

## **Modeling of Sediment Yield and Streamflow of Watershed Basin in the Philippines Using the Soil Water Assessment Tool Model for Watershed Sustainability**

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**Abstract :** Sedimentation is a significant threat to the sustainability of reservoirs and their watershed. In the Philippines, the Pulangi watershed experienced a high sediment loss mainly due to land conversions and plantations that showed critical erosion rates beyond the tolerable limit of -10 ton/ha/yr in all of its sub-basin. From this event, the prediction of runoff volume and sediment yield is essential to examine using the country's soil conservation techniques realistically. In this research, the Pulangi watershed was modeled using the soil water assessment tool (SWAT) to predict its watershed basin's annual runoff and sediment yield. For the calibration and validation of the model, the SWAT-CUP was utilized. The model was calibrated with monthly discharge data for 1990-1993 and validated for 1994-1997. Simultaneously, the sediment yield was calibrated in 2014 and validated in 2015 because of limited observed datasets. Uncertainty analysis and calculation of efficiency indexes were accomplished through the SUFI-2 algorithm. According to the coefficient of determination ( $R^2$ ), Nash Sutcliffe efficiency (NSE), King-Gupta efficiency (KGE), and PBIAS, the calculation of streamflow indicates a good performance for both calibration and validation periods while the sediment yield resulted in a satisfactory performance for both calibration and validation. Therefore, this study was able to identify the most critical sub-basin and severe needs of soil conservation. Furthermore, this study will provide baseline information to prevent floods and landslides and serve as a useful reference for land-use policies and watershed management and sustainability in the Pulangi watershed.

**Keywords :** Pulangi watershed, sediment yield, streamflow, SWAT model

**Conference Title :** ICSCECSE 2021 : International Conference on Sustainability in Civil, Environmental, Construction and Structural Engineering

**Conference Location :** Tokyo, Japan

**Conference Dates :** April 22-23, 2021