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An Efficient Decision Making for Fertilization

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Abstract: *Farmers often have limited control over fertilizer use, but achieving higher yields and minimizing fertilizer loss requires competent guidance. To optimize fertilizer utilization, it is essential to provide farmers with the best practices for applying fertilizers. Rainfall plays a significant role in nutrient loss following fertilizer applications after each rainfall event. Ideally, moderate rainfall occurring at the right time aids in nutrient absorption and the dissolution of dry fertilizers within the soil's rooting zone. However, excessive rainfall can lead to undesirable outcomes such as nutrient runoff and accelerated leaching of vital elements like nitrogen (N), phosphorus (P), potassium (K), manganese (Mn), and boron (B) from the soil. This necessitates a comprehensive approach that considers rainfall patterns, crop fertility, and time-series data analysis. By employing an advanced version of the random forest algorithm, this project offers nutrient recommendations tailored to specific crops. The proposed method leverages historical rainfall data and crop fertility information to forecast the optimal quantity of nutrients required for different crops. By considering these factors, the project aims to enhance soil fertility, promote optimal crop growth conditions, and mitigate the risks of nutrient leaching and runoff. Ultimately, this approach serves as a valuable resource for farmers seeking to improve their agricultural practices and maximize crop yields while minimizing environmental impact.*

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