



LASER IRRIGATION – ALTERNATE TO DRIP AND SPRINKLER IRRIGATION

Y. Pavan Kumar Reddy^{1*}, Siva Jyothi², K. Madhusudhan Reddy³ and B. Sahadeva Reddy⁴

^{1&4} ANGRAU-Agricultural Research Station, Ananthapuramu

² ANGRAU-Krishi Vigyan Kendra, Reddipalli

³ ANGRAU- S.V.Agricultural college, Tirupati

**Corresponding author email: y.pavankumarreddy@angrau.ac.in*

ABSTRACT

Indian agriculture food basket is grown like a giant elephant with the advent of the green revolution, and later on, the micro-irrigation task force came into existence in India. The area under micro-irrigation is increased enormously, and the footprint of the crop yields reached pinnacle ranging from horticultural to field crops etc. The traditional micro-irrigation installation cost at the farm level is a big financial task that hinders the adoption and farmers looking for the govt policy support. There is a need to address this issue with best and most effective systems to facilitate the farmer at an affordable price. In this context, laser irrigation viz., laser spray, and laser drip irrigation are innovative, highly efficient conveyance systems with higher water use efficiency and in an affordable price range to small and marginal farmers, to bring more area under micro-irrigation to achieve more harvest in a wide range of crops.

INTRODUCTION

Micro-irrigation was an untapped potential during the early 20th century in the Indian agriculture scenario. In starting of the 20th century, the definition of irrigation took a new track as a Feed the crop- Not soil. Farmer's income is consistently connected with rain, particularly in drought-prone arid districts of Andhra Pradesh (Reddy et al., 2020). However, a National Task Force Committee (NTFC), constituted by the Govt of India in 2003, has endorsed that 69 M ha of the area is suitable for micro-irrigation in India. A target of 14 M ha has been suggested for the 11th five-year plan (Yella Reddy & Satyanarayana, 2016). With the initiation of the task force on micro-irrigation and govt incentives, the area under micro-irrigation is increased enormously in India and a few other states like Andhra Pradesh, Maharashtra, Tamilnadu, etc. However, in the recent past, many studies revealed that drip and sprinkler irrigation deepen the water table depth in a few parts of Maharashtra and southern states due to the free power supply and automated irrigation switching systems. However, in districts like Ananthapuramu, the harvested water can be used as micro irrigation to enhance yields. Laser irrigation could be a possible alternative for micro-irrigation.

LASER IRRIGATION

Laser irrigation is an innovative alternative to drip and sprinkler irrigation techniques punched with laser holes at definite intervals to discharge minute droplets to the crop with both laser spray and laser drip irrigation.

LASER IRRIGATION

Laser irrigation is an innovative alternative to drip and sprinkler irrigation techniques punched with laser holes at definite intervals to discharge minute droplets to the crop with both laser spray and laser drip irrigation.

LASER SPRAY IRRIGATION

Irrigation as simulated light rainfall during the operation and runs with low pressure. The lateral pipes are laser punched with minute holes for water discharge in the form of sprays.

SPECIFICATIONS OF LASER SPRAY SYSTEM

- ✓ This is available in 32 mm and 40 mm diameter of laterals.
- ✓ The discharge of each lateral is 172-175 litres per hour per meter length.
- ✓ The wetting diameter of each laser punch is 12 m; however, the best results can be obtained at a 10m distance with 100 % overlapping.
- ✓ The Wall thickness of the lateral line is 0.3 mm.
- ✓ It can drizzle up to 5-6 feet (1.5 to 1.8m) height depending on the operating pressure.

Table: 01. Comparison of Laser spray vs traditional sprinkler irrigation system

Specification	Laser spray irrigation	Sprinkler irrigation
Spacing between laterals	6 X 6 m	12 X 12 m
Discharge (lph)	170	1500
Pressure (kg/cm ²)	0.7	1.5-2
Depth of Application (mm/hr)	28	10
Cost per acre (INR/acre) approx.	20000	25000
Radius of operation	4-5 m	10-12m

LASER DRIP IRRIGATION SYSTEM

- ✓ It can work at ultra-low pressure, i.e., 0.1 kg/cm²
- ✓ The dripper discharge is 4lph, spacing between the dripper is 40 cm.
- ✓ Row to row lateral drip spacing is 1.2m (approximately 4 feet).
- ✓ The depth of application water per hour is 8.33mm.
- ✓ The time required for running 1 acre through laser drip is 36 minutes.

DURABILITY AND COST OF LASER SPRAY MATERIAL

Laser spray accessories are very cheap (approximately 16000 to 20000 INR/acre) compared to drip and sprinkler irrigation and can be affordable by every farmer and life span for 3-5 years depending on the usage and maintenance of the farmer.



Fig:01. Laser spray system irrigation system at ARS Research farm, Ananthapuramu



Fig: 02. Different accessories used in laser irrigation laser punched pipe, valve and laser end cap

Table: 02. Comparison of Laser drip vs traditional drip irrigation system

Specification	Laser drip	drip irrigation
Operating Pressure required at dripper discharge point (kg/cm ²)	0.1	1
Dripper discharge (lph)	4	4
Dripper spacing in the lateral (cm)	40	40
Row to row spacing of lateral (m)	1.2	1.2
Depth of application (mm/hr)	8.33	8.33

SUITABILITY OF THE CROPS

Laser irrigation can be adopted in a wide range of crops from suitable for leafy vegetables, onion particularly they enhance the humidity and alter the micro-climate for better yields in the summers particularly. In the hilly terrains of western ghats viz., Ooty, Munnar areas have little higher temperatures and require cool climates and higher humidity. Laser spray lowers air temperature by altering the micro-climate in that context. Laser irrigation is suitable for a wide range of field crops, cereals, pulses, and oilseed crops. Sprinkler irrigation may affect the flowering, pollination, fruit set etc., in certain crops, may be replaced with laser irrigation. Even it can be helpful in the horticultural crops and in greenhouses too.

CONCLUSION

Laser irrigation is at the infant stage in India. It can be studied in depth to a wide range of crops. The area under laser irrigation may increase the policy decision imparted to the existing micro irrigation methods, viz., drip and sprinkler irrigation. Further, it is high time to adopt better micro-irrigation techniques such as laser irrigation in a wide range of crops to upscale the farmer economic status by increasing productivity.

REFERENCES

- Pavan Kumar Reddy, Y., Sahadeva Reddy, B., Malleswara Reddy, A Radha Kumari, C and B Ravindranatha Reddy. 2020. Irrigation management in Pigeonpea under rainfed Alfisols. *Journal of Pharmacognosy and Phytochemistry* 9(6): 136-139.
- Yella Reddy, K., Satyanarayana, T.V. 2016. Micro-irrigation pays rich dividends-experiences of Andhra Pradesh, India. Presented at Royal Irrigation Department, Thailand.

** **