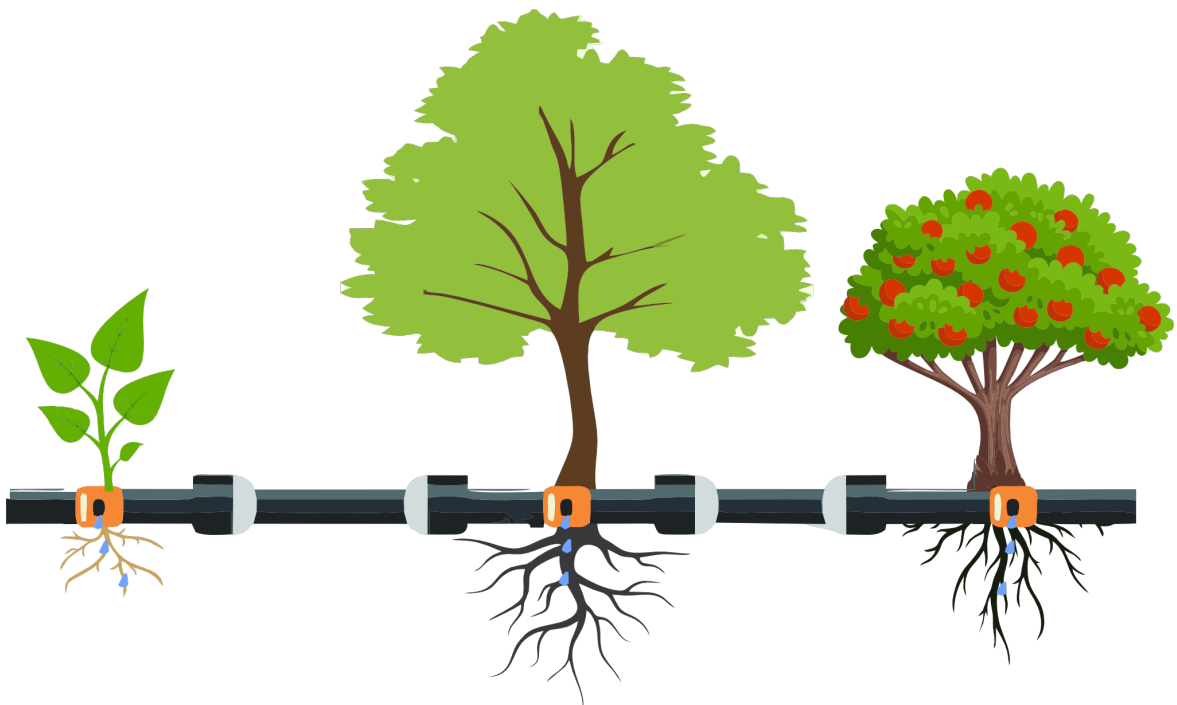




Climate-smart Farmer Field School catalogue

# Drip irrigation



Heat  
tolerance



Water  
saving



Extreme  
weather  
event



CO<sub>2</sub>



CH<sub>4</sub>



Energy  
saving



Increased  
productivity

Adaptation

Mitigation

Productivity

Funded by



## ADAPTATION



Drip irrigation helps maintain optimal soil moisture levels, reducing heat stress on plants and improving their ability to withstand high temperatures.



Highly efficient water application directly to the root zone minimizes losses due to evaporation and runoff.

By promoting deeper root growth, drip irrigation enhances plant resilience to droughts and floods

## MITIGATION



Indirectly, drip irrigation can contribute to CO<sub>2</sub> reduction by improving plant growth and soil health, leading to increased carbon sequestration. However, the impact is less direct compared to other factors.



The impact on methane emissions is generally negligible, except in specific scenarios like poorly managed rice paddies.



Drip irrigation often operates at lower pressures than other methods, reducing energy consumption for pumping water.

## PRODUCTIVITY



By providing precise water and nutrient delivery, drip irrigation optimizes crop growth and yield potential.



## Description

Drip irrigation, sometimes referred to as trickle irrigation, consists of a network of pipes, tubing valves, and emitters. Field crop, vegetables and orchard plants can be cultivated through drip irrigation, which delivers a slow supply of water at a gradual rate directly to the soil. Drip irrigation fosters climate smart agriculture by optimizing water use for sustainable crop productivity and resilience. In Jordan, drip irrigation systems cover an area of 92,500 hectares of the total area suitable for agriculture, with an annual increase of 0.1 percent (UNEP, 2016) and Jordan's agricultural sector has already used 65 – 70 percent of Jordan's freshwater resources (MWI, 2007).



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## Key requirements

- Drip irrigation system as per the identified crop or cropping system.
- Improved (certified) varieties.



## Benefits

- Drip irrigation uses 30–50 percent less water than surface irrigation and achieves up to 95 percent irrigation efficiency rates (World Bank, 2006).
- Drip irrigation significantly increases crop yields by 28.92 percent, 14.55 percent, 8.03 percent, 2.32 percent, and 5.17 percent relative to flooding irrigation, border irrigation, furrow irrigation, sprinkler irrigation, and micro-sprinkler irrigation, respectively (Yang *et al.*, 2023).
- Unlike other forms of irrigation, such as sprinklers that are only 65 – 75 percent efficient, drip irrigation is 90 percent efficient at allowing plants to use the water applied (URI, 2024).
- Less evaporation losses of water as compared to surface irrigation.
- Improves seed germination.
- Allows the rows between plants to remain dry, reducing weed growth.
- Prevents disease by minimizing water contact with the leaves, stems, and fruit of plants.
- Saves time, money, and water because the system is so efficient.
- Increases water delivery effectiveness on uneven ground.
- No soil erosion.
- Efficiently prevents water leaching, minimizing nutrient runoff below root zone.
- Reduces salinization and waterlogging
- Low labour and relatively low operation cost.
- Ready adjustment to sophisticated automatic control.

## Challenges

- Skilled labour is required of proper operation and management.
- Sensitivity to clogging and requires careful water filtration and system maintenance to prevent blockages.
- High salinity or mineral content in water can affect system performance and longevity.
- Ensuring even water application across the field can be challenging, especially on uneven terrain or with varying soil types.
- Higher upfront cost compared to traditional surface irrigation methods like furrow irrigation.
- Cost-effectiveness and suitability vary depending on crop type, soil conditions, and water availability.
- Specialized skills and capacity building are required for design, install and operation.
- Availability of qualified service providers and spare parts may be limited in some areas, impacting maintenance and repair.
- Requires electricity or other energy source for pumping
- Though not overly complex, drip irrigation systems do involve a few technical aspects that are worth understanding.
- Limited local service providers available.
- Continuous technical support and service provision is required for suitable use.
- Not suitable for all crops in comparison with cost-benefit analysis or value for money.





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## Adoption feasibility

Very High because of:

- More economic return through uniform and continuously controlled supply of water as per the plant required without stress.
- Gender friendly (all genders can participate in decent management of the irrigation system).
- Significant water savings – up to 90 percent.

## Why this has not been practiced?

- It is expensive at initial cost.
- Due to low skill and technical knowledge.
- Unawareness /low access to knowledge.
- Low availability of tools and services & maintenance at the local level.

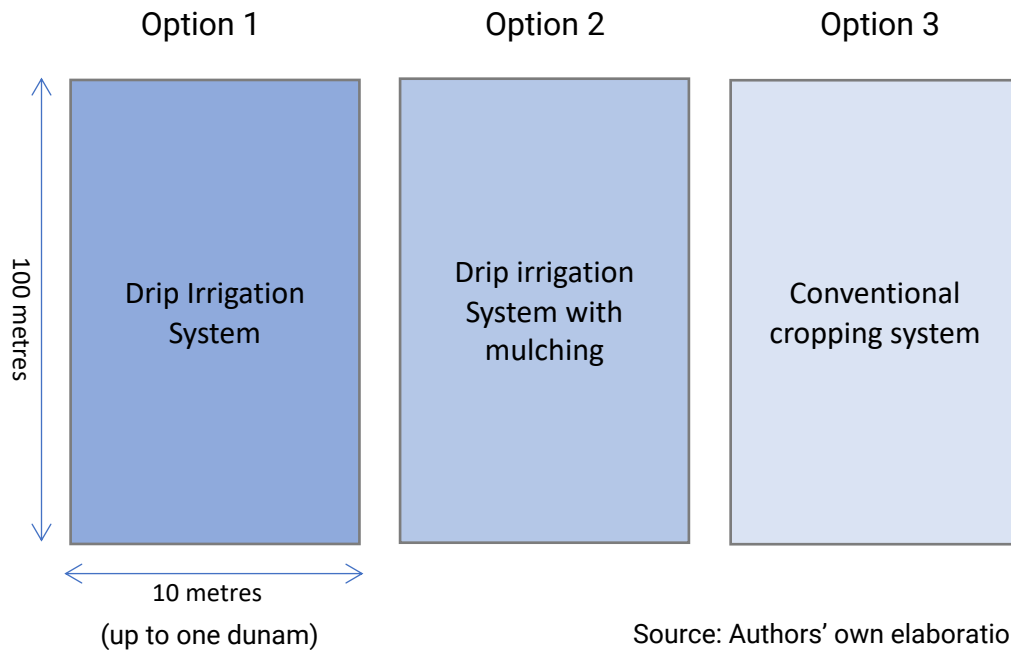
## Enabling services

Agreement of climate-smart farmer field school community with the local (public and private) service providers for quality service provision/ subsidized rates for:

- drip irrigation system
- repair and maintenance services
- quality seed of improved varieties
- quality fertilizer, pesticides and advisory services

## Field school learning experiments

(Select at least two options for comparison)



### Adaptation feasibility

Very high due to:

- gender friendly (low barriers to gender inclusion)
- increased soil fertility and water holding capacity
- soil moisture conditioning
- excellent process for organic waste management
- improve soil biotic process



## References

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## Project

Building resilience to cope with climate change in Jordan through improving water use efficiency in the agriculture sector

## Partners

Ministry of Agriculture, Jordan  
Ministry of Environment, Jordan  
Ministry of Water and Irrigation, Jordan  
United Nations Development Programme

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Ma'an, Tafileh, Karak and Madaba  
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