

**PREDIKSI LAJU EROSI TANAH MENGGUNAKAN
ANALISIS SOIL AND WATER ASSESSMENT TOOL (SWAT)
DI SUB DAS DENGKENG, BENGAWAN SOLO,
JAWA TENGAH**

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ABSTRAK

Menurut Dinas PSDA Provinsi Jawa Tengah Tahun 2009 Sub DAS Dengkeng, yang merupakan bagian dari DAS Bengawan Solo di Jawa Tengah masuk dalam kategori kritis. Kondisi ini menunjukkan terjadinya degradasi lahan di Sub DAS Dengkeng akibat berkurangnya vegetasi dan pengelolaan lahan yang tidak baik. Penelitian ini bertujuan untuk memprediksi laju erosi menggunakan model *Soil and Water Assessment Tool* (SWAT); menyusun peta distribusi erosi; dan memverifikasi hasil prediksi SWAT dengan metode *Universal Soil Loss Equation* (USLE). Data penelitian meliputi peta kemiringan lereng, peta penggunaan lahan, peta jenis tanah, data iklim, dan data hidrologi Sub DAS Dengkeng. Dua belas titik sampel ditentukan berdasarkan hasil *overlay* penggunaan lahan, jenis tanah, dan kemiringan lereng. Penentuan laju erosi dari SWAT menggunakan nilai *sediment yield*, menghasilkan kisaran nilai erosi 0-1396,309 ton/ha/tahun. Hasil kalibrasi diperoleh nilai Koefisien Determinasi (R^2) = 0,67 yang menunjukkan hubungan cukup kuat dan hasil validasi *Nash Sutchcliffe Efficiency* (NSE) = 0,32 yang menunjukkan model tidak memuaskan. Peta distribusi spasial hasil SWAT menunjukkan bahwa bagian hulu dan tengah Sub DAS Dengkeng mengalami erosi sedang hingga sangat berat, sedangkan bagian hilir didominasi oleh erosi ringan hingga sangat ringan. Verifikasi menunjukkan nilai Korelasi Spearman (r_s) = 0,483 dengan kategori sedang, sehingga model SWAT dapat digunakan sebagai alat pendugaan erosi di wilayah Sub DAS Dengkeng.

Kata Kunci: Bengawan Solo, erosi, Sub DAS Dengkeng, SWAT, USLE

SOIL EROSION RATE PREDICTION USING SOIL AND WATER ASSESSMENT TOOL (SWAT) ANALYSIS IN DENGKENG SUB BASIN, BENGAWAN SOLO, CENTRAL JAVA

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ABSTRACT

According to the Central Java Provincial PSDA Office in 2009, the Dengkeng Subwatershed, which is part of the Bengawan Solo Watershed in Central Java, is classified as critical. This condition indicates land degradation in the Dengkeng sub watershed due to reduced vegetation and poor land management. This study aims to predict erosion rates using the Soil and Water Assessment Tool (SWAT) model; compile erosion distribution maps; and verify SWAT predictions using the Universal Soil Loss Equation (USLE) method. The research data included slope maps, land use maps, soil type maps, climate data, and hydrological data for the Dengkeng Subwatershed. Twelve sampling points were determined based on the results of overlaying land use, soil type, and slope. The erosion rate was determined from SWAT using sediment yield values, resulting in an erosion range of 0-1396,309 tons/ha/year. The calibration results obtained a Coefficient of Determination (R^2) value of 0,67, indicating a fairly strong relationship, and a validation result Nash Sutchliffe Efficiency (NSE) = 0,32, indicating that the model was unsatisfactory. The spatial distribution map of the SWAT results shows that the upper and middle parts of the Dengkeng Subwatershed experience moderate to very severe erosion, while the lower part is dominated by light to very light erosion. Verification shows a Spearman correlation coefficient (r_s) = 0,483 with a moderate category, indicating that the SWAT model can be used as an erosion estimation tool in the Dengkeng Subwatershed area.

Keywords: Bengawan Solo, erosion, Dengkeng Subwatershed, SWAT, USLE