

**DETEKSI DAN PEMETAAN DIGITAL KARBON ORGANIK  
DAN P TERSEDIA TANAH SAWAH VULKANIS GUNUNG  
TALANG**

**TESIS**

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# DETEKSI DAN PEMETAAN DIGITAL KARBON ORGANIK DAN P TERSEDIA TANAH SAWAH VULKANIS GUNUNG TALANG

## ABSTRAK

Karbon organik tanah dan ketersediaan P merupakan kunci utama penentu kualitas tanah. Pemetaan karbon organik dan ketersediaan P tanah diperlukan untuk memberi informasi dan melihat sebaran C-organik maupun sebaran fosfor (P). Penelitian bertujuan memetakan secara digital sebaran C-organik sekaligus sebaran fosfor pada tanah sawah vulkanis serta melihat korelasi data antara C-organik dan fosfor dengan nilai *normalized difference vegetation index* (NDVI) di kawasan vulkan Gunung Talang Kabupaten Solok. Penelitian menggunakan metode survei untuk pengambilan sampel tanah dengan sistem grid interval 1000x1000 m pada kedalaman tanah 0-20 cm dan 20-40 cm serta metode NDVI untuk melihat nilai indeks vegetasi. Hasil penelitian menunjukkan bahwa tanah sawah vulkanis Gunung Talang memiliki nilai C-organik lapisan atas (0-20 cm) antara 1,04-11,82%, C-labil 0,39-2,51%, C-sangat labil 0,39-2,51%, C-humus metal kompleks 0,028-0,239%, C-terikat liat non kristalin 0,015-0,103%, C-total 4,147-14,15%. Nilai Fraksionasi C lapisan bawah (20-40 cm) yaitu, C-organik antara 0,49-8,06%, C-labil 0,43-2,09%, C-sangat labil 0,43-2,09%, C-humus metal kompleks 0,042-247%, C-terikat liat non kristalin 0,005-0,09%, C-total 2,07-14,04%. Nilai Fraksionasi P lapisan atas (0-20 cm) yaitu, P-tersedia 7,28–29,97 ppm, P-retensi 90,97-95,77%, P-potensial 105,41– 310,32 ppm, Al-P 9,09–32,50 ppm, Fe-P 8,13–30,07 ppm, P- terselubung 21,67– 62,01 ppm dan Ca-P 10,99–42,34 ppm. Nilai Fraksionasi P lapisan bawah (20-40 cm) yaitu, P-tersedia 6,20–26,56 ppm, P-retensi 91,57-96,31 ppm, P- potensial 92,86–293,32 ppm, Al-P 10,78–33,72 ppm, Fe-P 9,83-31,12 ppm, P terselubung 12,80-48,41 ppm dan Ca-P 12,55–45,98 ppm. Didapatkan hasil korelasi sangat lemah antara C-organik dengan NDVI  $r=0,116$  di kedalaman 0-20 cm dan nilai  $r=0,107$  di kedalaman 20-40 cm. Didapatkan hasil korelasi sangat lemah antara P-tersedia dengan NDVI  $r=0,196$  di kedalaman 0-20 cm dan nilai  $r=0,136$  di kedalaman 20-40 cm. Berdasarkan hasil penelitian diperoleh kesimpulan bahwa kandungan C-organik tanah lokasi penelitian kedalaman 0-20 cm didominasi oleh kriteria tinggi-sangat tinggi 2214,03-2307,77 ha. Kandungan C-organik tanah lokasi penelitian kedalaman 20-40 cm didominasi oleh kriteria tinggi-sedang 1500,23-1611,17 ha. Kandungan fosfor tanah lokasi penelitian kedalaman 0-20 cm didominasi oleh kriteria tinggi 1253,7 ha. Kandungan fosfor tanah lokasi penelitian kedalaman 20-40 cm didominasi oleh kriteria tinggi 1140,6 ha. C-organik maupun P-tersedia tanah pada wilayah penelitian tidak bisa diestimasi dengan NDVI, karena ternyata pendugaan kadar karbon organik tanah maupun P-tersedia tanah masih belum bisa dijangkau oleh metode NDVI. Disarankan melakukan penelitian metode NDVI untuk mengestimasi kandungan N pada tanaman padi, bukan C-organik tanah maupun P-tersedia tanah.

**Kata Kunci :** Karbon Organik Tanah, Fosfor, Indek Vegetasi, Sawah Vulkanis.

# DETECTION AND DIGITAL MAPPING OF ORGANIC CARBON AND P AVAILABLE SOIL VOLCANIC PADDY SOILS OF MT. TALANG USING

## ABSTRACT

Soil organic carbon and P availability are key determinants of soil quality. Mapping organic carbon and soil P availability is needed to provide information and see the distribution of organic C and the distribution of phosphorus (P). The research aims to digitally map the distribution of C-organic as well as the distribution of phosphorus in volcanic rice fields and see the correlation of data between C-organic and phosphorus with normalized difference vegetation index (NDVI) values in the Mount Talang volcanic area, Solok Regency. The research used a survey method for taking soil samples with a grid system of 1000x1000 m intervals at soil depths of 0-20 cm and 20-40 cm and the NDVI method to see the vegetation index value. The results showed that the volcanic rice fields of Mount Talang had a C-organic value in the top layer (0-20 cm) between 1.04-11.82%, C-labile 0.39-2.51%, C-very labile 0, 39-2.51%, C-humus metal complex 0.028-0.239%, C-bound non-crystalline clay 0.015-0.103%, C-total 4.147-14.15%. The C fractionation value of the bottom layer (20-40 cm) is, C-organic between 0.49-8.06%, C-labile 0.43-2.09%, C-very labile 0.43-2.09% , C-humus metal complex 0.042-247%, C-bound non-crystalline clay 0.005-0.09%, C-total 2.07-14.04%. The P fractionation value of the top layer (0-20 cm) is, P-available 7.28–29.97 ppm, P-retention 90.97-95.77%, P-potential 105.41– 310.32 ppm, Al -P 9.09–32.50 ppm, Fe-P 8.13–30.07 ppm, covert P- 21.67– 62.01 ppm and Ca-P 10.99–42.34 ppm. The P fractionation value of the bottom layer (20-40 cm) is, P-available 6.20–26.56 ppm, P-retention 91.57-96.31 ppm, P-potential 92.86–293.32 ppm, Al -P 10.78–33.72 ppm, Fe-P 9.83-31.12 ppm, disguised P 12.80-48.41 ppm and Ca-P 12.55–45.98 ppm. The results showed a very weak correlation between C-organic and NDVI  $r=0.116$  at a depth of 0-20 cm and a value of  $r=0.107$  at a depth of 20-40 cm. The results showed a very weak correlation between P-available and NDVI  $r= 0.196$  at a depth of 0-20 cm and a value of  $r=0.136$  at a depth of 20-40 cm. Based on the research results, it was concluded that the soil C-organic content of the research location at a depth of 0-20 cm was dominated by high-very high criteria of 2214.03-2307.77 ha. The soil organic C content of the research location at a depth of 20-40 cm is dominated by medium-high criteria of 1500.23-1611.17 ha. The soil phosphorus content of the research location at a depth of 0-20 cm is dominated by the height criterion of 1253.7 ha. The soil phosphorus content of the research location at a depth of 20-40 cm is dominated by the height criterion of 1140.6 ha. Soil organic C and available P in the research area cannot be estimated using NDVI, because it turns out that estimating soil organic carbon and soil available P levels cannot be reached using the NDVI method. It is recommended to conduct research on the NDVI method to estimate the N content in rice plants, not soil organic C or soil available P.

**Keyword** : Soil Organic Carbon, Phosphorus, Vegetation Index, Volcanic Rice Fields.