



## INTISARI

Faktor utama penyebab turunnya kapasitas waduk di Indonesia adalah tingginya laju sedimentasi, yang pada akhirnya menyebabkan terganggunya fungsi waduk. Penelitian ini bertujuan untuk memperkirakan umur guna Waduk Logung menggunakan pendekatan erosi lahan dan hasil sedimen. Erosi lahan dihitung berdasarkan model erosi *Revised Universal Soil Loss Equation* (RUSLE) dengan integrasi Sistem Informasi Geografis (SIG) berbasis *grid*, sedangkan hasil sedimen diperkirakan menggunakan pendekatan angkutan sedimen di sungai. Analisis *Sediment Delivery Ratio* (SDR) menghasilkan laju sedimen yang masuk ke waduk. Umur guna waduk diprediksi menggunakan metode *dead storage* yaitu hubungan *trap efficiency*, volume sedimen waduk, dan pemadatan sedimen. Mitigasi pengendalian sedimentasi dilakukan dengan melihat signifikansi beberapa skenario terhadap penambahan umur guna waduk. Skenario-skenario tersebut meliputi pembangunan cekdam sebanyak 9 buah, pengaturan tata guna lahan, dan kombinasi keduanya, masing-masing dalam kurun waktu 5 tahun. Hasil penelitian menunjukkan bahwa besarnya laju erosi lahan pada DTA Waduk Logung sebesar 23,36 mm/tahun. Hasil sedimen pada DTA Waduk Logung diketahui sebesar 163.929 m<sup>3</sup>/tahun, dengan nilai *SDR* pada DTA Waduk Logung sebesar 0,154. Umur guna Waduk Logung diprediksi mampu bertahan sampai pada tahun ke-43. Adanya pengendalian sedimentasi memiliki signifikansi yang berbeda-beda. Pembangunan cekdam hanya dapat menambah umur guna waduk selama 2 tahun, sedangkan apabila pembangunan cekdam disertai dengan adanya penambangan bahan galian C, maka umur guna waduk menjadi lebih lama 10 tahun. Pengaturan tata guna lahan dengan tingkat keberhasilan 100% dan kombinasi pengaturan tata guna lahan dengan cekdam (penambangan bahan galian C), masing-masing mampu memperpanjang umur guna waduk selama 21 tahun dan 45 tahun.

**Kata kunci:** erosi, sedimentasi, umur guna waduk, mitigasi.



## ABSTRACT

The main factor causing the capacity declining of reservoirs in Indonesia is the high rate of sedimentation, which is, in turn, causes the reservoir's functions disturbance. This study aims to estimate the useful life of Logung Reservoir using the approach of the soil erosion and the sediment yield. The soil erosion was calculated based on the Revised Universal Soil Loss Equation (RUSLE) erosion model with grid-based integration of Geographic Information Systems (GIS), while the sediment yield was estimated using the sediment transport approach in the river. Analysis of Sediment Delivery Ratio (*SDR*) was the results of the rate of sediment entering the reservoir. The useful life of the reservoir was predicted using the dead storage method which was the relationship of trap efficiency, volume of reservoir sediment, and sediment compaction. Mitigation of sedimentation control was carried out by looking at the significance of several scenarios for increasing the useful life of the reservoir. These scenarios include the construction of 9 check dams, land use arrangements, and a combination of both, within 5 years. The results showed that the soil erosion rate in the Logung Reservoir catchment area is 23.36 mm/year. The sediment yield in the Logung Reservoir catchment area is 163,929 m<sup>3</sup>/year and the *SDR* is 0.154. The useful life of the Logung Reservoir was predicted to survive until the 43<sup>rd</sup> year. The simulation result of sedimentation control has a different significance. The check dam construction can only increase the useful life of the reservoir for 2 years, since if the check dam was built along with the mining of C mineral, the useful life of Logung Reservoir will be 10 years longer. Land use arrangements with a success rate of 100% and a combination of land use arrangements and check dam (mining of C mineral), each of the methods can increase the useful life of the reservoir for 21 years and 45 years.

**Keywords:** erosion, sedimentation, the useful life of the reservoir, mitigation.