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Impacts of Drip irrigation in India

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ABSTRACT

Micro irrigation, earlier known as Drip or Trickle irrigation is a highly efficient method of water application. It developed and expanded globally at a fast rate in the last two decades in more than 35 countries with maximum coverage in the United States and India is not too far from it, it is also developing these types of systems. This is most appropriately applicable to widely spaced crops such as fruits, vegetables, and field crops. Its different variations consist of a surface trickle, bubbler, micro sprinkler, spray, mechanical move, pulse, subsurface drip, all of which are covered under a single term Micro irrigation.

Keywords *— Microirrigation, Trickle irrigation, Mechanical move, subsurface drip*

1. INTRODUCTION

Before moving to drip Irrigation lets understand what irrigation is. It is the application of controlled amounts of water to plants at needed intervals. Irrigation helps to grow agricultural crops, maintain landscapes, and re-vegetate disturbed soils in dry areas and during periods of less than average rainfall. Irrigation is the most important part of Indian History, and now also many people earn their livelihood by that only, in India the rural area people earn their livelihood by farming and the respective citizens of India also get their food by these crops which are grown by the farmers, hence this is very important that we give some advancement to them so that they can give more output to us and hence we can develop more fastly.

2. HISTORY OF DRIP IRRIGATION

Primitive drip irrigation has been used since ancient times. Fan Sheng-Chih Shu, written in China during the first century BCE, describes the use of buried, unglazed clay pots filled with water as a means of irrigation. Modern drip irrigation began its development in Germany in 1860 when researchers began experimenting with subsurface irrigation using clay pipe to create combination irrigation and drainage systems. The research was later expanded in the 1920s to include the application of perforated pipe systems. The usage of plastic to hold and distribute water in drip irrigation was later developed in Australia by Hannis Thill.
Usage of a plastic emitter in drip irrigation was developed in Israel by Polish-born Simcha Blass and his son Yeshayahu. Instead of releasing water through tiny holes easily blocked by tiny particles, water was released through larger and longer passageways by using velocity to slow water inside a plastic emitter. The first experimental system of this type was established in 1959 by Blass who partnered later (1964) with Kibbutz Hatzerim to create an irrigation company called Netafim. Together they developed and patented the first practical surface drip irrigation emitter.

Fig. 1: Drip irrigation pattern

3. COMPONENTS OF DRIP IRRIGATION

Components used in drip irrigation include:

- Pump or pressurized water source.
- Water filter(s) or filtration systems.
- Backwash controller (Backflow prevention device.
- Pressure Control Valve (pressure regulator).
- Distribution lines (main larger diameter pipe, maybe secondary smaller, pipe fittings).
- Hand-operated, electronic, or hydraulic control valves and safety valves.
- Smaller diameter polyethylene tube (often called "laterals").
- Poly fittings and accessories (to make connections).
- Emitting devices at plants (emitter or dripper, micro spray head, inline dripper or inline drip tube).

4. HOW DRIP IRRIGATION CAN BE USED IN INDIA

As India consists of wide agricultural areas where the practice of agriculture is done, majorly UP east, Assam, Rajasthan, Bihar and Tamil Nadu and many more states. As we are seeing day by day more heat is their which results in more water consumption if we just spill the water in crops, we need some resistive techniques so that less water is wasted and we can use water for future use. The Drip irrigation technique provides water directly to the root of the plant hence which saves 10-20 mld/day. So by this step, we can help the farmers in a better way and they can save water by this process which can be used afterward to irrigate plants. As sometimes India faces water crises due to high summer temperature, by this method we can save water and if any crises are there we can use this water for the growing of plants.

5. WHICH STATES USES DRIP IRRIGATION IN INDIA

- Rajasthan.
- Maharashtra.
- Andra Pradesh.
- Karnataka.
- Gujrat.
- Haryana.
- Madhyapradesh.
- Tamil Nadu.

Table 1: How many companies manufacture machines for drip irrigation

S. No.	Companies	States
1.	Drip India irrigation Pvt. Ltd.	5th floor, Gajanan Avenue, New Pandit Colony, Nashik, Nashik, Maharashtra 422002
2.	Netafim Irrigation India Private Limited	302, Taksh Paradigm, Near Star Mart, 3rd Floor, Old Padra Road, Old Padra Road, Vadodara, Gujarat 390015
3.	Kothari Drip Irrigation Systems Ltd	2/211, Kunnathur-Sevur Road, Kunnathur, Tamil Nadu 638103
4.	Irrigation Products International Private Limited	4/112, 2nd Floor, East Coast Road, Neelankarai, Chennai, Tamil Nadu 600115
5.	Ambika Drip Irrigation	Ambika Drip Irrigation Near Govt. Bus Stand,,Behind Santhegate,opp VRL transport, Kolar, Karnataka 563101
6.	Premier Irrigation Adritec Private Limited	Premier Irrigation Adritec Private Limited
7.	Jain Drip Shop Eluru	Beside SBI, Eluru,W G Dt, Kandrika Gudem, Andhra Pradesh

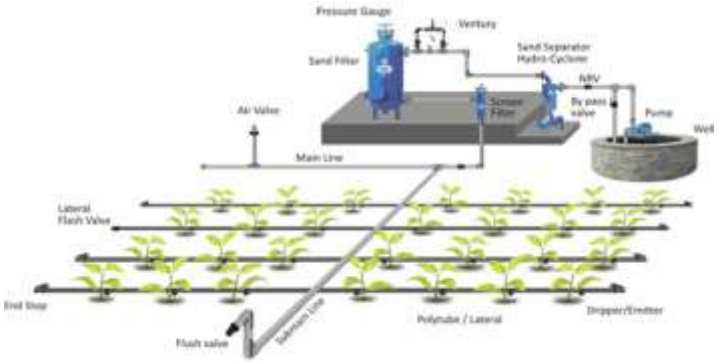

Fig. 2: Drip irrigation setup

6. HOW CAN WE IMPROVE DRIP IRRIGATION FACILITIES IN INDIA

As we can see that most companies of drip irrigation as located in south Part of India, then how cum other people of India will get to know which technology has just arrived in market, we need to establish some plants in rest part of India as other people can be used to it and see what it's all about and how it is used. As if it is located in another part of India, not everyone can afford to transport

it from a far distance. So we need to set up some plants here too so that everyone gets the benefit of it. We need to help farmers so that they can provide us with good quality grains and it can be transported to other countries from where they can get some profit margin.

Also, we should take care that some volunteers should be there to help the farmers out how to use the Drip Irrigation device. Hence by this method, we can help farmers.

7. ADVANTAGES OF DRIP IRRIGATION

The advantages of drip irrigation systems include a high efficiency of water use and greater crop yields compared to other irrigation methods. In addition, crops irrigated using drip irrigation systems generally require less tillage and are of better quality. DIS also contribute to improved plant protection and reduced occurrences of plant diseases and greater efficiencies in the use of fertilizers, because water containing the agrochemicals is applied directly to the plant roots in the quantities necessary for optimal plant production. For a similar reason, DIS can also make use of lower quality water and results in no return flows, tailwater losses or increased soil erosion. Because water is applied in optimal quantities, plants generally have a shorter growing season and produce fruit earlier, with less weed growth and pest damage than conventionally irrigated crops. The lower labor requirements result in relatively low operational costs, with savings in labor of up to 90% of the costs associated with conventional systems, in part, because mechanical operations can be carried out simultaneously with the application of irrigation water. DIS can be used in hilly terrain and on lands with problem soils and results in improved infiltration in soils with low conductivity. Drip irrigation systems are low-pressure systems, which can be adapted for use in greenhouses, and with automated control systems.

8. DISADVANTAGES OF DRIP IRRIGATION

Drip irrigations systems have a sensitivity to the clogging of the drippers, which may require pretreatment of turbid source waters, and, if not properly installed, can cause moisture distribution problems. The systems are also susceptible to rodent damage. The systems have a high cost compared to conventional irrigation methods and require higher levels of skill for design, installation, and operation, which make them liable to damage or theft.

9. EFFECTIVENESS OF TECHNOLOGY

Leaving few things, there was an improvement in crop yields and savings in water use of between 18% and 40%. Consequently, there was a substantial improvement in the water use efficiency that ranged up to three times that of water use efficiencies achieved using conventional surface irrigation methods, even with the use of poor quality irrigation water. Because of the directed delivery of irrigation water, it is possible to utilize poor quality irrigation water using the drip irrigation system.

10. OPERATION AND MAINTENANCE

The principle operation and maintenance requirements associated with the implementation of this technology include the need for regular cleaning of the system and careful monitoring of the quality of the source water, as the drip irrigation systems are very sensitive to the clogging of the drippers. The systems also require a relatively high degree of skill to design, install and operate and are susceptible to theft, damage, and disruption by rodents that destroy the drip pipes and drippers.

11. COST ESTIMATION

The capital costs involved in the establishment of a drip irrigation system are high compared to the costs of establishing conventional irrigation systems. However, the labor requirements and operational costs are low. The net result is that the benefit-cost ratio for DIS is very favorable compared to conventional systems since the payback period for investment very short.

Example:

Taking the example of Maharashtra the cost of DIS ranged from $450/ha to $1 150/ha in 1990. Elsewhere, the cost of using drip irrigation systems for sugarcane irrigation averaged $715/ha, for banana irrigation $1 150/ha, and for cotcrus-fruit irrigation $575/ha, with the payback periods ranging from 2 months for banana crops, 12 months for cotcrus-fruit crops, and 18 months for sugarcane crops. Comparative benefit-cost ratios for various crops ranged from 1.64 for groundnuts (peanuts), to 4.84 for pomegranates, to 5.15 for tomatoes, to 8.58 for grapes, to 15.0 for mosambi.

12. CONCLUSION

This is a proven technology suitable for use with high-value crops. Several crops which can be irrigated using drip irrigation systems include sugarcane, groundnuts or peanuts, coconuts, cotton, coffee, grapes, potatoes, and all fruit crops, spaced vegetable crops, and flowers.

By this process, we can save ample amount of water, which can be used time of drought. This process does play important role in the agriculture field.

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