

**MODEL DINAMIKA HIDROLOGI HUTAN  
DAERAH TANGKAPAN AIR SUNGAI RENDANI  
DI KABUPATEN MANOKWARI PROVINSI PAPUA BARAT**

**Disertasi**

**Untuk memenuhi sebagian persyaratan  
mencapai gelar Doktor pada  
Program Studi Doktor Ilmu Kehutanan**



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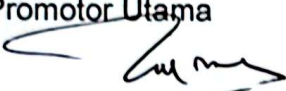
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## ABSTRACT

**Bernadetta Margaretha Gunarsih Sadsoeitoeboen.** Forest Hydrological Dynamics Model of Rendani River Catchment Area in Manokwari Regency, West Papua Province (Supervised by Marlon I. Aipassa, Sumaryono and Y. Budi Sulistioadi)

Rendani River Catchment Area (DTA) is located in the Wosi Rendani. It was a protected area for the city of Manokwari, but since 2014 its status has formally changed into non forest area. This catchment consists of one main river with 6,263 meters length with 7 tributaries that serve as the water sources used by the Manokwari Regional Water Company (PDAM) in providing the water for the people of Manokwari, especially those living around the municipal area. The forest areas in this catchment is currently under threat due to opening of land for settlements and other infrastructures. This development causes a disruption to the balance of the hydrological system which obviously has an impact on the quantity and quality of water. This study determined the hydrological conditions of the Rendani River Catchment, formed and analysed a dynamic model to identify the balance of such hydrological system and developed necessary steps for managing and maintaining the hydrological functions of the area. This research used a mathematical method to determine hydrological conditions, as well as developed a model using Stella 9.02 software to form 3 sub-models (forest hydrology dynamics, cover change, and water consumption). Model simulations were performed for the duration of 20 years (2018 to 2038) and the management strategies was constructed using SWOT analysis. The results of model simulation on the variations of the intensity of forest and land rehabilitation activities (RHL) on the target land from 0 to 100%, indicated a gradual increase of the average discharge starting from 1 m<sup>3</sup>/year until it settled at 0.57 m<sup>3</sup>/sec at 100% rehabilitation intensity. The land utilization based on the changes in the coefficient of annual land utilization level from 10 to 100%, caused a decrease in the land-availability up to less than 50%. To maintain the land cover level above 50%, the land utilization should be limited to the annual rate of <10%. The results of the SWOT analysis indicated that conservation of the Rendani River catchment and the management of the Rendani River water resources by involving the community owners of communal rights and communities around the Rendani River catchment are required to maintain its hydrological functions.

***Keywords: land cover, land utilization, forest and land rehabilitation***