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Analisis Sebaran Tingkat Kelembapan Tanah terhadap Lahan Sawah di Kabupaten Pati Menggunakan Citra Landsat 8 dan 9

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Keywords:

Kelembapan Tanah, Lahan Sawah, Landsat 8/9, NDMI

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Abstract

Informasi kelembapan tanah sangat penting karena berkaitan dengan optimalisasi penggunaan lahan sawah yang dapat berdampak pada aktivitas bercocok tanam. Lahan sawah Kabupaten Pati tersebar pada wilayah dataran tinggi, dataran rendah, dan daerah dekat dengan pesisir yang menunjukkan tingkat kelembapan tanah berbeda-beda. Tujuan penelitian ini adalah melihat sejauh mana identifikasi kelembapan tanah menggunakan citra dan bagaimana sebaran kelembapan tanah pada lahan sawah di Kabupaten Pati. Pendugaan kondisi kelembapan tanah menggunakan algoritma *Normalized Difference Moisture Index* (NDMI) dengan memanfaatkan gelombang NIR (*Near Infrared*) dan SWIR (*Shortwave Infrared*). Hasil pengolahan citra menunjukkan tingkat kelembapan tanah di Kabupaten Pati selalu kering di Pati bagian selatan pada musim kemarau di mana sesuai dengan faktor yang memengaruhi yaitu jarak dari sungai serta curah hujan yang ada. Dilakukan validasi lapangan dengan *hygrometer* sebanyak 83 dari 84 titik sesuai dengan kondisi kelembapan tanah sebenarnya. Hasil regresi linier sederhana diperoleh koefisien determinasi (*Multiple R-Squared*) sebesar 72%, sehingga algoritma NDMI dapat digunakan mendeteksi kelembapan tanah dalam lahan sawah. Perlu diperhatikan terkait waktu penelitian tidak hanya pada musim kemarau saja dan menyesuaikan kalender tanam pada lahan sawah.

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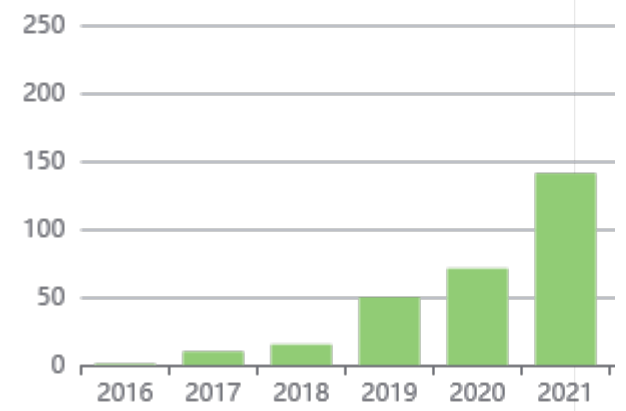
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Analisis Sebaran Tingkat Kelembapan Tanah terhadap Lahan Sawah di Kabupaten Pati Menggunakan Citra Landsat 8 dan 9

Izzah Zakiyatur Rahmah, Yudo Prasetyo, Nurhadi Bashit

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Abstract Soil moisture information is essential because it is related to optimizing the use of rice fields, which can impact farming activities. The rice fields of Pati Regency are spread across the highlands, lowlands, and areas close to the coast, which show different levels of soil moisture. This research aims to see the extent of the identification of soil moisture using images and how the distribution of soil moisture in rice fields in Pati Regency. Estimating soil moisture conditions using Normalized Difference Moisture Index (NDMI) algorithms by utilizing NIR waves (Near Infrared) and SWIR (Shortwave Infrared). The image processing results show that the soil moisture level in Pati Regency is always dry in the southern part of Pati during the dry season, which is influenced by factors such as the distance from the river and the available rainfall. Field validation was carried out with a hygrometer, and 83 of the 84 points corresponded to actual soil moisture conditions. The results of simple linear regression obtained the coefficient of determination (Multiple R-squared) of 72%, so the NDMI algorithm can be used to detect soil moisture in rice fields. It is essential to pay attention to the research time, not only during the dry season, and to adjust the planting calendar for paddy fields.

Keywords: Soil Moisture; Paddy Fields; Landsat 8/9; NDMI

Abstrak Informasi kelembapan tanah sangat penting karena berkaitan dengan optimalisasi penggunaan lahan sawah yang dapat berdampak pada aktivitas bercocok tanam. Lahan sawah Kabupaten Pati tersebar pada wilayah dataran tinggi, dataran rendah, dan daerah dekat dengan pesisir yang menunjukkan tingkat kelembapan tanah berbeda-beda. Tujuan penelitian ini adalah melihat sejauh mana identifikasi kelembapan tanah menggunakan citra dan bagaimana sebaran kelembapan tanah pada lahan sawah di Kabupaten Pati. Pendugaan kondisi kelembapan tanah menggunakan algoritma *Normalized Difference Moisture Index* (NDMI) dengan memanfaatkan gelombang NIR (*Near Infrared*) dan SWIR (*Shortwave Infrared*). Hasil pengolahan citra menunjukkan tingkat kelembapan tanah di Kabupaten Pati selalu kering di Pati bagian selatan pada musim kemarau di mana sesuai dengan faktor yang memengaruhi yaitu jarak dari sungai serta curah hujan yang ada. Dilakukan validasi lapangan dengan *hygrometer* sebanyak 83 dari 84 titik sesuai dengan kondisi kelembapan tanah sebenarnya. Hasil regresi linier sederhana diperoleh koefisien determinasi (*Multiple R-Squared*) sebesar 72%, sehingga algoritma NDMI dapat digunakan mendeteksi kelembapan tanah dalam lahan sawah. Perlu diperhatikan terkait waktu penelitian tidak hanya pada musim kemarau saja dan menyesuaikan kalender tanam pada lahan sawah.

Kata kunci: Kelembapan Tanah; Lahan Sawah; Landsat 8/9; NDMI