

# Smart Agricultural Soil Management

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Access to soil analysis is limited in developing countries due to lack of equipment, expertise, and infrastructure. On-the-go soil sensors have emerged as a cost-effective solution to soil testing, providing key soil parameters for irrigation, nutrient availability, and fertilizer needs. In this study, the Soil Multi Parameter Sensor was connected to an Arduino Uno to send data to a desktop application that recommends suitable crops, irrigation, and fertilizer needs. Validity of results was confirmed by comparing to standard solutions, with a coefficient of determination of 0.92 for pH and electrical conductivity and 0.8 for nitrogen, phosphorus, and potassium. This technology can help farmers make informed decisions and adopt sustainable crop management practices, increasing yields, profitability, optimizing water resource use, and contributing to achieving food security. It is a valuable tool in improving agricultural production in developing countries.