

# An Analysis of Micro Irrigation in India

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## ABSTRACT

There is a global crisis regarding water and water management. The crisis significantly affects the availability of water use and its very uneven spatial distribution. The situation of water availability has changed drastically in the last 4-5 decades. The overall efficiency of irrigation in India is often found to be quite low compared to global standards due to the use of the conventional flood irrigation technique used in large parts of India. The water use efficiency of the conventional flood irrigation method used mostly in Indian agriculture is very low due to significant losses in transportation and distribution. In view of the rapid decline in irrigation water potential and increasing water demand from various sectors, a number of demand management strategies and programs have been introduced to conserve water and increase the existing water use efficiency in Indian agriculture. One such method introduced relatively recently in Indian agriculture is micro irrigation, which involves the drip method of irrigation. Micro irrigation, formerly known as drip or drip irrigation, is a highly efficient water management technique. Micro irrigation has proven to be an effective method for saving water and increasing water use efficiency compared to the traditional irrigation method where the water use efficiency is only about 35-40 percent. Appropriate management of drip irrigation is influenced by many factors, including system design, soil characteristics, crop and environmental conditions, etc. The effects of these factors can be integrated into a practical, efficient planning system that determines the amount and timing of drip irrigation. Micro irrigation is one of the most effective irrigation methods. It is considered a promising technology for water conservation and management techniques.

**Keywords:** Agriculture, Irrigation techniques, Micro-irrigation, Water management, Water saving techniques.

## INTRODUCTION

The rapid depletion and diminishing of groundwater resources threatens the agricultural community and forces them to adopt better water management practices to achieve sustainable production. The concept of irrigation is as old as human civilization; however, over a period of time there was an increase in the efficiency of irrigation patterns. Adoption of improved water management practices is an important need of the day. Indian crop production suffers not only from drought but also from indiscriminate use of water for irrigation. Overall, micro-irrigation shows superiority over other traditional irrigation methods in terms of water use efficiency, energy savings, yield increase and net return per unit volume of groundwater. Micro irrigation technology is important and has been promoted since the 1990s. Furthermore, this technology also improves crop yield and provides economic benefits to farmers.

This technology now forms part of the Pradhan Mantri Krishi Sinchayee Yojana. The Pradhan Mantri Krishi Sinchayee Yojna was launched in 2015 and integrated micro-irrigation into the flagship scheme as an integral part. The scheme aims to provide a comprehensive solution for the irrigation supply chain. One of the key differentiators for micro-irrigation is that compared to other components of the scheme, which include the creation of infrastructure to bring water to farms and watershed development, micro-irrigation presents a win-win opportunity for all stakeholders where implementation is seen on the ground. Infrastructure development takes years, while bringing an area under micro-irrigation is a task that requires only a few months. Apart from various programmes, large-scale projects have also been launched at the state level which has seen success, such as the Gujarat Green Revolution Company (GGRC) and the Andhra Pradesh Micro Irrigation Project (APMIP). The common thread that runs through them is the presence of a team dedicated to supporting micro-irrigation and strong operations supported by information technology.

## Micro Irrigation:

Micro irrigation has seen steady growth over the years. Since 2005, the area covered by micro-irrigation systems has grown at a CAGR of 9.6% to reach 9.39 million hectares. However, the potential area that can be covered by micro-irrigation totaled 69.5 million hectares in 2015. Although adoption of micro-irrigation techniques by farmers is growing at a rapid pace, market penetration is still very low. Half of the country's arable land is still rain-fed, so there is huge potential to promote micro-irrigation. Most of the areas covered by micro irrigation systems are sprinkler irrigated with 5.81 million hectares while 3.57 million hectares are under drip irrigation. The area under drip irrigation has shown stronger growth in

recent years, growing at a CAGR of 9.85% during 2012-2015, while sprinkler irrigation grew at a rate of 6.60% during the above period. Drip and sprinkler irrigation methods differ in terms of flow rate, required pressure, wetted area and mobility. India has huge potential for both irrigation methods. In terms of crops, the maximum use of drip irrigation systems was in fruit crops, followed by plantation crops in terms of area coverage. The Indian micro irrigation market is highly competitive with the presence of large and small manufacturers and dealers of drip and sprinkler irrigation equipment in many states of India. Currently, there are nearly 200 micro-irrigation companies in the country.

### **Objectives of the Study:**

The main objectives of the present study were:-

1. To promote micro-irrigation technologies for water-intensive/water-consuming crops like sugarcane, bananas, cotton, etc. and give due consideration to expanding field crop coverage using micro-irrigation technologies.
2. To promote micro-irrigation technologies in water scarce, water scarce and groundwater critical blocks/areas.
3. To link tube well / river lift irrigation projects with micro irrigation technologies for best energy utilization for both lift and pressure irrigation.
4. To promote, develop and disseminate micro-irrigation technology for the development of agriculture and horticulture with modern scientific knowledge.
5. To point out employment opportunities for skilled and unskilled persons, especially unemployed youth, for installation and maintenance of micro irrigation systems.

### **METHODOLOGY**

Secondary data has been used in this research paper. Data has been collected from various governments/ official web site and other sources.

### **Challenges for Indian Agriculture:**

Indian agriculture has two main challenges:

1. Lack of water
2. Feeding a growing population.

### **Contribution of Agriculture to the withdrawal of fresh water:**

Agriculture contributes the most to the withdrawal of fresh water. According to the Food and Agriculture Organization of the United Nations, the irrigation and livestock segments accounted for 91 percent of India's water withdrawal, well above the global average. Observations of the source of water intake are also alarming. Roughly a third of the water withdrawal came from groundwater. Groundwater is being depleted very quickly and there is no faster mechanism for replenishment as it is a very long process. Groundwater, if used from a greater depth, cannot be recharged by rainfall and is therefore no longer a renewable resource. World Bank estimates in 2010 showed that groundwater supported 60 percent of irrigated agriculture and 80 percent of rural and urban water supply.

### **Dependency of Population on Agriculture:**

The country's growing population depends largely on agriculture and agricultural production. Feeding a growing population expected to reach 1.6 billion by 2050 will be a major challenge for Indian agriculture. Although the production of food grains has increased significantly over the years, there is a need for the production to increase even further to meet the future demand created due to this population growth of the country. Since land is a limited resource, this would require improving crop productivity.

### **Government Schemes to Promote Micro Irrigation:**

Pradhan Mantri Krishi Sinchayee Yojana was launched on 01<sup>st</sup> July, 2015 by the Central Government of India. The goal of the regime was to achieve convergence of investments in the agricultural sector. The objective of the scheme was to ensure water resources, distribution network and applications at the farm level. Micro irrigation is an integral part of the system to maximize water use efficiency. It also enables states to work out their own irrigation development based on district and state irrigation plans. The components of Pradhan Mantri Krishi Sinchayee Yojana are as below:-

1. Har Khet Ko Pani – The aim of the project was to create new water sources (surface and underground). As part of this plan, the repair, restoration, renovation of water bodies and the construction of buildings for capturing rainwater were implemented. In this scheme, groundwater development in an area where it is abundant is created to store flood water during the rainy season. Water management and the distribution of water bodies have improved.
2. More yields per drop – The main objective of yield per drop was to increase the area under micro irrigation technology to increase the efficiency of water use in the country. It also increases crop productivity and farmers' income. It supports micro irrigation technology in water consuming crops like sugarcane, banana etc. It supports micro irrigation technology in water scaring and critical ground water blocks/districts.

### **Current Status of Micro Irrigation:**

The area under micro-irrigation has increased from 11,817 ha in 2005-06 to over 9.39 lakh ha in 2015-16 due to promotional schemes introduced by the state and central governments. Despite its many advantages over conventional irrigation methods, the area under micro-irrigation currently occupies only about 19 percent of the total irrigated area. According to the latest information only 3.57 lakh ha area is under drip irrigation and 5.81 lakh ha is under sprinkler irrigation which is very less and farmers have to increase it and governments have to support it.

### **SUGGESTIONS**

The government regularly tries to promote micro-irrigation technology through various schemes so that farmers can adopt this technology in India. The government wished to extend this technology to the maximum irrigated area. It is believed that the adoption of micro-irrigation cannot be scaled up in India without subsidies. Government should make arrangements for supply of fertilizers and equipment by agencies. Technical support should also be provided by agencies for operating micro-irrigation systems. By providing training facilities to farmers, this technology can be scaled up for their adoption. Farmers do not have sufficient knowledge about system maintenance. Therefore, the government should promote this water conservation technology to the farmers by publicizing the scheme in various newspapers and advertisements on social media. Some special packages may be introduced for farmers who are willing to adopt this technology. The government can provide free services to farmers regarding the adoption of this water conservation technology along with providing them with an easier subsidy method for sustainable development.

### **CONCLUSION**

Water, which is the most important element of nature, is therefore a very basic requirement for all living beings on Earth. Water has become the focus of the modern world and its international organizations, such as the United Nations officially declaring the annual World Water Day on March 22. A water-secure world reduces poverty, promotes education and raises living standards. It is a world where there is a better quality of life for all. In this article, we have discussed the micro-irrigation technology as water saving and management technique and concluded the importance of the scheme as below:

1. Micro irrigation helps in water use efficiency.
2. It has the potential to act as both supply and demand management.
3. Expansion of the area under micro-irrigation technology using the same amount of water.
4. Savings on labor, fertilizers and electricity. The cost of cultivation is thus reduced.
5. Micro-irrigation technology not only saves water, but also helps health management and prevents water accumulation.
6. Micro-irrigation with the creation of water catchment storage, structures like ponds, reservoirs etc. is a convergence and related afforestation protection scheme in over-exploited zones to recharge aquifers.

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