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Rain Hose Irrigation Technology in Groundnut- A New Innovation in Irrigation System

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Abstract

Climate change has brought changes to our rainfall patterns. The farmers suffer from water scarcity for cultivation. To overcome this, a new innovative irrigation technology, the rain hose irrigation technology has been introduced. It is an affordable spray irrigation technology and a replacement for Sprinkler Irrigation System. It is otherwise called as 'Rain pipe irrigation'. It is easy to install and maintain. Rain Hose is flexible hose with pattern of drip holes. These drip holes are made with nano punching technology to ensure uniform flow of water. Rain Hose is suitable for closely spaced crops *viz.*, greengram, blackgram, groundnut, radish, onion, greens and other vegetable crops etc. Currently this technology mainly adopted by groundnut growers in Dharmapuri district of Tamil Nadu.

Introduction

Irrigation water is one of the most critical inputs for agriculture that is scarce and expensive. To increase the productivity, the major input *viz.*, water plays a very important role in any production system and it is already known fact that the fresh water availability is decreasing day-by-day and the share of water to agriculture is diminishing sharply. To meet the demand of ever increasing population, and changing living standards and dietary needs, we need to produce more and more cereals/ pulses/ oilseeds (Sri Ranjitha *et al.*, 2018). Thus, an efficient alternative is to adopt new technologies such as rain hose irrigation to close growing field crops too and one such effort in groundnut is carried out to see the production potential of the crop under rain hose irrigation compared to existing surface furrow irrigation.

Why is it Suitable for Groundnut?

Groundnut (*Arachis hypogaea* L.) is cultivated widely in rainfed regions of semi-arid tropics where there is a high variation of rainfall and poor rain distribution. Dharmapuri district is one of the largest groundnuts grown area in the state, with an area of 15000 hectares grown consistently every year. It is an herbaceous annual with a fairly developed root system and a tap root. Tap root appears on the second day after seed germination and has a massive root cap. It elongates rapidly and grows almost vertically. It may vary from a few millimeters in diameter in annual species to 10 cm in perennial species. The well-developed tap root may penetrate to a depth of 130 cm but rarely goes beyond 90 cm. The root system is normally concentrated at a depth of 5 to 35 cm and root spread is confined to a radius of 12 to 14 cm. The root systems of spreading types are usually more vigorous than the bunch types. The lateral roots appear on the third day after seed germination. They are basically similar to tap roots but they lack the central pith and they multiply

very quickly (as many as 100-120) on the fifth day and grow to a length of 15-20 cm.

Groundnut needs frequent and light irrigation to maintain high soil moisture. To saturate the soil in every irrigation; more water is required which is difficult for dry-land farmers in check basin irrigation method and also the mobile nutrients get leached from the soil in this process. Under and over-irrigation leads to loss in yield, soil erosion and aflatoxin disease susceptibility. With rain hose irrigation technology, small amount of water can be applied more frequently, better control of leaching that reduces nitrogen application and helps to maintain optimum irrigation thus leading to maximum yield.

Components

The four main components are required for installation and given below.

- **Rain hose:** It is used as main hose tube (40 mm thickness) and generally length is 100 m.
- **PVC Tee Take Off connector:** which takes off from the sub main.
- **Straight connector (or) Jointer:** It is used to join two rain hose tube.
- **End cap:** It is used to close the tube at the end.

Advantages

- Low cost irrigation technology
- No clogging problem
- Filter is not required
- Easy to install and maintain
- Easily portable one place to another place
- Water use efficiency is high

Disadvantages

- It is not suitable for > 30 cm height of the crops
- Not suitable for undulated lands
- Fertigation is not possible
- More damage from dog, rat etc.
- Not suitable for high wind speed area

Results

The present study was conducted at Krishi Vigyan Kendra farm, Papparapatty to assess the suitable irrigation methods for groundnut cultivation (Table 1). From this result, rain hose irrigation method has registered 40.5 percent higher yield, net return (Rs. 62,850.00 /ha), benefit cost ratio (2.95), water use efficiency (7.28) and 49.0 percent water saving as compared to farmers practice surface irrigation methods.

Table 1: Comparison of rain hose irrigation and surface irrigation method in groundnut

| Treatments | Pod Yield (kg/ha) | Net returns (Rs./ha) | B:C Ratio | Water applied (mm) | WUE (kg/hamm) |
|-----------------------------|-------------------|----------------------|-----------|--------------------|---------------|
| Rain hose irrigation method | 1928 | 62850 | 2.95 | 265 | 7.28 |
| Surface irrigation method | 1147 | 23250 | 1.73 | 520 | 2.21 |



Figure 1: Laser spray irrigation on groundnut at 30 DAS

Conclusion

It is a new technology adopted in less than 30 cm height of the crops viz., groundnut, blackgram, greengram and vegetables like radish, greens etc. It is very useful to the farmers as compare to drip and sprinkler irrigation and their also got higher crop yield with utilized less amount of water and more profit from this technology.

Reference

Sri Ranjitha, P., Ramulu, V., Jayasree, G., Narender Reddy, S., 2018. Growth, Yield and Water Use Efficiency of Groundnut under Drip and Surface Furrow Irrigation. *Int. J. Curr. Microbiol. App. Sci.*, 7(09), 1371-1376. doi: <https://doi.org/10.20546/ijcmas.2018.709.164>.