

Study on cost economics of drip and micro sprinkler irrigation systems for tomato crop

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■ **Abstract** : Field experiment was conducted to find out the economic feasibility of drip and micro sprinkler irrigation system for tomato crop. Once the selective merit and demerits of drip irrigation, micro sprinkler irrigation and surface irrigation method in terms of yield, quality of produce, water saving etc., are established, the cost economics of all the three were studied under the experiment. The major constraint in adopting drip irrigation is its economic feasibility. The analysis of the data revealed that, the installation cost of sprinkler irrigation was less (Rs. 94225/-), B-C ratio was high (3.49) and yield also high (54.2 t/ha) as compared to the drip irrigation system which shown very high installation cost (Rs.101891/-) with lower B-C ratio (3.37) and lower yield (53.6 t/ha).

■ **Key words** : Drip irrigation, Micro sprinkler, Surface irrigation, Cost benefit ratio

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Irrigation can improve crop production, reduce yield variability and increase profits. But choosing and buying an irrigation system are both expensive and complex. When considering investing in an irrigation system, farmers must keep in mind several major factors: the availability of water; the system's application efficiency; the depth from which the water must be pumped, or pumping lifts; the operating pressure of the design; financing; savings in field operations; energy sources; energy prices; crop mix; economies of scale; labor availability; and commodity prices. Keeping the above factors in view, the present study on the cost economics for different treatments *i.e.* drip irrigation, micro sprinkler irrigation and surface irrigation were studied in tomato crop at Tamil Nadu Agricultural University, Coimbatore.

METHODOLOGY

Field experiment was conducted using cost economics of micro irrigation in tomato crop, at Tamil Nadu Agricultural University, Coimbatore. This place is situated in North Western agro climatic zone of Tamil Nadu at 11° N latitude and 77° E longitude and at an altitude of 431 MSL. To study the effect of micro irrigation on yield, water use efficiency and economic feasibility of drip and micro sprinkler irrigation system on tomato crop, the system was designed with measured paths and

lengths of main, sub main and lateral lines from water source to experimental site. To maintain the required operating pressure in the system the main line was connected with the pumping source (bore well) along with a gate valve for regulating water as per the treatment requirement. Average discharge of drip and micro sprinkler were 4 lph and 36 lph, respectively. In the experimental field, Tomato of F₁ NS-7531 variety with duration of 120 days was selected for the study. The experiments were laid out in Randomized Block Design with three replications, treatments includes in this experiment were irrigation by micro sprinkler system (T₁), irrigation by drip system (T₂), and surface irrigation (T₃). Irrigation was given to all the treatments immediately after transplanting, control plot was irrigated weekly twice. Flow through the sub main and all laterals were controlled by separate valve. During the crop period the climate and weather data was recorded. Irrigation was not given to the crop at the time of rainfall. The yield data was recorded as and when the fruits were harvested on attaining maturity and data on cost of cultivation, fixed cost, gross and net income and water used for different treatments were recorded under micro irrigation on tomato crop.

RESULTS AND DISCUSSION

The data on cost of cultivation, fixed cost, gross and net

Table 1 : Yield and water use efficiency for different treatments in tomato

Treatments	Water applied (mm)	Effective rainfall (mm)	Total water used (mm)	Yield (kg/ha)	Water use efficiency (kg/ha/mm)
T ₁	370	100	470	54200	115.31
T ₂	250	100	350	53600	153.14
T ₃	450	100	550	40000	72.72
Mean				49266	
SED	754.49				
CD (0.05)	2094.94				

Table 2 : Cost of components in different treatments for 1 ha

Treatments	Main pipe		Sub main pipe		Lateral pipe		Drippers/Micro sprinklers		Other Accessories (Rs.)	Total cost (Rs./ha)
	Length (m)	Cost (Rs.)	Length (m)	Cost (Rs.)	Length (m)	Cost (Rs.)	No	Cost (Rs.)		
T ₁	5	225	100	3000	5000	25000	25000	60000	2000	94225
T ₂	5	225	100	3000	10,000	50000	16666	46666	2000	101891

Table 3 : Cost economics of drip and micro sprinkler irrigation system for tomato in 1 ha

Sr. No.	Description	T ₁	T ₂	T ₃
1.	Fixed cost (Rs./ha)	94225	101891	0
	Life (years)	10	10	
	Depreciation	9422.5	10189.1	
	Interest @ 12 % (Rs.)	11307	12226.92	
	Repair and maintenance	1884.5	2037.82	
	Total cost (b+c+d)	22614	24453.82	0
2.	Cost of cultivation	55000	55000	65000
3.	Seasonal total cost (2+e) (Rs.)	77614	79453.82	65000
4.	Water used (mm)	470	350	550
5.	Yield of produce (t/ha)	54.20	53.60	40.00
6.	Selling price (Rs./t)	5000	5000	5000
7.	Income from produce (5x6) Rs./ha	271000	268000	200000
8.	Net seasonal Income (7-3) (Rs.)	193386	188546.18	135000
9.	Gross benefit – cost ratio (7/3)	3.49	3.37	3.07

income and water used for different treatments for tomato crop were studied during the experiment. The life of the pipe materials were taken as ten years. Interest at twelve per cent of fixed cost and cost on repairs and maintenance at two per cent of fixed cost were taken into consideration to work out the cost economics.

Micro sprinkler irrigation system gave higher yield (54.20 t/ha) as compared to drip irrigation (53.60 t/ha) and surface irrigation (40.00 t/ha) (Table 1). The benefit cost (B-C) ratio was higher in micro sprinkler treatment (3.49) as compared to drip (3.37) and control treatment (3.07) (Table 3).

In drip treatment it was clear that installation cost of drip system was very high (Rs. 101891/-) and lower yield with lower gross benefit ratio compared to micro sprinkler treatment (Rs. 94225/-) (Table.2) . The micro sprinkler irrigation gave higher

yield and less cost compared to drip irrigation system. A experiment on cost economics of the drip irrigation system for tomato crop was also conducted by Jadhav *et al.* (1990).

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