Machine Learning-Based Assessment of Post-Monsoon Groundwater Quality for Sustainable Agricultural Practices

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This research paper explores the applicability of machine learning algorithms and data visualization techniques in assessing groundwater quality for sustainable agriculture in Telangana, India, during the post-monsoon period. Groundwater is an integral part of agriculture. Still, its quality degrades due to a variety of factors. The chemical composition of groundwater is essential for the healthiness of the soil and crop growth. In this study, we employ K-Nearest Neighbors, logistic regression, random forests, and support vector machines to categorize groundwater quality according to its chemical properties. Additionally, data visualization methods were used to comprehend the temporal and spatial changes in groundwater quality. The data set used in this study, which includes measurements of different ions, pH, E.C., and TDS from multiple Telangana districts between 2018 and 2021, was obtained from Telangana Open Data. The data was from post-monsoon season, a time of great groundwater recharge and a broad range of groundwater quality. The findings help farmers and other stakeholders to choose the right crops, irrigation systems, and livestock to raise to improve sustainable agriculture practices in the face of declining groundwater levels and quality.

Keywords: *groundwater quality assessment, machine learning algorithms, data visualization, sustainable agriculture*