

**ANALISIS TINGKAT BAHAYA EROSI DAS AIR
DINGIN DALAM PENENTUAN AREA
KONSERVASI MENGGUNAKAN MODEL SWAT**

BETRAND FEBRIAN JASTA
2111111013



Dosen Pembimbing:

- 1. Fadli Irsyad, S.TP, M.Si, Ph.D**
- 2. Ir. Ayendra Asmuti, M.Si**

**FAKULTAS TEKNOLOGI PERTANIAN
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Betrand Febrian Jasta, Fadli Irsyad, Ayendra Asmuti

ABSTRAK

Daerah Aliran Sungai (DAS) Air Dingin di Kota Padang mengalami perubahan penggunaan lahan akibat meningkatnya aktivitas manusia dan pertumbuhan penduduk yang pesat. Kondisi tersebut menyebabkan tekanan terhadap lingkungan DAS, sehingga dapat meningkatkan laju erosi dan kerusakan fungsi hidrologis DAS. Penelitian ini bertujuan untuk menganalisis tingkat bahaya erosi dengan menggunakan model *Soil and Water Assessment Tool* (SWAT) sebagai acuan dalam penentuan area konservasi lahan dalam pengendalian erosi di DAS Air Dingin. Penelitian menggunakan Model SWAT yang dalam prosesnya ada 5 tahap yaitu deliniasi, pembentukan HRU, simulasi, kalibrasi dan validasi. Hasil kalibrasi menunjukkan nilai *Nash-Sutcliffe Efficiency* (NSE) sebesar 0,56 dan nilai NSE validasi yaitu 0,58, serta koefisien determinasi (R^2) kalibrasi sebesar 0,56 dan R^2 validasi sebesar 0,60, yang tergolong dalam kategori memuaskan. Hasil simulasi menunjukkan bahwa persentase wilayah dengan tingkat erosi sangat berat 3,45%, berat 4,48%, sedang 5,15%, ringan 53,96% dan sangat ringan 32,96%. Konservasi diprioritaskan pada area dengan tingkat erosi berat dan sangat berat yang didominasi dengan penggunaan lahan semak belukar, lahan pertanian kering dan sawah. Area ini berada di sub DAS Koto Tuo, Sungai Latung, Muaro Panjalinan dan Batang Air Dingin. Upaya konservasi yang disarankan yaitu penerapan teknik konservasi mekanik berupa bangunan penahan tanah seperti guludan dan terasering serta tindakan konservasi vegetatif berupa agroforestri, penanaman vegetasi berakar kuat dan penggunaan mulsa mengurangi limpasan dan laju erosi secara signifikan.

Kata Kunci: Daerah Aliran Sungai; erosi; kalibrasi; konservasi; NSE

ANALYSIS OF EROSION HAZARD LEVELS IN THE AIR DINGIN WATERSHED FOR CONSERVATION AREA DETERMINATION USING THE SWAT MODEL

Betrand Febrian Jasta, Fadli Irsyad, Ayendra Asmuti

ABSTRACT

The Air Dingin Watershed (DAS) in Padang City has experienced changes in land use due to increasing human activities and rapid population growth. These conditions cause pressure on the watershed environment, thereby increasing the rate of erosion and damage to the hydrological function of the watershed. This study aims to analyze the level of erosion hazard using the Soil and Water Assessment Tool (SWAT) model as a reference in determining land conservation areas for erosion control in the Air Dingin Watershed. The study used the SWAT Model, which in its process has 5 stages, namely delineation, HRU formation, simulation, calibration, and validation. The calibration results show a Nash-Sutcliffe Efficiency (NSE) value of 0.56 and a validation NSE value of 0.58, as well as a calibration coefficient of determination (R^2) of 0.56 and a validation R^2 of 0.60, which are classified as satisfactory. The simulation results show that the percentage of areas with very severe erosion levels is 3.45%, severe 4.48%, moderate 5.15%, light 53.96% and very light 32.96%. Conservation is prioritized in areas with high and very high levels of erosion, dominated by scrubland, dryland, and rice fields. These areas are located in the Koto Tuo, Latung River, Muaro Panjalinan, and Batang Air Dingin sub-watersheds. Recommended conservation efforts include the application of mechanical conservation techniques in the form of soil retaining structures such as ridges and terracing, as well as vegetative conservation measures such as agroforestry, planting of strong-rooted vegetation, and the use of mulch to significantly reduce runoff and erosion rates.

Key word: Watershed; erosion; calibration; conservation; NSE