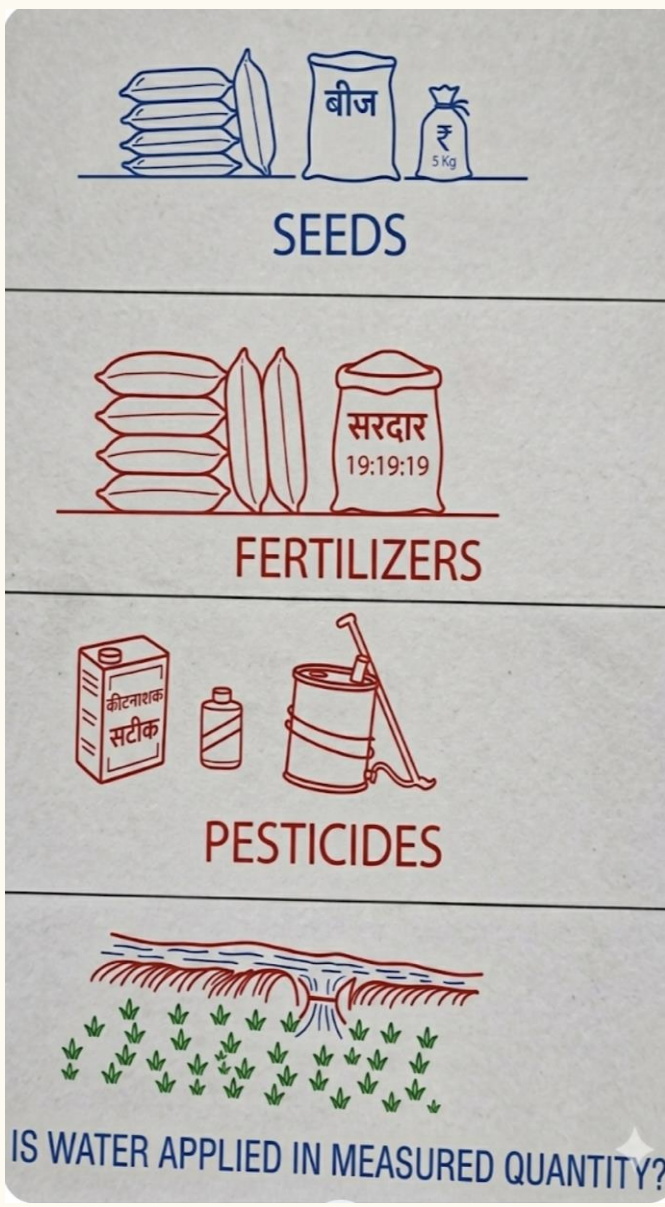


Abstract

- Farmers use seeds, fertilizers, and pesticides in measured quantities, but irrigation water, despite being a scarce resource, is often applied without precise measurement. One reason is the limited availability of simple and practical irrigation-scheduling techniques, while sophisticated methods remain beyond the reach of many farmers.
- In this context, a two-year field study was conducted to evaluate an easy-to-use irrigation-scheduling method for applying measured quantities of water according to crop water requirements. A locally made small pan evaporimeter was used to measure daily evaporation and estimate the water requirement of wheat. A soil-moisture sensor was also used to provide an alert when irrigation was required.
- The study demonstrated approximately 20% savings in irrigation water and a 27% increase in water-use efficiency. Based on the findings, a farmer-friendly irrigation-scheduling app was developed to make the method more accessible and practical for farmers.

Introduction



- Farmers use seeds, fertilizers, and pesticides in measured quantities, but irrigation water is often applied without precise measurement.
- Water wastage during irrigation was observed in the study area.
- Agriculture accounts for about 70% of global freshwater withdrawals, making efficient irrigation essential.
- A major challenge is the lack of simple, farmer-friendly scientific irrigation-scheduling methods.
- Objective: To develop a simple, low-cost, easy-to-adopt irrigation-scheduling method based on crop water requirements, with the aim of conserving water and improving water-use efficiency — “more crop per drop.”

Methods

- Irrigation need is based on Evapo-Transpiration (ET)
- Area under study: 2,016 m²
- Area divided into two equal parts
- Crop: Wheat
- Small Pan Evaporimeter (30 cm diameter) used to measure Evaporation, which reflects the effect of major weather parameters.
- Treatments:
- T1: Irrigation using the traditional method of applying water on an ad hoc basis.
- T2: Irrigation using a measured quantity of water based on cumulative pan evaporation.

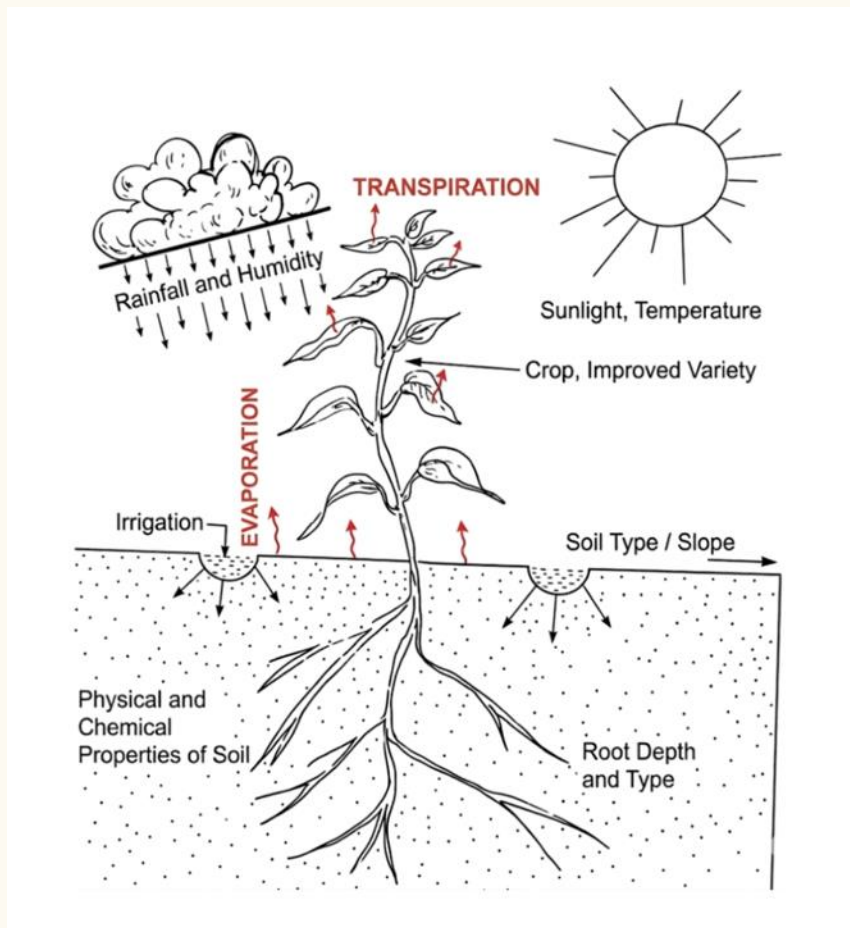


Fig. 1: Factors Affecting Crop Water Requirement (Evapotranspiration)



Fig. 2: Pan Evaporimeter



Fig. 3: Flow Measuring Flume



Fig. 4: Irrigation Layout



Fig. 5: Soil Moisture Sensor

Results

- A. Water Saving
 - Year 1: 18.5%
 - Year 2: 21.7%
 - Average Water Saving: 20.1%
- B. Increase in Water-Use Efficiency (*Crop yield per unit of water used*)
 - Year 1: 25%
 - Year 2: 30%
 - Average Increase: 27.5%

Discussion

- Applying a measured quantity of irrigation water based on crop evaporative demand resulted in considerable water saving and improved water-use efficiency.
- The results show that effective irrigation scheduling does not always require sophisticated or expensive technology.
- A simple, low-cost pan evaporation-based method can be practical and easier for farmers to adopt.
- The technique can help conserve water while maintaining crop productivity.
- Further testing with more field replications and real-time evaporation data could improve the reliability and wider applicability of the method.

Conclusion

- A simple, farmer-friendly irrigation-scheduling technique based on pan evaporation was developed.
- The method achieved an average water saving of 20.1% and a 27.5% increase in water-use efficiency.
- An easy-to-use irrigation-scheduling app was developed based on the study.
- The approach can contribute to water conservation and environmental sustainability.
- Neighboring farmers also began using the irrigation data for their wheat crops, demonstrating the potential for wider social impact.
- Farmer education and water-literacy programmes can support broader adoption.

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