

عنوان مقاله:

The effect of irrigation practice and water consumption using aqua-crop

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خلاصه مقاله:

BACKGROUND AND OBJECTIVES: The study explored the relationship between irrigation practices, water availability, and soil fertility in relation to crop yield. The investigation analyzed three distinct irrigation scenarios, namely full irrigation, deficit irrigation, and rain fed agriculture. The primary objective of the study was to evaluate the correlation between irrigation practices and soil fertility. To achieve this, the study incorporated different soil fertility levels, with high levels representing unlimited fertility for both full and deficit irrigation, and low levels corresponding to rain fed conditions. This design is primarily used to isolate the effects of irrigation practices on crop yields under a variety of fertility scenarios. The study also looks into how to achieve sustainable water management in the agricultural sector.
METHODS: Aqua-crop, a computerized model, was utilized to mimic real-life crop harvests. The aqua crop model was used to simulate crop yield in response to water availability. The calibration of the model involved utilizing data on various crop growth parameters, including soil fertility, crop canopy cover, evapotranspiration, soil water movement, crop yield and harvest index percentage. This innovative study utilizes aqua-crop to analyze the impact of irrigation methods on crop yields under controlled settings, effectively isolating irrigation influences from soil discrepancies. This approach is well-suited for studying sustainable water management strategies in agriculture, a pressing concern in light of worldwide water scarcity.
FINDING: Aqua-crop simulations revealed that consistent irrigation with a full irrigation system and high efficiency (70 percent) resulted in high yields. The simulated yields (8.48 to 10.4 tons per hectare) were significantly higher than farmers' actual yields (3.86 to 4.74 tons per hectare). Discrepancies between farmer irrigation methods and the model's assumption of uniform water application are the probable cause of the variation, underscoring the significance of considering real-world intricacies in the interpretation of model outcomes. The observed yield differences despite similar irrigation systems indicate the potential impact of unaccounted for factors such as soil type variations and real-world farmer practices (e.g., fertilization). Nevertheless, a substantial R-squared value of 0.85 suggests a robust association between simulated and ... observed yields, suggesting that aqua-crop can be valuable in comprehending overall irrigation-yield connections. Emphasis is placed on consider

کلمات کلیدی:

Aqua Crop, Crop yield, irrigation management, Water use

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