EFEKTIVITAS PENGENDALIAN EROSI BERDASARKAN USIA REKLAMASI DAN KERAPATAN VEGETASI DI AREA REKLAMASI TAMBANG BATUBARA PT SUPRABARI MAPANINDO MINERAL KALIMANTAN TENGAH

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INTISARI

Erosi merupakan salah satu tantangan utama dalam pengelolaan lahan reklamasi tambang, khususnya pada tahap awal revegetasi. Penelitian ini bertujuan untuk mengevaluasi efektivitas pengendalian erosi berdasarkan usia reklamasi dan kerapatan vegetasi di area reklamasi tambang batu bara PT Suprabari Mapanindo Mineral, Kalimantan Tengah. Pengukuran dilakukan pada tiga lokasi reklamasi dengan usia revegetasi yang berbeda, yaitu Plot 1 (reklamasi 2024), Plot 2 (reklamasi 2023), dan Plot 3 (reklamasi 2022). Metode yang digunakan meliputi model plot kecil berukuran 22 x 4 m untuk mengukur aliran permukaan *(direct runoff)* dan tingkat erosi. Analisis vegetasi untuk menilai kerapatan tutupan lahan dengan perangkat lunak *SeXI-FS* untuk tanaman pionir dan *line intercept* untuk tumbuhan bawah *(cover crops*), serta analisis regresi linier untuk mengevaluasi hubungan antara curah hujan, limpasan permukaan (*direct runoff*), dan tingkat erosi.

Hasil penelitian menunjukkan bahwa tingkat erosi berkurang secara signifikan seiring bertambahnya usia reklamasi dan kerapatan vegetasi. Tingkat erosi rata-rata tercatat sebesar 83,73 ton/ha pada Plot 1, 4,65 ton/ha pada Plot 2, dan 0,12 ton/ha pada Plot 3. Penurunan ini sejalan dengan peningkatan kerapatan tutupan vegetasi utama dan *cover crops*. Pada Plot 1, tutupan vegetasi utama hanya mencapai 6%, sedangkan *cover crops* 11%. Di Plot 2, tutupan vegetasi utama meningkat menjadi 34% dan *cover crops* mencapai 90%. Pada Plot 3, tutupan vegetasi utama mencapai 87% dengan cakupan *cover crops* sempurna sebesar 100%. Hasil penelitian menegaskan bahwa kombinasi *cover crops* dan vegetasi utama sangat efektif dalam mengurangi erosi dalam memperbaiki fungsi ekosistem lahan reklamasi. Strategi revegetasi yang terencana, terutama pada tahap awal reklamasi, terbukti mempercepat stabilisasi tanah dan mitigasi dampak hidrologi negatif. Temuan ini memberikan dasar ilmiah bagi pengelolaan reklamasi tambang yang berkelanjutan, sekaligus menjadi acuan untuk meningkatkan keberhasilan program reklamasi di wilayah tambang lainnya.

Kata kunci: Erosi, tutupan vegetasi, *cover crops*, reklamasi tambang, revegetasi

EFFECTIVENESS OF EROSION CONTROL BASED ON RECLAMATION AGE AND VEGETATION DENSITY IN THE COAL MINE RECLAMATION AREA OF PT SUPRABARI MAPANINDO MINERAL CENTRAL KALIMANTAN

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ABSTRACT

Erosion is one of the main challenges in managing reclaimed mining land, especially during the early stages of revegetation. This study aims to evaluate the effectiveness of erosion control based on the age of reclamation and vegetation density in the coal mining reclamation area of PT Suprabari Mapanindo Mineral, Central Kalimantan. Measurements were taken at three reclamation sites with different revegetation ages: Plot 1 (reclamation in 2024), Plot 2 (reclamation in 2023), and Plot 3 (reclamation in 2022). The methods used included a small plot model measuring 22 x 4 m to measure surface runoff (direct runoff) and erosion rates. Vegetation analysis was conducted to assess land cover density using SeXI-FS software for pioneer plants and line intercept for understory plants (cover crops), along with linear regression analysis to evaluate the relationship between rainfall, surface runoff (direct runoff), and erosion rates.

The results showed that erosion rates decreased significantly with increasing reclamation age and vegetation density. The average erosion rate was recorded at 83.73 tons/ha in Plot 1, 4.65 tons/ha in Plot 2, and 0.12 tons/ha in Plot 3. This decrease aligns with the increase in the density of primary vegetation cover and cover crops. In Plot 1, primary vegetation cover reached only 6%, while cover crops accounted for 11%. In Plot 2, primary vegetation cover increased to 34%, and cover crops reached 90%. In Plot 3, primary vegetation cover reached 87% with perfect cover crop coverage of 100%. The research results confirm that the combination of cover crops and main vegetation is highly effective in reducing erosion and improving the ecosystem function of reclaimed land. A planned revegetation strategy, especially during the early stages of reclamation, has proven to accelerate soil stabilization and mitigate negative hydrological impacts. These findings provide a scientific basis for sustainable mine reclamation management and serve as a reference for enhancing the success of reclamation programs in other mining areas.

Keywords: Erosion, vegetation cover, cover crops, mine reclamation, revegetation