

## Irrigation Management: Micro Irrigation - A Boon to Farmers

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### Introduction

Irrigation with drippers, sprinklers, foggers, and other emitters on the surface or below the ground is known as micro irrigation, and it is a contemporary technique. A micro irrigation system consists of the following main parts, water supply, pumping apparatus (motor and pump), fertigation tools, ball valves, filters, control valves, PVC joining accessories (main and sub main), and emitters.

- With this technique, water is sprayed drop by drop closer to the crop's root zone.

The drippers are set in accordance with crop spacing. The market offers a wide variety of emitters. They fall into the following categories: pressed compensated drippers, micro tubes, inline drippers, and on-line drippers.

- Wider crop spacing is best suited for drip watering. In sandy or loamy soils, micro sprinkler irrigation is typically used. Small grasses and horticultural crops work well with this approach. With this technique, water is sprayed in several directions at a lower height.
- There are other options for portable micro sprinklers. Compared to drippers and micro sprinklers, they disperse a little bit more water. They only spray one meter or less of water. It is applied to low-water-holding soils to prepare lawns and nurseries.



**Fig. 2. Drip Irrigation**

### Advantages of drip irrigation system

- Lower water uses and increased yield.
- Greater fruit size and superior quality.
- Saves labour and field preparation costs.
- Suitable for all types of soil.
- Simple chemigation and fertigation technique.

### Disadvantage of drip irrigation system

- High initial investment.
- Clogging of emitters.
- Possible damage of system components due to animals, etc.,

### Investment cost mostly differs based on spacing of the crops

- Solid particles (sand, rust), soft dirt (organic matter, algae, microorganisms, salt), and sediments (fertilizer salt) are often the causes of blockage).
- The primary determinant of the system's success or failure is its filter. The primary goal of filtration is to prevent dirt particles from harming any system components.
- To remove salt encrustation, 30 per cent commercial hydrochloric acid can be used at the rate of one liter per one m<sup>3</sup> area. (One-part HCl mixed with 5 parts of water).
- To remove algae and fungal clogging 5 to 500 ppm sodium hydrochloride (10 per cent chlorine) can be used.



**Fig. 1. Sprinkler Irrigation**

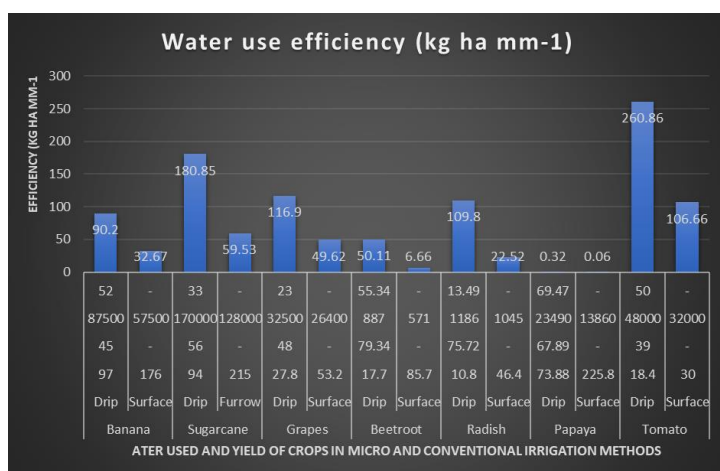
### Maintenance of drip system

- Back washing and sand filters have to be cleaned
- Frequent cleaning of emitters and drippers
- Flushing at every irrigation
- Cleaning of sub main and main pipes
- Cleaning of PVC pipes and laterals and acid or chlorine may be used to remove clogging

**Table: 1 Water used and yield of crops in micro and conventional irrigation methods**

Crop	Methods of irrigation	Water requirement (cm)	% water saving	Yield kg ha <sup>-1</sup>	% increase in yield	Water use efficiency (kg ha mm <sup>-1</sup> )
Banana	Drip	96.00	46.00	87600	53.00	91.20
	Surface	175.00	-	57400	-	33.67
Sugarcane	Drip	95.00	55.00	170500	34.00	181.85
	Furrow	214.00	-	128300	-	58.53
Grapes	Drip	28.80	49.00	32600	24.00	117.90
	Surface	54.20	-	26300	-	47.62
Beetroot	Drip	18.70	78.34	888	56.34	59.11
	Surface	86.70	-	572	-	7.66
Radish	Drip	11.80	75.72	1187	14.49	110.80
	Surface	45.40	-	1046	-	23.52
Papaya	Drip	74.88	66.89	23590	68.47	0.5
	Surface	226.80	-	13960	-	0.08
Tomato	Drip	19.40	40.00	48500	51.00	261.86
	Surface	32.00	-	32200	-	107.66

(WTC Annual Reports 1985-2003)



**Fig. 3. Water Use Efficiency**

### Affordable micro irrigation systems

Affordable micro irrigation system is mostly suitable to kitchen garden, nursery and ornamental crops.

#### 1. Bucket kit System

Bucket kit system is defined for kitchen garden suitable for women, marginal and small farmers. It consists of a bucket (15 lit.) 10 metre long lateral

(12mm) fitted with drippers (4 LPH), which can irrigate about 100 plants in approximately 20 m<sup>2</sup> area. The bucket is placed at a height of 1m (3 feet) and water is filled for 4 to 5 times daily.



**Fig. 4. Bucket kit System**

#### 2. Drum kit System

This system is ideally suitable to kitchen garden and small commercial vegetable growers. The



drum is having 200-liter capacity which would supply water approximately 500 plants by filling the drum twice daily. It consists of lateral (16mm and 12mm). One number of 16mm lateral and five 12mm laterals are used. This system could cover an area of 120 m<sup>2</sup>.



Fig. 5. Drum kit System

3. Micro sprinkler System

Micro sprinkler kit is suitable for farmers with access to pressurised water. It is very useful for groundnut, vegetables, nurseries home gardens, and lawns etc. It can be connected with a tap from an overhead tank or a domestic water pump. It consists

of 15 micro sprinklers with pipes irrigating an area of 240 m<sup>2</sup>.

Table: 2 Descriptions of different Kits.

Sl. No.	Item	Selling Cost/Unit	Area covered by the kits
1.	Bucket Kit (Drip system)	Rs.500	20 m <sup>2</sup>
2.	Drum Kit (Drip system)	Rs.900 (Excluding Drum Cost)	120 m <sup>2</sup>
3.	Micro sprinkler kit	Rs.1000	240 m <sup>2</sup>

**Conclusion:** Micro irrigation is a vital tool in addressing global water scarcity and promoting sustainable agriculture practices. By adopting micro irrigation systems, farmers, policymakers, and stakeholders can contribute to a more water-efficient future, ensuring food security, environmental protection, and economic growth.

References

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