

# **COMPARISON OF ORDINARY KRIGING, INVERSE DISTANCE WEIGHTED, AND SPLINE INTERPOLATION METHODS IN MAPPING LEAD IN SOIL IN SEVERAL VILLAGES IN PEDAN DISTRICT, KLATEN**

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## **ABSTRACT**

The presence of lead (Pb) heavy metal contamination in the soil of several villages in Pedan District, Klaten Regency, is suspected to be caused by the existence of a final disposal site (TPA) containing toxic and hazardous waste (B3), which has seeped into the soil. This study aims to compare the Kriging, Inverse Distance Weighted (IDW), and Spline interpolation methods in mapping Pb in the soil around the Troketon landfill. Sampling was conducted using the purposive sampling method on agricultural land in the form of rice fields and dry fields based on a radius of 200-2,400 meters from the TPA point. The parameters used are the Pb heavy metal content tested using an  $\text{HNO}_3$  extractor, then the distribution of Pb content is mapped using Kriging, IDW, and Spline interpolation methods with the ArcGIS 10.8 application. The determination of the best interpolation method uses the RMSE (Root Mean Square Error) test. The threshold value of Pb in the soil is 1 ppm and in wastewater is 0.1 ppm. Laboratory test results show the lowest Pb value of 0.509 ppm and the highest of 2.046 ppm. The RMSE test results show that Kriging interpolation is the best because it has the lowest RMSE value of 0.3022 with a Pb prediction range between 0.802 ppm and 1.736 ppm. The area with Pb values below the threshold is 489.73 Ha (61% of the total research area). The distribution of Pb on the generated map is relatively continuous with a surface that changes gradually. Mapping the distribution of Pb can provide information in formulating mitigation policies to reduce the impact of Pb accumulation pollution on the environment in the area.

Keywords: Final Disposal Site, IDW, Interpolation, Kriging, Lead, Spline