Prediksi laju erosi potensial dan laju timbulan sampah potensial berbasis luasan penutup lahan kedap air menggunakan sistem informasi geografis (SIG) (studi kasus DAS Ciliwung) = Prediction of potential erosion rate and potential waste generation rate based on impervious land cover using geographic information system gis (case study Ciliwung watershed)

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Abstrak

Permasalahan lingkungan seperti perubahan kawasan menyerap air menjadi lahan kedap air, erosi tanah dan timbulan sampah yang meningkat akan memberikan dampak negatif terhadap fungsi hidrologis DAS Ciliwung (Degradasi DAS Ciliwung). Untuk mewujudkan perencanaan dan pengelolaan penggunaan lahan yang berpedoman pada keseimbangan lingkungan (DAS Ciliwung yang sehat) maka diperlukan pengendalian terhadap erosi, timbulan sampah dan luasan lahan kedap air. Metode-metode perhitungan laju erosi & laju timbulan sampah yang ada memerlukan proses yang panjang dan membutuhkan berbagai jenis data.

Penelitian ini bertujuan untuk membuat persamaan matematis yang praktis dan relatif akurat dalam memprediksi laju erosi & laju timbulan sampah berbasis luasan lahan kedap air (impervious cover) di DAS Ciliwung. Pemodelan dilakukan dengan software sistem informasi geografis ArcGis Versi 10.1 Lisensi Departemen Geografi FMIPA Universitas Indonesia.

Perhitungan laju erosi menggunakan metode USLE dan laju timbulan sampah menggunakan proyeksi laju timbulan sampah berdasarkan data kepadatan penduduk & laju timbulan sampah per orang per hari sedangkan perhitungan luasan lahan kedap air menggunakan aplikasi ArcGis 10.1. Analisa korelasi antar variabel dalam penelitian ini dilakukan dengan menggunakan analisis regresi dan korelasi antar variabel.

Kesimpulan dari penelitian ini adalah terdapat hubungan yang sangat kuat antara luas lahan kedap air dengan nilai laju erosi potensial & nilai laju timbulan sampah potensial, persamaan matematis yang mewakili adalah persamaan regresi non linier eksponensial masing-masing sebagai berikut Y=6892 e-0,07x dengan nilai koefisien determinasi (R2) = 0,936 dan Y=53,30 e 0,090x dengan nilai koefisien determinasi (R2) = 0,868.

.....Environmental problems such as changes in the pervious area becomes impervious, soil erosion and increased waste generation will have negative impacts on hydrological functions of Ciliwung Watershed. To carry out the planning and management of land use based on the balance of the environment (healthy Ciliwung watershed) it is necessary to control erosion, waste generation and impervious cover.

Methods for computation the rate of erosion and waste generation requires a long process and various types of data. This research aims to create mathematical equation that are practical and relatively accurate in predicting of erosion rate and waste generation rate based on impervious land cover on Ciliwung Watershed. Modeling using ArcGIS software version 10.1 License Department of Geography FMIPA University of Indonesia.

Computation of erosion rate using USLE method and waste generation rate using projected based on data density of population and the rate of waste generation per person per day, while computation of impervious

land cover area is based on application of ArcGIS 10.1. Analysing correlation between variable in this research was conducted by using regression and correlation analysis.

The conclusion of this research is that there is a very strong relationship between impervious land cover area and the value of potential erosion rate and potential waste generation rate as well. The mathematical equation that represent the relation are exponential non linear regression equations as the following : Y = 6892 * e-0,07x with coefficient of determination (R2) = 0,936 for relation between impervious land cover area and potential erosion rate; and Y = 53.30*e 0,090x with coefficient of determination (R2) = 0.868 for relation between impervious land cover area and potential waste generation rate.