ABSTRACT

Estimation of land cover change impacts on the water balance components of the Pampanga River Basin using gridded meteorological datasets in SWAT

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Understanding and quantifying water resource availability is essential in the management of water resources in both macro and micro-scale settings. Humans heavily depend on water resources such that the exponential growth of the human population results in an increasing demand for the usage of these resources. However, the impacts of human population growth on water resources are not limited to water supplies and demands. Manifestations of this population growth, especially land-use/land cover changes (LULCC), also exacerbate water stress and were proven to affect watershed hydrology in various studies. Thus, understanding the impact of LULCC on watershed water resources is vital for local water management.

The impacts of LULCC on watersheds could be understood by using hydrological models, especially the Soil and Water Assessment Tool (SWAT). SWAT requires datasets such as digital elevation models (DEM), LULC maps, soil type, and meteorological parameters to simulate watershed hydrology. However, in the Philippines, some watersheds lack enough ground-based meteorological data to be used for modeling, especially those that are situated in principal river basins. Hence, this study proposes to use global gridded datasets limited to the Global Precipitation Measurement (GPM), Tropical Rainfall Measurement Mission (TRRM), and the Global Land Data Assimilation System (GLDAS) as alternative inputs to perform SWAT simulations. The output using these datasets will be compared to SWAT simulations performed using ground-based meteorological data from the Philippine Atmospheric, Geophysical, and Astronomical Services Administration (PAGASA) to reveal the usage applicability of these gridded datasets for modeling Philippine watersheds.

Keywords: *SWAT, gridded meteorological datasets, LULCC, Pampanga River Basin*