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Spatial Distribution of Mangrove Density Using Sentinel-2A Imagery of Perancak Estuary

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A R T I C L E I N F O

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A B S T R A C T

Mangrove forest ecosystems are vegetative communities found in tropical and subtropical estuaries and shallow coastal lagoons. They are mostly composed of several types of mangrove trees that can thrive in muddy beach tidal zones. The science and art of remote sensing involves analyzing data collected using instruments without coming into direct touch with the thing, location, or phenomena being researched in order to learn more about it. Sentinel-2A is a medium spatial resolution satellite image with a wide swath that can be used for studies on land cover monitoring, including vegetation, soil, and water, as well as water networks and coastal areas. It revisits the same location every 5 days, as opposed to Landsat's 16-day interval. The research findings indicate that there was an increase in the development of mangrove density between 2019 and 2023. Specifically, the total area of mangrove forests rose from 118.59 Ha in 2019 to 145.44 Ha in 2023. These developments are displayed in the table below

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INTRODUCTION

Indonesia is a nation made up of islands. Indonesia's extensive coastline has the capacity to create diverse ecosystems. Communities and their surroundings are connected within ecosystems. Coastal locations are home to mangrove ecosystems, which are influenced by the tides and are primarily dominated by unique tree or shrub species that can withstand the salinity and brackishness of the water (Santoso, 2000).

A mangrove forest ecosystem is a type of vegetation found in tropical and subtropical estuaries and shallow coastal lagoons. It is mostly composed of various varieties of mangrove trees that can thrive in muddy beach tidal zones. Mangroves are plant communities or trees that are affected by the tides and are found between the sea and the land (Romimohtarto and Juwana, 2001).The research's objective (heading 2)

LITERATURE REVIEW

The purpose of this study is to examine changes in the mangrove forest region in Bali Province's Perancak, Jembrana Regency. It is anticipated that the community, government, and other relevant entities will find this study valuable in providing information that can be utilized for mangrove rehabilitation.

METHODOLOGY

Under the environmental and natural resource study grant scheme, a two-stage study on the spatial distribution of mangrove density using Sentinel-2A imagery of the Perancak estuary in Perancak, Jembrana Regency, Bali Province, will be carried out. This study will be carried out at the Perancak mangrove site as well as in the Water Resources Management laboratory. While field research will be done in Perancak, Jembrana Regency, the water quality measuring procedure will be carried out at the Warmadewa University Faculty of Agriculture location and laboratory. The research is scheduled to begin in 2024 and run for a full year.

Sentinel-2A is a medium spatial resolution satellite picture with a broad field of view that is used for land cover monitoring studies, covering vegetation, soil, and water, as well as water networks and coastal areas. It revisits the same place every 5 days (as opposed to Landsat's 16 days). Four bands (band 2, band 3, band 4, and band 8) are sampled at 10m resolution (as opposed to Landsat's 15m panchromatic), six bands (band 5, band 6, band 7, band 8a, band 11, and band 12) are sampled at 20m resolution, and three bands (band 1, band 9, and band 10) are sampled at 60m resolution using the Sentinel-2A Multispectral Instrument (MSI). As a supplement to Landsat 7 and 8, Sentinel-2A

RESULT AND DISCUSSION

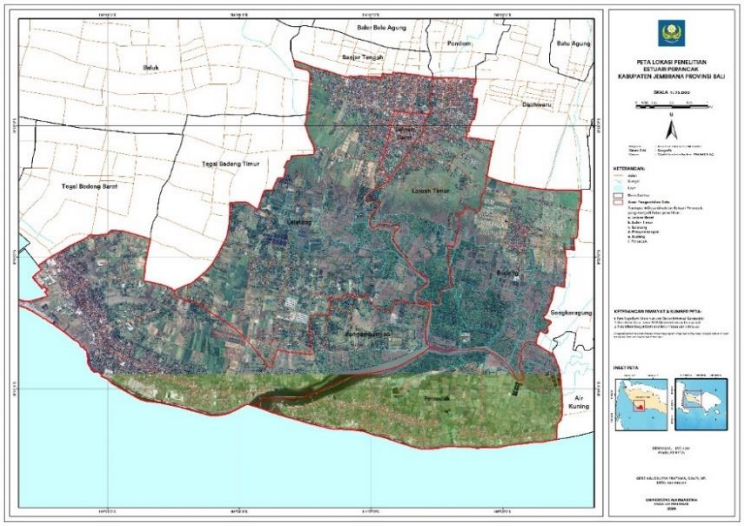

Figure 1. Research Location Map

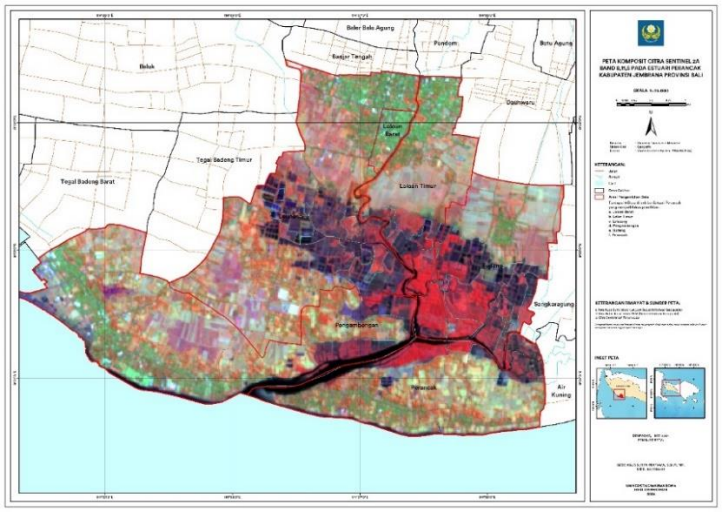

Figure 2. Sentinel Imagery Composite Map

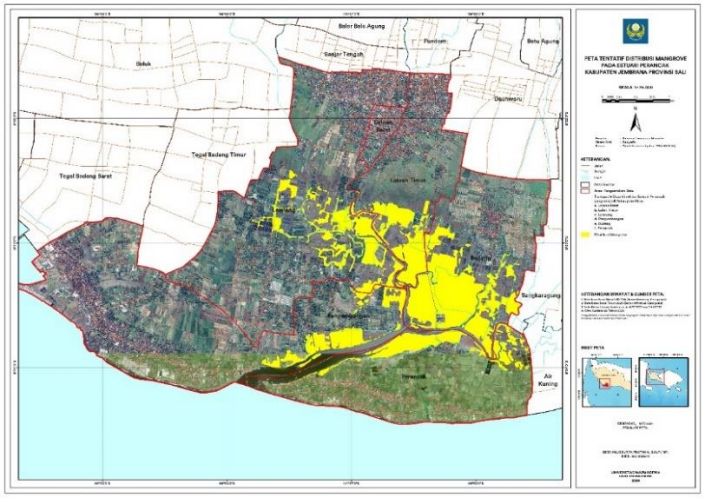

Figure 3. Mangrove Distribution Map

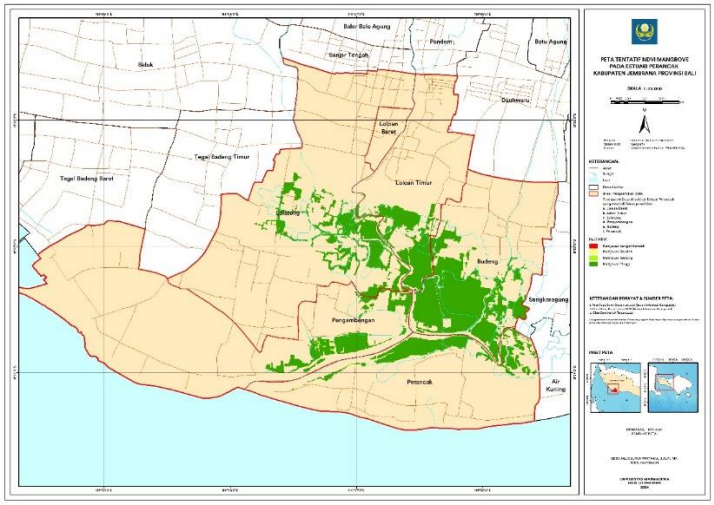

Figure 4. NDVI Map

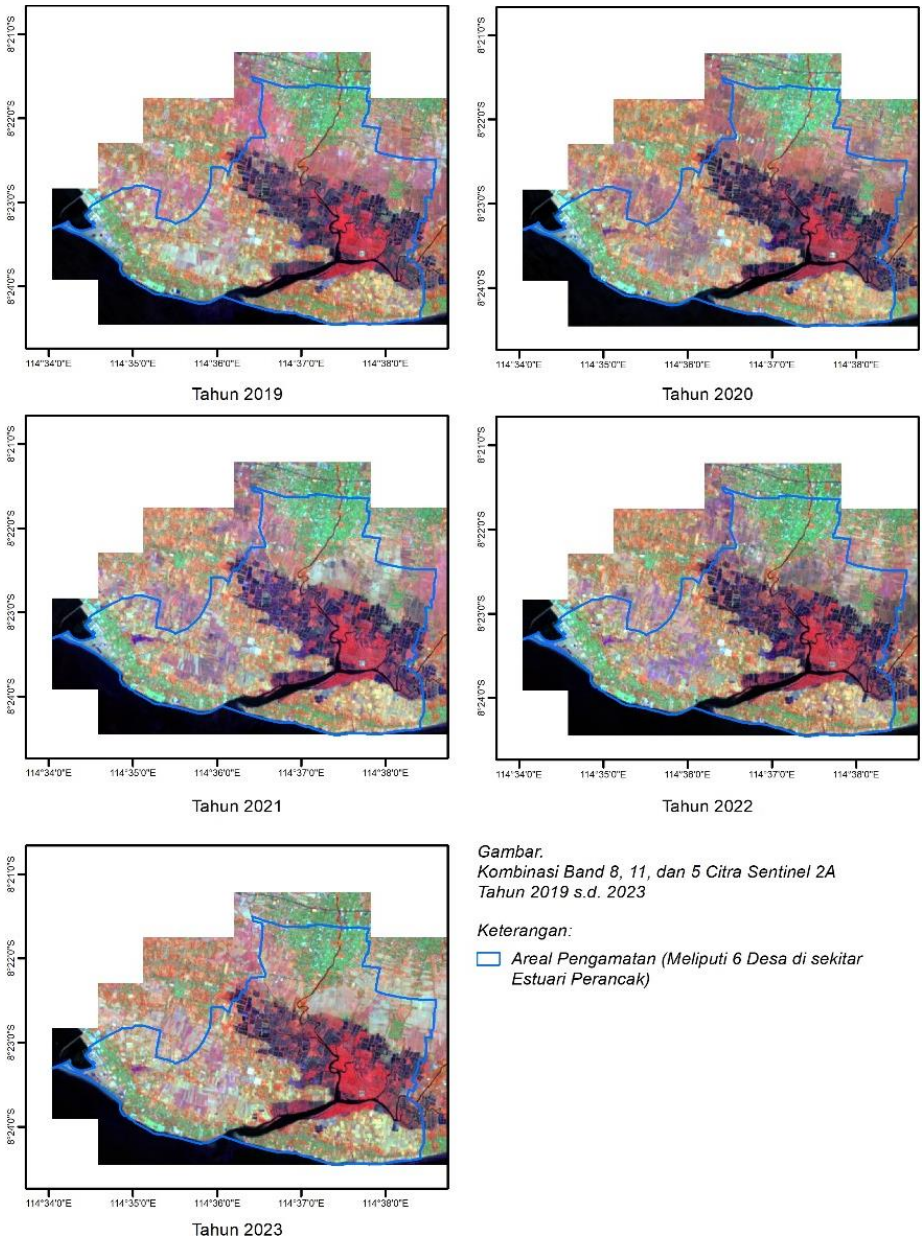

Figure 5. Band 8, 11, and 5 Citra Sentinel 2A 2019 to 2023

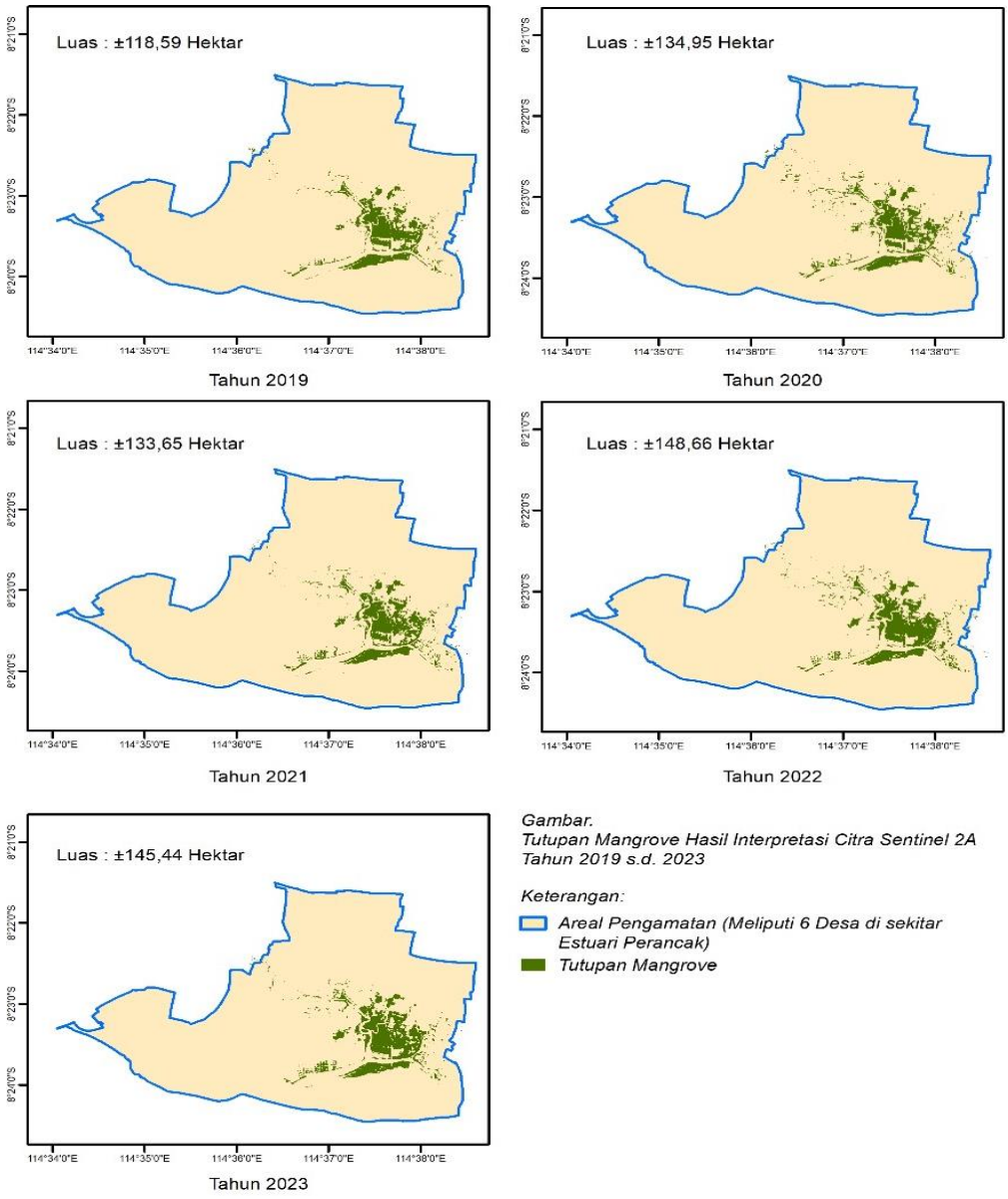

Figure 6. Mangrove Cover from Interplantation of Sentinel 2 A Imagery from 2019 to 2023

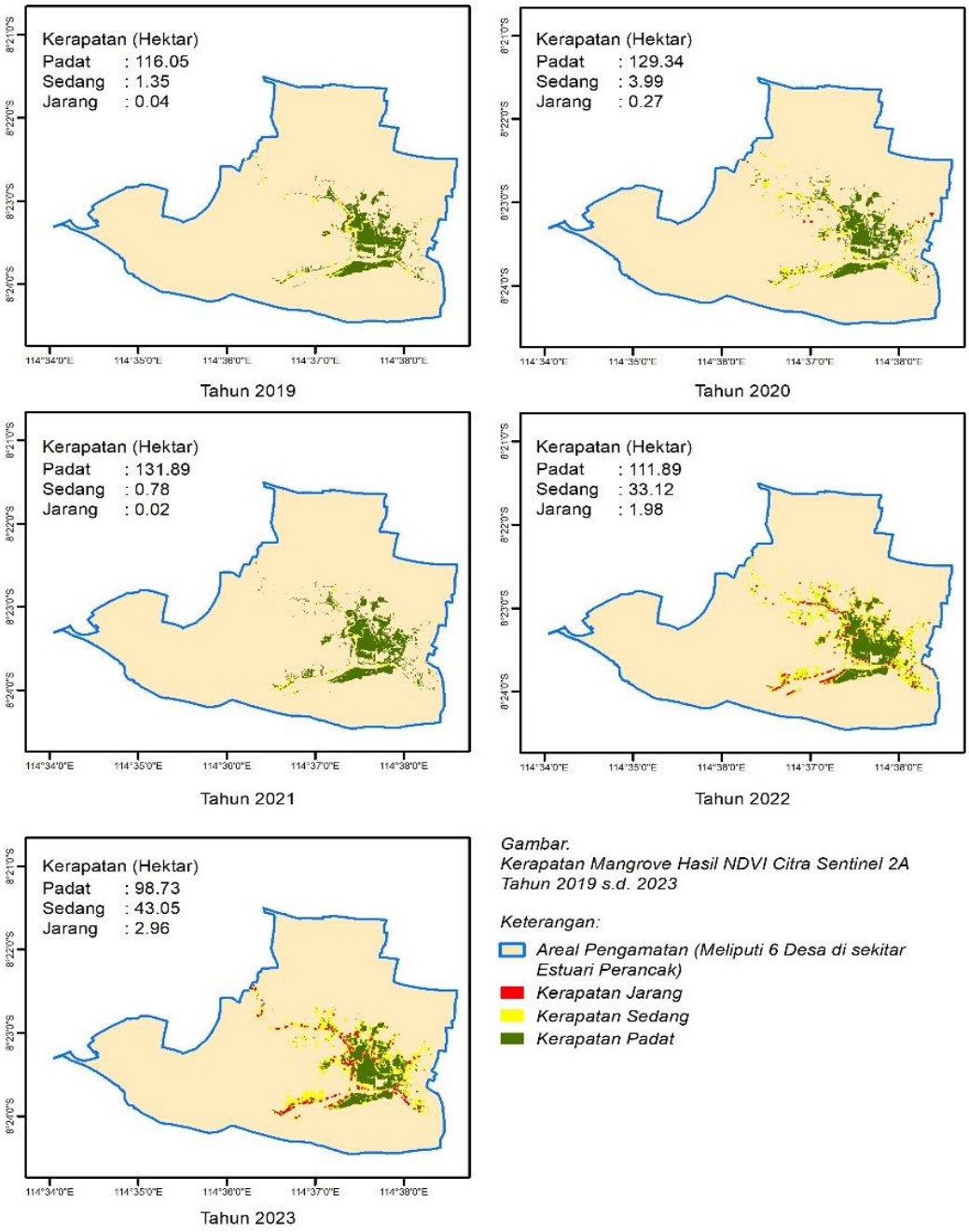

Figure 7. Mangrove Density Results NDVI Cita Sentinel 2A 2019 to 2023

CONCLUSIONS AND RECOMMENDATIONS

Mangrove Density Development 2019 to 2023

Mangrove density grew between 2019 and 2023, growing from 118.59 total acres to 145.44 in 2023. as seen in the following table.

Table 1. Mangrove Density Development 2019 to 2023

Density					
	2019	2020	2021	2022	2023
Congested	116,05	129,34	131,89	111,89	98,73
Currently	1,35	3,99	0,78	33,12	43,05
Currently	0,04	0,27	0,02	1,98	2,96
Total Area	118,59	134,95	133,65	148,66	145,44

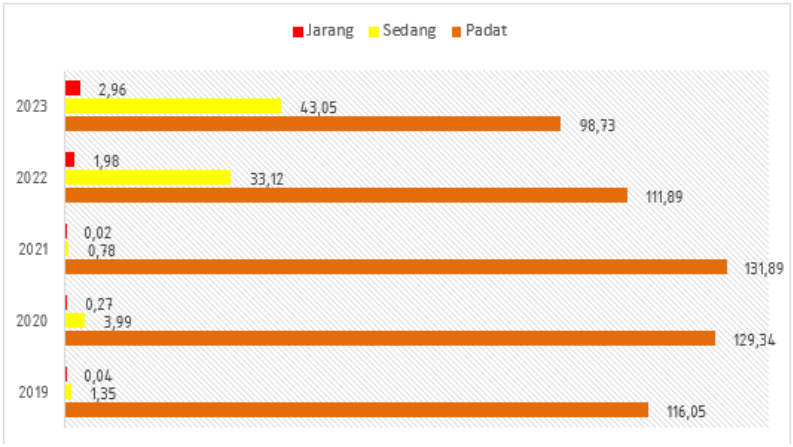

Figure 8. Mangrove Density Development Graph 2019 to 2023

Area Development 2019 to 2023

According to the table below, the overall development area of mangrove forests has grown from 118.59 Ha in 2019 to 145.44 Ha

Table 2. Area Development 2019 to 2023

Total Area (Ha)	Year				
	2019	2020	2021	2022	2023
	118,59	134,95	133,65	148,66	145,44

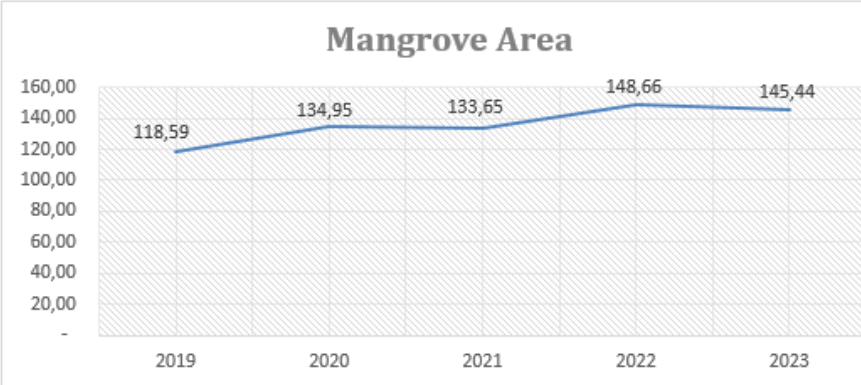

Figure 9. Mangrove Area Development Graph 2019 to 2023

FURTHER STUDY

Further research on the Potential for Development of Seaweed Cultivation Business Post Covid-19 Post in the Marine Area is required to improve this study and broaden readers' understanding because it still has limitations.

ACKNOWLEDGMENT

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