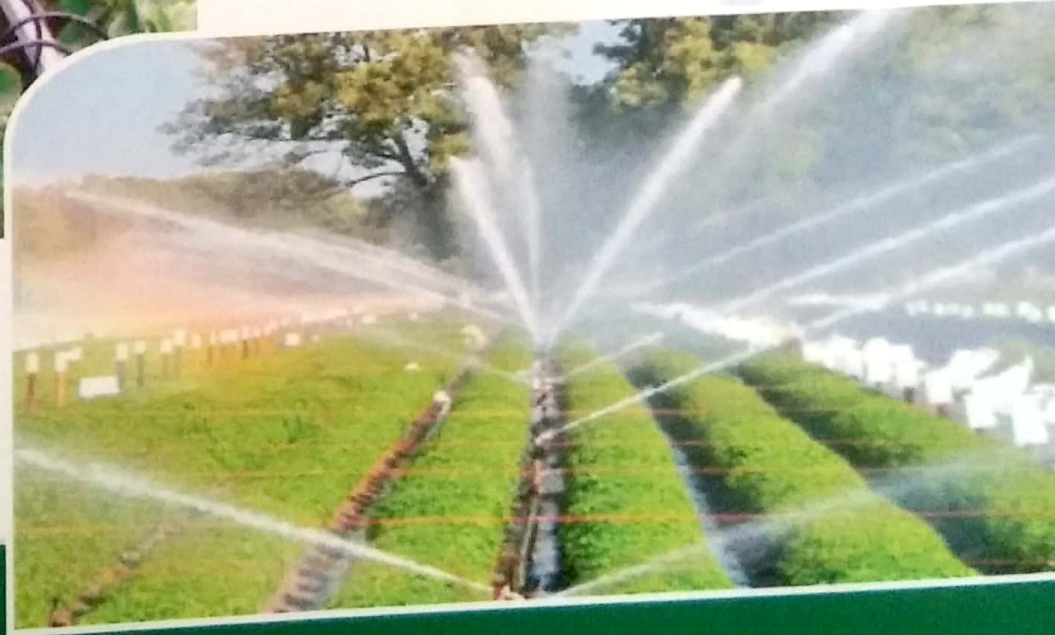


# IRRIGATION AND ECONOMIC DEVELOPMENT



*Edited by*

**Dr.S. THEENATHAYALAN**  
**Dr.P. KANNAN**



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## CHAPTER 21

# MICRO-IRRIGATION: AN EFFICIENT TECHNOLOGY FOR INDIA'S SUSTAINABLE AGRICULTURAL GROWTH

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### Abstract

This paper assesses the current status and technologies of micro irrigation and evaluating the future prospects of micro irrigation adoption in India. The rationale of the paper is to appraise micro irrigation as an innovative technology for sustainable agriculture in India and its significant impact on water productivity and land productivity. The present and future challenges of agricultural demand to population increase can be by technological innovations for sustainable agriculture. Economic return is most important for the adoption of any new technology. Since water being a precious resource for agriculture every drop of water available for irrigation is substantial for overall farm efficiency. To improve the water productivity for agriculture initiatives can be taken at field level and the saved water can be used for the irrigation of additional for environmental and social needs.

**Keywords:** improve water productivity, efficiency, sustainable agriculture

### Introduction

The water is a scarce natural resource and the major requirement of water is in agricultural sector. Technological innovations and interventions are essential for water development and management for sustainable agriculture. Since water being a precious resource for agriculture every drop of water available at delivery system and its proper utilization is very important for overall farm efficiency. Economic return is an important parameter for the adoption of any new technology and at the same time productivity of land and water are also equally important. Pradhan Mantri Krishi Sinchayee Yojna (PMKSY) a flagship scheme launched by Honorable Prime Minister in the year 2015 with two distinctive slogans for water management (i) "HarKhetkoPani" - Extension of Irrigation Cover and (ii) "Per Drop More Crop" - Improving Water Use Efficiency. This Yojna focuses on all aspects of water development and management with micro-irrigation as an integral component. Micro-irrigation was granted an allocation of approximately Rs. 1075 crores to all 640 districts in India.

### Objectives

- The paper analyzed the agricultural growth in India.

### Micro-Irrigation: An Innovation Technology

The benefits are noticed in terms of crop yields, reduction in energy consumption, reduction in the use of chemical fertilizers & pesticides. It also ensures additional benefits like non-exploitation of groundwater, reduction in the cost of weeding and relief from water scarcity induced Labour migration. (ii) Since low flow rate is required, small wells can also be used as a source and it helps



for energy savings up to 30.5%. The potential savings in power may be utilized in other sectors. (iii) The direct application of fertilizers to the roots results in the saving in fertilizer consumption up to 28.5%. This has a long term impact to achieve land productivity (iv) The crop yield is increased and it was stated that the productivity for crops & fruits is increased up to 42.4 % and the increase in productivity for vegetables up to 52.7%. This ensures good economic return for the better yields. (v) Farmers can judiciously add more new crops due to improved water scenario and it was estimated that as many as 30.4% farmers. Hence, micro-irrigation has been considered as an innovative technology for sustainable agricultural growth.

### **Micro-Irrigation: Current Status**

The average penetration level of micro-irrigation in the country is 5.5 % which is much less compared to other countries and only few States in India having the penetration level greater than the national average. These States are Haryana (16.3%), Sikkim (10.8%), Andhra Pradesh (10.4%), Rajasthan (9.3%), Karnataka (8.5%), Gujarat (8.1%), Maharashtra (7.3%) and Tamil Nadu (6.4%). The penetration level in all other states is less than the national average level 5.5 %. As per this report, a steady growth rate of 9.6% is observed in micro-irrigation since 2016 and till recently sprinkler irrigation was shown highest growth rate compared to drip irrigation. In 2017 the area under sprinkler irrigation was Compound Annual Growth Rate (CAGR) 58.6% and the same under drip irrigation was CAGR 41.4% whereas out of the total area under micro-irrigation in 2015, area under sprinkler irrigation was CAGR 56.4% and under drip irrigation was CAGR 43.6%. Hence, in the recent years (2018-19) there was a strong demand for drip irrigation and its growth rate (CAGR 9.85%) during this period outweigh the growth rate of sprinkler irrigation (CAGR 6.6%).

### **Government Schemes Available for Micro-Irrigation**

Government of India has initiated micro-irrigation in 1992 and recognized as a thrust area in various Centrally Sponsored Schemes (CSS) since 2006. This was later upgraded by National Mission on Micro Irrigation (NMMI) during the period 2010 to 2014 and National Mission for Sustainable Agriculture (NMSA) in the year 2014-15. NMMI had a clear vision to promote micro-irrigation as a thrust area and hence the area under this technology was increased from 3.09 Mha in Maharashtra in 1992 to 6.14 Mha in 2012. Under NMMI, some of the States Bihar, Karnataka, Orissa, Rajasthan and Sikkim achieved more than 90 % of the set targets (physical and financial) whereas Andhra Pradesh, Chhattisgarh, Gujarat, Haryana, Maharashtra and Tamil Nadu achieved more than 70% of the target. The key strengths of the scheme were focus on micro-irrigation, longevity for a sustained period of time, greater efficiency due to single implementation agency, quality standards and provisions for after sales service and Government support for demonstration. The limitations of this scheme were inadequate subsidy, inefficient fund disbursement, land ceiling and no uniform implementation.

### **National Mission for Sustainable Agriculture**

National Mission for Sustainable Agriculture (NMSA) implemented in the year 2014-15 had four components; (i) Rain fed area development, (ii) On-farm water management, (iii) Soil health management, and (iv) Climate change and sustainable agriculture. On-farm water management promotes efficient technologies and equipments and the main focus is on water use efficiency. Hence, micro-irrigation is considered as a component of on-farm water management. A total amount



of 1111.82 crores had been allocated to on-farm water management under NMSA where Gujarat share was 142 crores. The major strengths of this scheme were (i) to promote a sustainable agricultural system considering climate change aspects and (ii) to promote location specific agronomic activities. In this scheme also some shortcomings were noticed at the planning and implementation stages. These were (i) lack of focus as a single idea, (ii) incomplete guidelines and (iii) inefficiency in implementing the scheme.

### Challenges for Adopting Micro-Irrigation Technology

Though the technology has large potential and accrued benefits, according to the report published by the national schemes initiated since 2006 could not be addressed the following important issues related to planning and implementation of the technology: (i) Inadequate focus on nationwide spreading of micro-irrigation technology; (ii) Inefficiency in implementation as the implementation agency was changed from a dedicated mission to a component part of NMSA under PMKSY. In many States, the released funds were not utilized properly due to the lack of implementation strategies; (iii) Lack of reliable guidelines and delay in Government orders; (iv) Unavailability of subsidy funds for installation as subsidy reduced from 50% to 35% and allocation of funds under various schemes is declined; and (v) Difficulty in getting necessary supports from financial services. It was reported that a lower adoption rate due to the reduction in budget during the period (2013-16).

### Conclusion

The increase in the overall economic benefits accrued due optimum utilization of water. Since the technology offers higher benefits like irrigation efficiency (50-90%), fertilizer (28.5%) and energy (30.5 %), this technology is highly relevant and praise worthy. Micro-irrigation is an intervention to address various issues of agricultural growth and hence it is considered as a leveraging technology to sustainable agriculture. Farmers will adopt the technology if economic return is more. The noted benefits due to micro-irrigation technology are increase in yield, improvement in the water use efficiency, reduction in the cost of water, fertilizers and manures and weed removal.

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