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A Review on Drip Irrigation and Water Management in Agriculture

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ABSTRACT

In recent years, water has become a scarce resource. The problems such as evaporation and contamination add more trouble to the existing challenge. A new technique called drip irrigation has been placed to face the scenario where the availability of water is limited. This method has been used widely around the world and has seen more benefits. A different dimension to the drip irrigation is trickle irrigation which aims to take care of trees.

Key words: Drip irrigation, trickle irrigation, Yield, Cropping pattern and investment

INTRODUCTION

Agriculture is the backbone of human survival. However a country develops economically through many industries, agriculture is inevitable. India has been known for its interest and support to agriculture. With high population growth rate of and conversion of the agricultural properties into residential places, water resources have been affected more. In addition to these, various other challenges faced by the farmers are soil erosion, types of crops, land fertility, quality of materials available for irrigation, skilled labour available in the field of agriculture, commitment of agencies involved in the irrigation process etc. Given this situation, it becomes the need of the hour for the farmers to come up with an alternative method of irrigation to face the challenge and to make optimum utilization of the available water.

Drip Irrigation and water management

Drip irrigation technology is considered to be having more benefits than the traditional flood irrigation. This statement is confirmed by researchers as well. Kumar and Palanisami (2010) in their study reveal the implementation of the drip irrigation technology has resulted in increase in the area sown and the irrigated area with the available amount of water. This results in increased cropping intensity. Further, the drip irrigation technology has a significant improvement on saving of resources, cost of cultivation, yield of crops and profitability of the farm. Compared to the flood method of irrigation, the physical water and energy productivity is significantly higher in the dripping method of irrigation.

Even though the profitability of the farm is higher in drip irrigation, there are several difficulties in adopting the drip irrigation. The major factors are the huge initial investment and the lack of technical support. In addition to these, the other factors such as cropping patter, access to the water and the socioeconomic conditions of the farmers are also found to the major hindrances for adopting the drip irrigation (Narayanamoorthy, 1997). Most of the farmers are from the middle and lower income group and are mostly uneducated. It is difficult for the farmers to generate the fund required for the initial investment for implementing the dripping irrigation.

With the increase in population, India will be demanding 60 percent more grains with limited resources. In future, to cope up with the increasing demand, the resources used in the agriculture such as land, water etc. need to be utilised in and optimum

and efficient methods. The usage of inputs, particularly the water resource has to undergo the proper scrutinisation to ensure that the efficient output is achieved (Kiran, Jayasheela, & Hans, 2007).

As water has become a scarce resource, it is the duty of the farmers to commit themselves towards the optimum and efficient usage of water. Also the international agreements on the usage of water would guide the scientific way of utilising the water for efficient results (V. Basil Hans & Jayasheela, 2010).

The mechanism of proper usage of water can be placed in the system of irrigation in a friendly way. The water management system has to be integrated with other farm practices. These are practically feasible. With the overall change in the climate around the world, it is anticipated that the water shortage will be high in near future. When we step into such situation, the need of the hour will be the efficient system for managing the water resources and the irrigation techniques (Jaeger et al., 2017). In order to achieve the efficient water management system in future, it is necessary to educate the famers with the latest irrigation technologies and to provide them the necessary support in terms of initial investments and sustainability with the system.

Due to the increased industrialisation and growth in information technology, the new generations of the farmers' family have started going out of the agriculture and seeking jobs in cites. This resulted in the reduced number of the available labour for the agriculture. In order to neutralise the negative impact of the less labour, the automated system of drip irrigation can be used. It is found from the study that the automated system of drip irrigation in comparison to conventional system has led to the reduction of 50% consumption of water, reduced monitoring and increased yield (Ramya & Saranya, 2017).

Out of the total population in the world, India is contribution 17%. However, the challenge India faces is related to the availability of the fresh water resources. Only 4% of the fresh water resources are contributed by India to the world. The lower per-capita water availability for consumption has pushed India under the category, "water-stressed nation".

Once of the major influential factor about the drip irrigation is that it is efficient on all kids of topography. Because of this reason, drip irrigation is highly recommended to the farmers. The major challenge faced by the farmers is the soil erosion. The drip irrigation also helps the farmers in facing the soil erosion by restricting pollution of water bodies (V. B. Hans, 2010).

Famers from middle and lower economic group are reluctant to implement the drip irrigation method, due the inability to generate the fund for the initial investments, even though they are well aware of the benefits of the drip irrigation. They are expecting more support from the government (Moin & Kamil, 2018). Also, the lack of the training hands is also another factor deterring the famers from implementing the drip irrigation.

There are several types of the irrigation methods. The common methods of irrigation are

- Surface irrigation
- Localized irrigation
- Drip irrigation
- Sprinkler irrigation
- Center pivot irrigation
- Lateral move irrigation
- Sub-irrigation
- Manual irrigation

The all the irrigation methods cannot be used commonly for all types of crops. Certain methods are good for certain crops and certain other methods are bad for other crops. The suitable methods of irrigation are to be chosen based on the crop, the physical facility available for farming with major consideration on amount of water available for irrigation.

Agriculture on dry land poses a challenge for traditional irrigation methods. In such situations, drip irrigation method is most beneficial. A study was carried out to understand the benefits derived by implementation drip irrigation in horticultural crops in Dindugal district of Tamilnadu. The results of a research conducted gave findings with positive reinforcement to the concept of drip irrigation. Major benefits derived are less consumption of water, lesser human labour, increased yield, better quality and

shelf life of the produce and minimal weed growth. Few problems faced by the farmers have also been identified as non-availability of quality material for the drip irrigation system, lack of follow-ups by drip irrigation agencies, high investments in installation of the system, non-availability of spare parts and capital and delay in availing the loans (Sathyapriya, Naveenkumar, & Dhivya, 2017)

Mobile application - Uzhavan

The Government of Tamil Nadu has launched the bilingual mobile app called Uzhavan with the aim of using use the technology for the benefit of the farmers. . It can be used by farmers to get information on farm subsidies, book farm equipment and related infrastructure. It will also help them to get details on available stocks of seeds and fertilisers in local government and private stores. It gives information to the farmers on water levels in reservoirs, fertilizers stock, market price, subsidy scheme, seed stock position, weather forecast, agriculture news, crop insurance, custom hiring centre, Asst. Agriculture/ Horticulture Officer's visit etc.

However, the application doesn't cater needs of the famers in terms of the education on the irrigation techniques. A similar application with advanced technologies can be developed up to educate the farmers on implementation of drip irrigation by giving online demonstration of the process and information on sources of supply of materials and equipment need for installation and maintenance of the drip irrigation system. Kisan call centre can also updated with the resources on the irrigation techniques to assist the famers in providing the information in relation to the drip irrigation system.

CONCLUSION

Every crop needs different method of irrigation. With situations like water scarcity and quality of water changing it becomes necessary for every farmer to do a complete analysis of the environment and the water resources available to decide on suitability of any method of irrigation. Wastage of water has to be minimized to the extent possible as water is a universal requirement. New technologies have to be adopted to suit the need of the hour. Modern approach to solve current days issues are to be welcomes with open heart by farmers. It is also suggested that farmers can pool together to generate funds for investments on irrigation leading to collective gains and sharing of the commercials related to the same.

It is recommended that financial services agencies, drip irrigation agencies and material suppliers should come together and offer their services to the implementing farmers to the fullest satisfaction. A lot of cooperation from farmers side in educating and training the co-farmers can improve the current situation. Those who are trained in the drip irrigation system should volunteer to offer training to other farmers, thereby collaborating than competing. Government may also come up with more training in the field of water management.

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