Indian Economy · GS - III

What is water-use efficiency? Describe the role of micro-irrigation in increasing the water-use efficiency.

EXAM YEAR	PAPER	SUBJECT
2016	GS - III	Indian Economy

MARKS	WORD LIMIT
12.5	~200 words

Answer Hint

Water-use efficiency; drip irrigation; sprinkler irrigation; reduced evaporation; fertigation; water productivity; sustainable agriculture

Model Answer

Introduction

Water-use efficiency refers broadly to the amount of useful output obtained per unit of water used. In agriculture, it may be assessed through crop yield or biomass produced relative to water supplied or consumed.

Role of Micro-Irrigation

Micro-irrigation includes drip and sprinkler systems that deliver water in controlled quantities near crops or across targeted areas.

- **Reduced conveyance losses:** Water is delivered through pipes and emitters, reducing losses that may occur in open channels.
- **Targeted application:** Drip systems supply water near plant roots, limiting unnecessary wetting of soil.
- **Lower evaporation and runoff:** Properly designed systems reduce losses compared with less efficient irrigation methods.

- **Improved crop productivity:** Timely and uniform watering can reduce water stress and improve yields.
- **Fertigation:** Fertilisers can be applied with irrigation water, improving nutrient-use efficiency when managed correctly.
- **Adaptability:** Drip irrigation is useful for many horticultural and high-value crops, while sprinklers can suit various field crops and terrains.
- **Groundwater conservation:** Efficient application can reduce pumping requirements when accompanied by appropriate water-use controls.

Limitations

Initial installation costs, maintenance requirements, clogging, uneven pressure and limited technical knowledge can restrict adoption. Efficiency gains may also encourage expansion of irrigated area, so overall water consumption must be monitored.

Measures Required

Provide appropriate technical support, improve access to finance, train farmers in maintenance and match irrigation systems to crop, soil and water conditions.

Conclusion

Micro-irrigation can significantly improve on-farm water-use efficiency, but durable water conservation also requires suitable cropping patterns, groundwater governance and careful monitoring of total water use.

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