

# INTEGRATING CONSERVATION TILLAGE AND SOIL MONITORING FOR OPTIMISED SOIL MOISTURE IN SUSTAINABLE AGRICULTURE

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Sustainable agriculture responds to the global environmental challenges by conserving soil and water resources. Integrating conservation tillage with soil monitoring technologies boosts soil health and moisture retention, which improves water use efficiency. The strategy optimises soil moisture, contributing to better crop growth and less environmental impact, amidst unresolved issues like costs and training. Examining the potential of integrating soil monitoring technologies with conservation tillage as well as assessing how it could impact soil and water parameters, remains a critical area of research. Therefore, content for this study was gathered from three databases, Google Scholar, Web of Science (WoS), and Scopus, with a search conducted using a query comprised of major phrases, “conservation tillage” and “soil monitoring.” Microsoft Excel was employed for managing references and creating graphs. Literature published in English from 2005 to 2025 was selected based on inclusion and exclusion criteria with a focus on conservation tillage and soil moisture, and a structured methodology applied to the study objectives. The mean rates for literature screening, synthesis, and search-to-synthesis were 76.23%, 8.47%, and 6.47%, respectively. The variances were 1.62, 16.36, and 8.91, with standard deviations of 1.27, 4.05, and 2.98. The regression model, thus, suggests that increasing soil monitoring technologies boosts water use efficiency by 1.6429 per unit increase. Conservation tillage practices like strip tillage, no-till, ridge tillage, and mulch till significantly improve soil health, water retention, and crop yields. Future research should explore the long-term impacts on soil organic carbon levels and their cumulative effect on crop yield.