Journal of Engineering Research and Application
pp: 22-29
Volume 1, July 2022
http://dx.doi.org/10.55953/JERA.1103

A REVIEW OF THE DRIP IRRIGATION SYSTEM

Bhagya Jayant[1], Kunal Dahiya[1], Ark Rukhiyar[1] , Ritu Raj[2] & Rahul Kumar Meena[3*]

[1] Undergraduate Student, Department of Civil Engineering, Delhi Technological University, Delhi, India
[1] Post Graduate Student, Department of Civil Engineering, Delhi Technological University, Delhi, India
[2] Assistant Professor, Department of Civil Engineering, Delhi Technological University, Delhi, India
[*] Corresponding author rahul.08dtu@gmail.com

Abstract- Irrigation can be defined as the process of applying artificial water to soil or land in order to promote the growth of agricultural crops such as corn and wheat. Water irrigation has a number of advantages, including an increase in crop yield, protection against famine, revenue generation, and the avoidance of mixed cropping. It also has advantages in navigation, hydroelectric power generation, and the creation of employment opportunities. It should be noted that irrigation has both advantages and disadvantages, just like everything else. Irrigation has a number of disadvantages, including the waste of irrigation water, the formation of marshy lands, damp weather, and the loss of valuable agricultural land. Drip irrigation is one of the surface and subsurface irrigation methods that we will discuss in this paper. We will also discuss the various effects and advancements in this technique that have occurred as a result of the research conducted. Last but not least, the significance and necessity of this system will be discussed.

Key words:- Drip, Irrigation, Artificial Irrigation, Efficiency, Framers

Introduction

Drip irrigation system is a type of micro-irrigation system that is widely used around the world to improve crop yields and to increase crop yield potential. It is the most recent irrigation method to be developed. It is used as a surface and subsurface irrigation method, depending on the situation.

In surface irrigation, water is distributed to the agricultural land through small channels that flood the area to a depth determined by the amount of water required. Hydraulic applications and

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distribution can be accomplished either by gravity or by pumping. When used on soils with low to moderate infiltration capacities and on lands with uniform terrain, this method is effective. It is further divided into three categories: flow and lift irrigation; perennial irrigation; and flood irrigation. Farmers have traditionally used this method to harvest their crops. However, because of the significant disadvantage of this practice was found to be ineffective due to water loss due to evaporation in the middle of the process.

It is also possible to use drip irrigation in conjunction with subsurface irrigation, which is another option. Subsurface irrigation is a type of irrigation in which water flows underground and nourishes plant roots through capillary action. Water is delivered directly to the roots, with no excess water flowing anywhere else in the system. The network is made up of three types of pipes: main pipe, sub main pipe, and lateral perforated pipe. This method is best suited for soils with high water permeability. They can be further divided into two categories: natural sub irrigations and artificial sub irrigations. Artificial irrigation, on the other hand, is more expensive and is therefore only recommended in areas with high returns.

When people first started using this technique, they encountered some difficulties determining when to allow the water to flow. Gradually, they discovered the best method for determining the best time of day to allow water to flow and the length of time it should flow for the best crop yield results.

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LITERATURE REVIEW

There is a plethora of literature on agricultural technology adoption. Drip irrigation adoption, on the other hand, is contingent on a variety of demographic, regional, and other factors, such as government incentives. As a result, according to the study's goal, the suggested study integrates certain relevant literature. Precision farming, according to Yahasaswini Sharma et al (2015), will boost productivity, lower production costs, and reduce the impact of farming on the environment. Precision farming, according to Crookston (2006), is one of the top ten agricultural revolutions in history, and it entails

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using the correct management strategies in the right area, at the right time, and at the right place. According to Mulla et al (1996), precision farming has several advantages, including increased efficiency in farm management inputs, increased agricultural output, improved crop quality, and less fertilizer transportation. Agriculture was linked to socioeconomic trends in underdeveloped nations by Pinaki Mondal et al (2008). The scope, current state, and tactics for precision agricultural adoption in India and other developing nations are also discussed in this research. Khondoker A. Mottaleb (2018) explored the perception and acceptance of new agricultural technology in developing nations. The said study highlights the significance of poverty among farmers in developing countries' rural regions in making technology adoption decisions. According to a study by Neşe Üzen et al on the importance of micro-irrigation in modern agriculture, the micro irrigation system is successful for horticulture in any weather condition. This will result in higher crop yields, better fertilizer use, less salinization, and no crop disease, as well as lower labour costs. P. Suryavanshi et al. (2015) recommended micro-

irrigation as sustainable agriculture since it saves water and increases crop output while lowering cultivation costs. When compared to surface irrigation, all crops farmed with drip irrigation have higher production. Drip irrigation's prospects, possibilities, and limitations in India were explored by Khusro Moin et al (2018); they also discussed the economic state of water in India, as well as a comparison between surface irrigation and drip irrigation in terms of cost-benefit analysis, agricultural yield, labor, and efficiency. It also examines the rate of drip irrigation adoption in India, concluding that the reason for farmers' reluctance to embrace drip irrigation is the high initial cost, which is prohibitive for small and medium farms. According to Namara et al. (2001), the adoption of micro-irrigation technologies involves three essential factors: (a) the technology must be economically and technically feasible; (b) farmers must be aware of the technology, and (c) farmers must be able to access it. With the aforementioned literature research, we can see the limits and reasons why farmers in different parts of India are not using drip irrigation.

METHODOLOGY

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Drip irrigation is a technique in which water and fertilizer are applied slowly and directly to the root zone of the plant in order to reduce evaporation and seepage losses. This is accomplished through the use of specially designed emitters and drippers. This method is best suited for row crops and orchards, such as tomatoes, grapes, corn, cauliflower, cabbage, and other similar crops, as well as orchards.

Using drip irrigation has a number of advantages, including the fact that it requires little water, has low evaporation losses, produces the fastest rate of vegetative growth, wets the soil surface the least amount of time, and thus reduces the occurrence of diseases caused by damp conditions. There is no need to level the land. There is no soil erosion taking place. There is less labour required. One example is Israel, which was experiencing severe water shortages prior to the implementation of drip irrigation. After implementing drip irrigation, Israel's water supply was significantly improved.

And the disadvantages include a lot many too. It is little expensive, around 30 – 40k per acre or may vary through states/ locality with subsidies imposed on them. Requires extra training apart from notion of general farming. Government is doing its best to raise awareness through camps or books on this newly adopted system. Have to redo, good qualities pipes have general life span of 5 years, which may be exceeded maximum to 8 years. After which, the entire pipe system needs to be removed and changed with the new pipes. This is tedious and time taking. Does not

offer frost protection. Needs regular flushing and supervision. High skill is required in the design, installation, operation and maintenance.

Drip irrigation system is not traditionally irrigation, therefore, farmers need to learn the technique which takes little training (now also provided by government camps and education). Water is saved by minimizing evaporation. Low soil erosion occurs. The main benefit of drip irrigation system is that water is directly at the root zone. Surface drip or surface. Cheap pipes made in possible. Subsidies can be given by the government for installation of drip system. Proper guidelines are given for its entire set – up this is for outlet system.

It saves up to 20 to 50% of water, therefore saving fertilizers like nitrogen gas which are directly sent to the pipes, saving up electricity charges and also recharges the rainwater. Nowadays, new

http://dx.doi.org/10.55953/JERA.1103

techniques used to resist the rodent incubation involves setting the pipes' plastic layer with posion, so that when any rodent bites it, gets poisoned and dies on spot

CONCLUSIONS

From various research papers reviewed above as well other secondary research it may be concluded that:

- Farmers with less income or small farmers who are marginalized have less tendency to obtain drip irrigation systems in any form. The major reason for it is the high initial costs and short lifespan of pipes in this system. Also, since most of these small farmers do not have large enough land holdings, therefore investing in drip irrigation techniques becomes not viable for them.
- It may also be concluded that big farmers having large landholdings are more willing to acquire this technique as it saves them to labor, water, electricity, and fertilizer costs. It optimizes available water for them as evaporation loss is less and water is dripping directly at the root of the plant.
- Although, for a country like India, drip irrigation is very beneficial and must be adopted. However, when the matter of the world is concerned, it has its own complications. Some countries like New Mexico which face deficit irrigation develop stresses in plants thereby making the crop more prone to diseases and attacks causing environmental harm. For such areas, this technique takes a dip as the crop yields are reduced as water never reaches the water deficit areas. For many such places as such, water-saving techniques are used which may reduce the downstream flow of water and raise production.
- Drip irrigation was found to be better than most of the other irrigation methods due to its multiple advantages and adaptability in the current scenario in the irrigation system. It is simple and needs little training to implement. The government in many states also promoted the procurement of the same by providing subsidies.

Data Availability Statement

http://dx.doi.org/10.55953/JERA.1103

All data, models and code generated or used during the study appear in the submitted article.

Funding Statement

Authors would like to express their sincere gratitude to Delhi Technological University, Delhi, India for providing research facilities to conduct this research work.

Acknowledgments:

The authors acknowledge the Department of Civil Engineering and Delhi Technological University, Delhi

Conflict of Interest:

The authors declare that there are no conflicts of interest.

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Received: 18 March 2022
Revised: 11 April 2022
Accepted: 26 April 2022
Journal of Engineering Research and Application