

ABSTACT

Soil organic carbon stock is one of the most crucial factors for environmental sustainability, especially on agricultural land. Agricultural land experiences a lot of carbon loss due to improper land management. Loss of organic carbon in agricultural land occurs through erosion, tillage, litter decomposition, and harvesting. Most studies of carbon stocks on agricultural land in the tropics, especially on slopes, only focus on land cover, land use, and slope gradient. The aspect or direction facing the slope rarely considered. In contrast, the slope aspect influences the reception of solar radiation intensity, which has an impact on the litter decomposition process. Studies related to organic carbon stocks in the direction towards the slopes of the Bompon Sub-watershed were carried out based on the interpretation of aerial photographs and available DEM data and field observations. Field observations carried out by observing the direction of the face, the type of land use, the type of plant, and the density of the plant. Laboratory tests carried out to determine soil characteristics, including texture, aggregate stability, bulk density, particle density, soil moisture level, soil pH, organic C, CEC, microbial biomass carbon, and total nitrogen. Data on direct exposure to solar energy uses secondary data obtained from NREL. Meanwhile, the data on the intensity of solar radiation received by the slopes obtained from processing DEM data using GIS. The results showed that there were differences in the intensity of solar radiation received by the slope based on the direction it faced and affected soil moisture conditions. Significant differences in soil moisture trigger differences in soil organic carbon content and soil organic carbon stocks on slopes. Soil organic carbon stocks on agricultural land on the slopes of the Bompon sub-watershed are meager, thus it is necessary to conserve organic carbon by returning organic matter, and modifying edaphic microclimate conditions by reducing solar radiation that hits the soil surface.

Keyword : Carbon stock, Soil organic carbon, Slope aspect, Solar radiation, Recarbonation.

INTISARI

Cadangan karbon organik tanah merupakan salah satu faktor yang sangat krusial terhadap keberlanjutan lingkungan terutama pada lahan pertanian. Lahan pertanian banyak mengalami kehilangan karbon akibat pengelolaan lahan yang kurang tepat. Kehilangan karbon organik pada lahan pertanian terjadi melalui erosi, olah tanah, dekomposisi seresah dan pemanenan. Kebanyakan penelitian cadangan karbon pada lahan pertanian di daerah tropis khususnya pada penggal lereng hanya berfokus terhadap tutupan, penggunaan lahan dan juga kemiringan lereng. Aspek atau arah hadap lereng sangat jarang dijadikan pertimbangan, sedangkan aspek lereng memiliki pengaruh terhadap penerimaan intensitas radiasi matahari yang berdampak pada proses dekomposisi seresah. Studi terkait cadangan karbon organik pada arah hadap lereng Sub – Das Bompon dilakukan berdasarkan interpretasi foto udara dan data DEM yang sudah tersedia dan observasi lapang. Observasi lapang dilakukan dengan pengamatan arah hadap, jenis penggunaan lahan, jenis tanaman dan kerapatan tanaman. Uji laboratorium dilakukan untuk menentukan karakteristik tanah meliputi tekstur, kemantapan agregat, *bulk density*, *particel density*, *soil moisture level*, pH tanah, C-organik, KTK, *microbial biomass carbon*, dan total Nitrogen. Data paparan langsung energi matahari menggunakan data sekunder yang didapat dari NREL. Data intensitas radiasi matahari yang diterima oleh lereng didapat dari mengolah data DEM menggunakan GIS. Hasil penelitian menunjukkan bahwa terdapat perbedaan intensitas radiasi matahari yang diterima oleh lereng berdasarkan arah hadapnya dan mempengaruhi kondisi kelembaban tanah. Perbedaan kelembaban tanah secara signifikan memicu terjadinya perbedaan kandungan karbon organik tanah serta cadangan karbon organik tanah pada lereng. Cadangan karbon organik tanah pada lahan pertanian di penggal lereng sub-Das Bompon sangat rendah, sehingga perlu upaya konservasi karbon organik dengan pengembalian seresah tanaman kedalam tanah, dan memodifikasi kondisi mikroklimat edafik dengan mengurangi radiasi matahari yang mengenai permukaan tanah.

Kata kunci : Cadangan karbon, Karbon organik tanah, Aspek Lereng, Radiasi Matahari.