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Developing an SCS-CN Flood Prediction Model for the West Bank using GIS and Machine Learning: Addressing Climate Change and Geopolitical Challenges

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Abstract

The goal of this work is to employ machine learning (ML) and geographic information systems (GIS) to create a Soil Conservation Service Curve Number (SCS-CN) model for the West Bank. Because of changed rainfall patterns and a lack of adaptive capacity, the West Bank, a territory particularly susceptible to the effects of climate change, is increasingly at risk of flash floods. These difficulties are made worse by the geopolitical environment, which limits attempts to mitigate flooding and build extensive infrastructure. Therefore, for efficient disaster planning and water resource management in this delicate location, a reliable and accurate flood prediction model is essential.

Land use, soil, CN, and hourly rainfall data for the West Bank are all collected as part of the technique. ArcGIS and Python will be used to prepare, intersect, and incorporate these datasets into a hydrological model. In order to improve the predicted accuracy of the model, machine learning methods will be used to optimize curve numbers and improve initial abstraction (Ia) and precipitation (P) estimates. The final objective is to create an early emergency system and a precise risk flood map model. In the midst of growing hydrological issues in the Palestinian setting, our research aims to provide crucial tools for humanitarian response and sustainable environmental planning.