INTISARI

Siklus biokimia yang terjadi pada tanah mencakup hara esensial yang menggambarkan nilai kesuburan tanah. Hara tersebut diantaranya Karbon Organik Tanah dan Nitrogen Total. Terjadinya defisiensi nutrien tersebut menurunkan nilai produktivitas pertanian dan sebaliknya apabila kadarnya berlebih akan berkontribusi terhadap pencemaran. Daerah Aliran Sungai (DAS) sebagai wilayah kajian merupakan sistem terintegrasi mencakup kawasan pertanian dan non pertanian dengan kondisi geomorfologi dan sosial yang kompleks. Intensivikasi dari aktivitas manusia dalam suatu DAS berpotensi dengan menurunnya kualitas tanah dan produktivitas lahan serta keseimbangan siklus biogeokimia. Kajian spasial dari dua unsur tersebut menjadi penting dalam menilai kondisi dan fungsi DAS. Penelitian ini berfungsi untuk mengetahui sebaran vertikal dan horizontal nilai karbon organik tanah dan nitrogen serta faktor fisiko-kimia tanah yang memengaruhi. Pendekatan geostatistik digunakan untuk memodelkan variabilitas spasial melalui interpolasi *ordinary kriging*, sehingga diperoleh peta sebaran karbon dan nitrogen tanah. Hasil penelitian menunjukkan bahwa karbon organik tanah dan nitrogen total memiliki pola distribusi yang dipengaruhi penggunaan lahan, topografi, dan kondisi fisikokimia tanah. Nilai Karbon organik terendah ada pada THS2B (*Typic Haplustepts* Sawah, 8-15%) Kedalaman 40-60 dengan nilai 4,03 g/kg dan tertinggi pada THK1B (*Typic Haplusteps,* Kebun, 0-8%). Pengelolaan yang lebih intensif memiliki nilai karbon dan nitrogen yang lebih rendah. Nilai nitrogen tertinggi terukur pada THK2 (*Typic Haplusteps,* Kebun, 8-15%) jeluk 0-20 yaitu sebesar 3,06 g/kg termasuk dalam harkat sedang. Nilai nitrogen total tanah terendah terukur pada THT1 (*Typic Haplusteps,*Tegalan, 0-8% jeluk 40-60 yaitu sebesar 0,37 g/ harkat sangat rendah.

Kata kunci: karbon, *kriging*, nitrogen

ABSTRACT

The biochemical cycles occurring in soil encompass essential nutrients that reflect the soil's fertility status. These nutrients include Soil Organic Carbon and Total Nitrogen. Deficiency of these nutrients can decrease agricultural productivity, while an excess can contribute to environmental pollution. Watershed as the study area is an integrated system that includes both agricultural and non-agricultural zones, characterized by complex geomorphological and social conditions. Intensification of human activities within a watershed may lead to declining soil quality, reduced land productivity, and disruption of biogeochemical cycles. Spatial analysis of these two elements becomes crucial for assessing the condition and function of the watershed. This research aims to determine the vertical and horizontal distribution of soil organic carbon and nitrogen values, as well as the physico-chemical factors affecting them. A geostatistical approach is used to model spatial variability through ordinary kriging interpolation, resulting in maps of soil carbon and nitrogen distribution. The results show that soil organic carbon and total nitrogen have distribution patterns influenced by land use, topography, and soil physico-chemical properties. The lowest organic carbon value was found in THS2B (Typic Haplustepts, paddy, 8-15%), at a depth of 40-60 cm, with a value of 4.03 g/kg, while the highest was in THK1B (Typic Haplusteps, mixed plantation, 0-8%). More intensive management is associated with lower carbon and nitrogen values. The highest nitrogen value was measured in THK2 (Typic Haplusteps, mixed plantation, 8-15%), at a depth of 0-20 cm, at 3.06 g/kg, classified as moderate. The lowest total soil nitrogen value was measured in THT1 (Typic Haplusteps, Dryland, 0-8%), at a depth of 40-60 cm, at 0.37 g/kg, classified as very low.

Keyword: carbon, kriging, nitrogen