ABSTRACT

Baseline and Future Hydrologic Response Assessment of the Cavite River Basin Using Proxy Streamflow Data for SWAT Model Calibration and Scenario Analysis

Ivan Michael Basco Gabriel   **Adviser:**
MS Environmental Science   **Mayzonee V. Ligaray, Ph.D.**

Hydrologic modeling is crucial for effective water resource management, particularly in data-scarce regions where the absence of discharge data hinders accurate model calibration and validation. The Cavite River Basin, which consists of seven ungauged watersheds—Zapote River, Imus River, Rio Grande River, Timalan River, Labac-Alemang River, Cañas River, and Maragondon River—plays a significant role in drainage towards Manila Bay, influencing flood dynamics in coastal and low-lying areas. However, the lack of streamflow records limits efforts to assess hydrologic behavior and flood risks in the region. This study aims to develop and evaluate SWAT models for these watersheds using the GEOGloWS Global Streamflow Forecasting Service as proxy discharge data. After calibration and validation, the models will be used to analyze the hydrologic response of the basin under projected land use/land cover (LULC) and climate change scenarios for the year 2050. LULC projections will be generated using GeoSOS-FLUS, while climate change data will be sourced from the CMIP6-based Climate Change Projections of DOST-PAGASA. By integrating these future scenarios, this study will provide insights into potential changes in streamflow, runoff, and water availability in Cavite, an area increasingly affected by urbanization, flooding, and extreme weather events. The findings will support flood risk management and long-term water resource planning, demonstrating the applicability of global datasets and modeling approaches in discharge-limited watersheds.

Keywords: Hydrologic modeling, SWAT, global gridded datasets, ungauged watersheds