NDVI 2009 value and NDVI 2019 (Fig. 2).

Mandeh via Tarusan, Carocok Painan, Pesisir Selatan Regency.

In Figure 3 and Figure 4 is a description of a map of land cover difference in 2009 and land cover 2019, and in table 2 on the change in land cover in the year 2009 until land cover 2019.

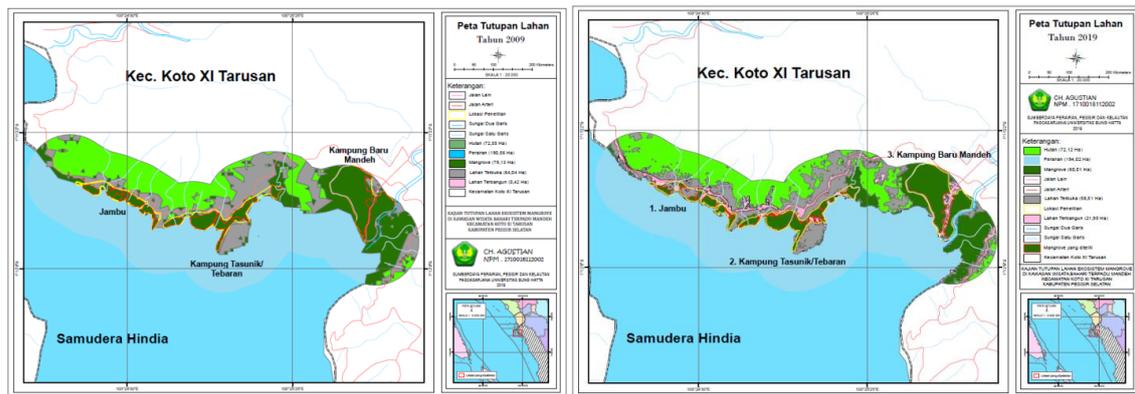


Fig 3. Map of Land Cover 2009 and 2019

Table 2. Land cover in 2009-2019

No	Land	Area 2009(Ha)	Area 2019 (Ha)	Change (Ha)	Change rate (%)
1	Waters	190,56	194,02	3,46	1,82
2	Forest	72,55	72,12	-0,43	-0,59
3	Settlement	0,42	21,95	21,53	5.128,53
4	Emplacement	64,04	58,51	-5,52	-8,63
5	Mangrove	79,13	60,01	-19,12	-24,16
Total		406,69	406,61	-0,08	5.096,96

Source: Data Primer, 2019

The condition of mangrove ecosystem that has been examined in several randomly generated segment can be seen in Figure 4 is mangrove

condition in 2009 as well as in picture 6 is a condition of mangrove ecosystem 2019.

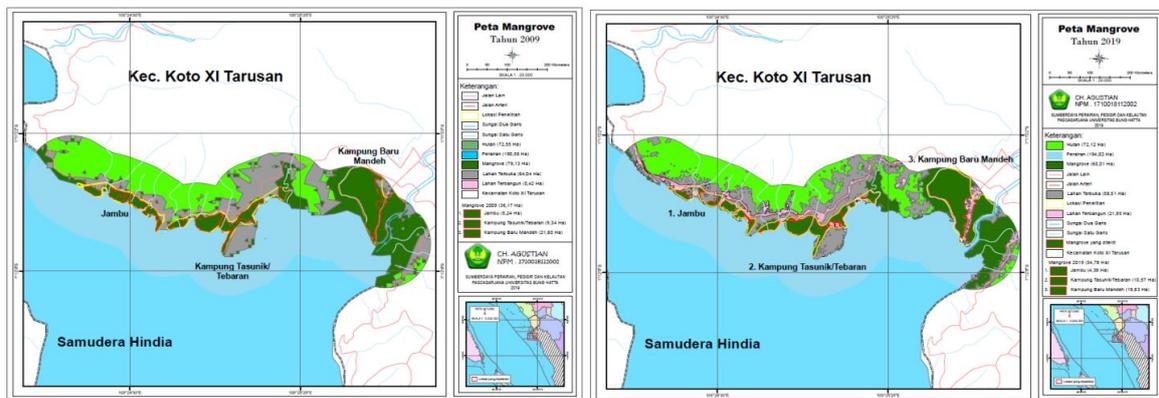


Fig 4. Map of Mangrove 2009 and 2019.

Table 3. The changes in the Mangrove area from 2009 – 2019

No.	Location	Coordinate	Area 2009	Area 2019	Change (Ha)	Change rate (%)
1	Jambu	100°24'27,573"E, 1°11'41,9" S	7,9	4,21	-3,69	-46,71
2	Kampung Tasuni /Tebaran	100°24'58,582"E, 1°11'49,61" S	18,95	9,41	-9,54	-50,34
3	Kambung Baru Mandeh	100°25'50,664" E, 1°11'42,486" S	25,33	31,27	5,94	23,45
Total			52,18	44,89	-7,29	-73,60

Source: Data Primer, 2019

The change of the area on the mangrove impacts the clearing of land that was built as road construction, as well as logging of mangrove whose timber is used for personal use (wood used for kitchen purposes). Segment 2 of table 3 is the addition of the mangrove area, because of rehabilitation or replanting or self-growth at the location of the segment 2.

3.3 Community perception

The opinion of the local people that the mangrove conditions in the Integrated maritime tourism area are still very interesting, because of the construction of the road section of Teluk Kabung-Mandeh-Tarusan and ecotourism development. As a result of the road-building, some of the soil material falls to the coastal area

4. CONCLUSIONS

The condition of the mangrove ecosystem in Mandeh integrated maritime Tourism Area Koto XI Tarusan Pesisir Selatan REGENCY shows the value of NDVI in the year 2009 of 0.29 with normal categories and in 2019 NDVI value of 1 with a very good category. Land cover in the year 2009 of 406.69 ha while the year 2019 of 406.61 ha with a change of -0.08 per 10 years. Mangrove area on 2 segments has an addition with the addition of the area of 1.23 ha while segment 3 decreases the amount of mangrove overflow of -1.77 ha per 10 years. Changes in the area are due to the opening of the road in the Mandeh region. Mangrove rehabilitation conducted by the Community and related government in Koto XI Tarusan Not enough, if it has not been equipped with self-awareness of the mangrove ecosystem and its environment.

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