

**ASSESSMENT OF FLOOD MITIGATION STRATEGY BASED
ON INTEGRATED APPROACH OF REMOTE SENSING AND
COASTAL VULNERABILITY GEOSPATIAL MODELING AT
THE COASTAL PLAIN OF SURINAME**



THESIS

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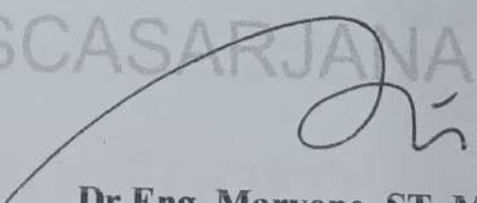
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DECLARATION

I, Esagu John Calvin here by certify that this work entitled as Assessment Of Flood Mitigation Strategy Based On Integrated Approach Of Remote Sensing And Coastal Vulnerability Geospatial Modeling At The Coastal Plain Of Suriname is truly an original work that I made myself and as a scientific work this thesis has never been submitted in any university or tertiary institution except asa fulfillment of the requirements to obtain a master degree (S-2) at Diponegoro University. To the best of my knowledge and belief, it does not include any previously published or written works by any other authors, except where due reference has been made in the text. Additionally, I certify that no portion of this work will ever again be used without the prior consent of Diponegoro Universityand, as applicable, any partner institution responsible for the joint awarding of this degree in my name for any other degree or diploma at any university or tertiary institution. If at a later date it is found that all or part of this thesis is not a result ofmy own work or plagiarism in certain parts, I agree to received the sanction of revocation of the academic degree that I hold and other sanctions in accordance with the applicable laws and regulations.

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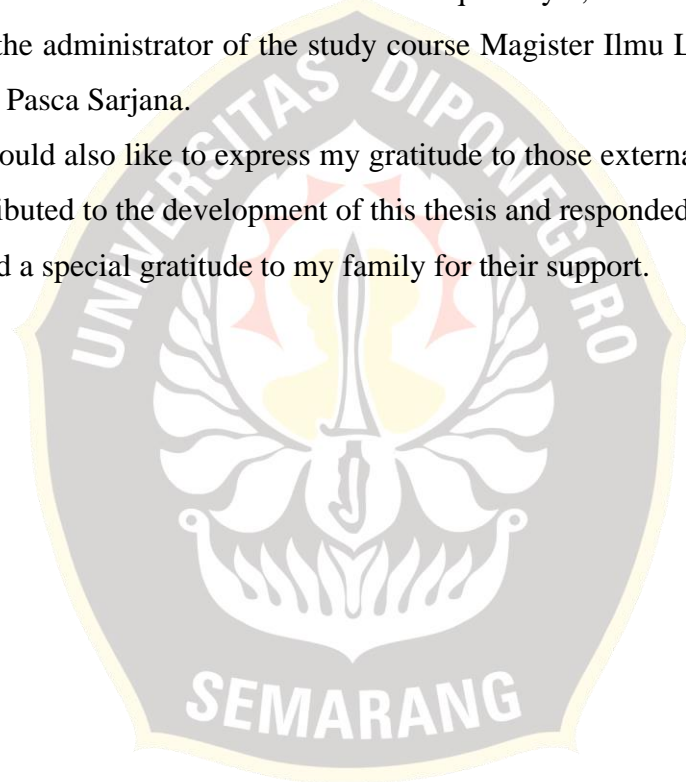
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ABSTRACT

Suriname is a small South American nation that relies heavily on its natural resources for economic growth. . The country's coastal plain is vulnerable to sediment exchange and erosion, but the presence of mud banks and rehabilitated mangrove habitats zoning for conservation provide some protection. Paramaribo, the capital of Suriname, has the highest population density, and its demographics extend into the surrounding districts of Wanica, Saramacca, and Commewijne. Suriname has experienced flood disasters almost annually, which has exacerbated in recent years, posing a significant socio-economic challenge. The country must balance the need for flood disaster adaptation and climate resilience with the potential impact on its resources and well-being of settlement areas. Policymakers and other stakeholders are working to address environmental impacts on the coast, but there is still a need for a comprehensive approach to monitor and manage flood impacts. This research has three objectives. The first objective is to analyze flood frequency events from 2021 to 2023 using multi-temporal satellite image processing from Sentinel-1 SAR (Synthetic Aperture Radar). The second objective is to generate a Coastal Flood Vulnerability Index (CFVI) for floods using a geospatial multi-criteria analysis approach based on exposure, sensitivity, and adaptive capacity components. The third objective is to assess the mitigation strategy for floods in settlement areas based on an integrated analysis of CFVI and stakeholder perception. This is a case - and field research methodology that uses a multi-criteria analysis regarding settlement areas and ranks by expert opinion CFVI in an equation derived from IPCC assessment report the vulnerability index equation for each district. The CFVI indices rely on secondary data acquisitioned from national and global datasets or referenced works. Interviews were conducted to better understand the stakeholder's perspectives that are at a strategic or governing level, and to evaluate the existence of flood early warning and other adaptation capabilities. A flood mitigation strategy is then suggested for the most - and second most vulnerable district by CFVI score.

Keywords: Suriname, Coastal flood, Vulnerability index, Settlement area, Mitigation Strategy, Flood frequency.

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