

**DINAMIKA VARIABILITAS CURAH HUJAN DAN KARAKTERISTIK  
SIFAT FISIKA TANAH TERHADAP BENCANA  
HIDROMETEOROLOGIS PADA SAWAH IRIGASI**

**INTISARI**

Oleh:

Yunita Nur Azizah

(21/473089/TP/13037)

Variabilitas curah hujan dan karakteristik fisika tanah berpengaruh terhadap bencana hidrometeorologis di lahan sawah irigasi. Penelitian ini mengevaluasi validasi data curah hujan antara observasi dan Global Climate Model (GCM), distribusi spasial dan temporal curah hujan ekstrem serta keterkaitannya dengan karakteristik fisika tanah, serta dampaknya terhadap bencana hidrometeorologis di Kabupaten Sleman. Data curah hujan dari model global memiliki korelasi baik dengan data BMKG ( $r = 0,68$ ;  $RMSE = 142,89$  mm). Curah hujan tinggi terjadi di wilayah timur dan utara, sedangkan curah hujan rendah terjadi di wilayah selatan. Berdasarkan indeks perubahan iklim (R95PTOT, R99PTOT, dan CWD), kejadian hujan ekstrem jangka pendek di wilayah barat laut yang berpotensi menimbulkan kejenuhan tanah dan banjir. Tren jangka panjang menunjukkan pola kejadian ekstrem yang bervariasi dengan kecenderungan menurun setelah tahun 2010.

Distribusi spasial menunjukkan Kecamatan Ndolo mengalami kekeringan meteorologis tertinggi (22 kejadian) dan Kalasan terendah (11 kejadian). Kekeringan agronomis tertinggi terjadi di Medari (24 kejadian). Kekeringan hidrologis tertinggi terjadi di Berbah (29 kejadian). Kejadian basah tertinggi berdasarkan SPI-12 bulan terjadi di Seyegan (30 kejadian). Kadar lengas tanah tinggi ( $>60\%$ ) di wilayah barat daya (6,7 km<sup>2</sup>), dan sebagian besar memiliki kadar lengas  $\leq 30\%$  (404,4 km<sup>2</sup>). Setelah dilakukan analisis matriks pearson, diketahui variabilitas curah hujan dan sifat fisika tanah memiliki pengaruh signifikan terhadap potensi bencana hidrometeorologis pada sawah irigasi, seperti banjir saat curah hujan tinggi dan kekeringan saat curah hujan rendah serta irigasi tidak mencukupi

**Kata Kunci:** Curah hujan, porositas tanah, berat jenis tanah, bencana hidrometeorologi, sawah irigasi.

**DYNAMICS OF RAINFALL VARIABILITY AND SOIL PHYSICAL PROPERTIES IN RELATION TO HYDROMETEOROLOGICAL HAZARDS IN IRRIGATED RICE FIELDS**

**ABSTRACT**

By:

Yunita Nur Azizah

(21/473089/TP/13037)

Rainfall variability and soil physical characteristics influence hydrometeorological disasters in irrigated rice fields. This study evaluates the validation of rainfall data between observations and the Global Climate Model (GCM), the spatial and temporal distribution of extreme rainfall, soil physical characteristics, and its impact on hydrometeorological disasters in Sleman Regency. Rainfall data from the global model showed a good correlation with BMKG data ( $r = 0.68$ ; RMSE = 142.89 mm). High rainfall occurred in the eastern and northern regions, while low rainfall was observed in the southern areas. Based on climate change indices (R95PTOT, R99PTOT, and CWD), short-term extreme rainfall events occurred in the northwestern region, potentially causing soil saturation and flooding. Long-term trends revealed varying patterns of extreme events, with a decreasing tendency after 2010.

Spatial distribution showed that Ndolo District experienced the highest number of meteorological droughts (22 events), while Kalasan had the lowest (11 events). The highest number of agricultural droughts occurred in Medari (24 events), and the highest number of hydrological droughts was recorded in Berbah (29 events). The most frequent wet events based on the 12-month SPI occurred in Seyegan (30 events). High soil moisture content ( $>60\%$ ) was found in the southwestern region (6.7 km<sup>2</sup>), while most areas had moisture content  $\leq 30\%$  (404.4 km<sup>2</sup>). Pearson correlation matrix analysis indicated that rainfall variability and soil physical properties have a significant impact on the potential for hydrometeorological disasters in irrigated rice fields, such as flooding during high rainfall and drought during low rainfall conditions and insufficient irrigation supply.

**Keywords:** Rainfall, soil porosity, bulk density, hydrometeorological disasters, irrigated rice fields.