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# Use of Sensor-Based Automated Irrigation for the Mitigation of Groundwater Depletion and Pollution Issues in Kalpitiya, Sri Lanka

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Kalpitiya, is an important agro ecological region in Sri Lanka, which has greatly strengthened the country's economy and food security. However, intensive farming practices in Kalpitiya have triggered its ground water depletion and pollution isuses. The objective of this study is to check the feasibility of a new sensor-based irrigation system against the prevailing groundwater depletion and pollution issues in Kalpitiya. The new system was used to automate a sprinkler kit by monitoring underground moisture contents via its high-frequency soil water content sensors placed at 15, 45 and 90 cm depths. During the study, irrigation uniformity and adequacy of the automated sprinkler kit (T1) were compared over those of the sprinklers operated with common farmers' experience based (T2) and timer controlled (T3) irrigations. T2 and T3 were also provided with the soil moisture detection facility as same as in T1. According to the results, the irrigation uniformities of T1, T2 and T3 were within an acceptable range (83-88%), but only T1 had 60% irrigation adequacy within 30cm depth. Further, soil water telemetric graphs and adequacy values also proved that deep percolation was considerably higher in T2 and T3 over T1. The study confirmed that new sensor-based irrigation control was capable in saving irrigation water and minimising groundwater leaching through its real-time soil moisture-sensing mechanism. Thus, the new technique had the potential to be used against ground water depletion and pollution issues in Kalpitiya.

***Keywords:*** *groundwater, Internet of Things, Kalpitiya, sprinkler irrigation, soil water content*