# INTISARI

Penelitian Dinamika Simpanan Karbon Organik Tanah ini dilaksanakan di DAS Girindulu karena berdasarkan hasil pra-observasi lapangan menunjukkan bahwa sebagian besar DAS Girindulu telah mengalami degradasi lahan akibat erosi, menyebabkan tanah lapisan atas dan karbon organik tanah terkikis, lalu ditraslokasi dan dideposisi ke tubuh Sungai Girindulu. Tujuan penelitian: (1) membuat model prediksi kehilangan tanah akibat erosi, (2) membuat model prediksi kehilangan karbon organik tanah akibat erosi, (3) mengkaji besarnya kehilangan tanah akibat erosi, (4) mengkaji besarnya karbon organik tanah yang hilang akibat erosi, (5) mengkaji besarnya simpanan karbon organik tanah.

Populasi dalam penelitian ini adalah seluruh satuan bentuklahan dan sungai di dalam DAS Girindulu. Sampel penelitian adalah sungai dan satuan bentuklahan yang representatif mewakili karakteristik populasi atas dasar kesamaan faktor genetik bentuklahan, formasi geologi, proses dan tingkat proses geomorfik. Pengumpulan data melalui Survei tanah dengan teknik sampling *purposive sampling*, plot sedimen erosi ditentukan berdasarkan variasi lereng dan kondisi lahan yang masih asli, dan analisis laboratorium. Data yang dikumpulkan adalah karakteristik tanah, lahan dan iklim terkait erosi tanah, simpanan dan kehilangan karbon organik tanah. Penyusunan model prediksi kehilangan tanah dan karbon organik tanah dianalisis secara kuantitatif melalui uji statistik (regresi), validasi model menggunakan uji-t. Dinamika simpanan karbon organik tanah dianalisis secara kualitatif dengan cara mendeskripsikan hasil prediksi simpanan karbon organik tanah, dengan kehilangan tanah dan karbon organik tanah, serta sedimen dan karbon sedimen sungai.

Hasil penelitian menunjukkan bahwa DAS Girindulu seluas 73.703,75 ha, dengan menggunakan persamaan model Regresi Girindulu (RG), terjadi erosi tanah sebesar 134,06 ton/ha/tahun setara 9.880.934,73 ton/tahun, dengan menggunakan persamaan model Regresi Sederhana Girindulu (RSG), terjadi kehilangan karbon organik tanah sebesar 2,08 ton/ha/tahun setara 153.120,22 ton/tahun, mempunyai simpanan karbon organik tanah sebesar 93,88 ton/ha setara 6.919.377,98 ton/DAS. Dinamika simpanan karbon organik tanah dipengaruhi oleh proses erosi berupa penghilangan ataupun penambahan karbon organik tanah. Kehilangan tanah dan karbon organik tanah dipengaruhi oleh ketersediaan pool C pada bentuklahan, kondisi iklim (curah hujan), kondisi geomorfologi (adanya sesar, panjang dan kemiringan lereng), karakteristik tanah (tekstur dan bahan organik), dan aktivitas manusia dalam mengelola lahan pertanian. Morfologi lahan mempengaruhi degradasi tanah dan degradasi karbon (C) dari pool karbon (C) melalui daya gerus dan daya angkut aliran permukaan, yang mana kekuatannya menurun seiring dengan bertambahnya panjang dan mengecilnya sudut lereng. Proses penggerusan dan pengangkutan tanah dan karbon organik tanah oleh aliran permukaan dipengaruhi oleh faktor bentuklahan, sifat tanah dan aktivitas manusia. Tindakan konservasi tanah yang dilakukan yaitu: penanaman kembali pohon (reboisasi) pada lahan kurang produktif, pembenaman residu pertanian, pemberian mulsa dengan serasah tumbuhan, pembuatan teras bangku, dan penggunaan pupuk organik pada lahan pertanian.

**Kata Kunci: model prediksi erosi, kehilangan tanah, kehilangan karbon organik tanah, simpanan karbon organik tanah, daerah aliran sungai**

# *ABSTRACT*

*Research Dynamics of Soil Organic Carbon Storage are implemented in Girindulu watershed because based on the pre-observation shows that most of Girindulu watershed degraded land due to erosion, causing topsoil and soil organic carbon eroded, transported and deposited into the Girindulu River body. This research was conducted in Girindulu watershed, Pacitan regency. The research aims to:1) create a predictive model of soil loss due to erosion, 2) create a predictive model of soil organic carbon loss prediction due to erosion, 3) assess the extent of soil loss due to erosion, 4) assess the extent of soil organic carbon loss due to erosion, 5) assess the extent of soil organic carbon storage.*

*The population of research is all landform unit and rivers in the Girindulu watershed. The research sample is a unit of landform and rivers a representative to represent the characteristic of the population on the basis of similarity of genetic factors landforms, geological formations, the process and the level of geomorphic processes. Data collection through soil surveying with purposive sampling technique, sediment erosion plots determined by variations in slope and land pristine condition, and laboratory analysis. The data collected are: the characteristics of the soil, land and climate related soil erosion, deposite and soil organic carbon loss. Preparation of predictive models of soil loss and soil organik carbon loss were analized quantitatively through statistical test (regresion), model validation using t-test. The dynamics of soil organic carbon storage according to qualitative analyzed by description to results soil organic carbon storage prediction, with soil loss and soil organic carbon loss, sediment and carbon sediment in the river.*

*The result of research showed that the Girindulu watershed area of 73.703,75 ha, using a Girindulu regression model equations (RG), soil erosion amounted of 134,06 tons/ha/year equivalent 9.880.934,73 tons/year, using simple Girindulu regression model equations (RSG), loss of soil organic carbon of 2,08 tons/ha/year equivalent 153.120,22 tons/year, have soil organic carbon storage of 93,88 tons/ha equivalent 6.919.377,98 tons/watershed. The dynamics soil organic carbon storage affected by erosion processes such as the removal or addition of soil organic carbon. Lossing soil and soil organic carbon loss effected with pool C stock on landform, climate condition (rainfall), geomorphologycal condition (the presence of a geological fault, length slope and land slope), soil characteristics (texture and organic matter), and human activity of agricultural society management. The morphology of the land affects soil degradation and degradation of carbon (C) from the carbon (C) pool through the grinding power and haulage runoff, which strength decreases with increasing length and slope angle sags. The process of crushing and transport of soil and soil organic carbon by runoff is influenced by factors landform, soil characteristics and human activities. Soil conservation actions that is: the replanting of trees (reforestation) of marginal lands, immersion agricultural residues, mulching with organic matter from vegetation, patio bench, and using organic fertilizer on cultivated land.*

***Keywords: erosion prediction model, soil loss, soil organic carbon loss, soil organic carbon storage, watershed***