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Spatial Variability of Soil Hydraulic Conductivity in New Valley, Egypt.

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Soils are characterized by high degree of spatial variability due to the combined effect of physical and chemical properties. The study's objective is to assess the effect of different soil properties on soil hydraulic conductivity. This will assist in finding the optimal usage of water and aid in soil management. The data have been taken on a plot of 120 m by 120 m at 10 m intervals. Soil parameters analyzed in the laboratory are bulk density, texture, water content, hydraulic conductivity, infiltration rate, and some chemical properties. soil bulk density, saturated water content, and pH have low variability, while sand content, calcium carbonate content, and soil water content at 33 kPa and 1500 kPa are moderately variable, and clay and silt content, hydraulic conductivity, infiltration rate, electric conductivity, and sodium adsorption ratio (SAR) are highly variable. Correlation analysis shows that hydraulic conductivity is significantly correlated with soil bulk density, calcium carbonate content, saturated water content and SAR while clay, silt, and sand content are highly correlated with calcium carbonate and organic matter. These relationships are also studied using spatial statistics (variography) and interpolation (kriging). Covariograms and cokriging techniques are used to quantify the spatial dependence and spatial structure of the soil properties and to predict values at unsampled locations.