Article: RT0395

Biotica Research Today

Vol 2:12 1239 / 1241

2020

Alternate Wetting and Drying Irrigation (AWDI) with Field Water Tube – A Best Water Saving Technology in Rice

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Open Access

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Keywords

AWDI, Field water tube, Rice, Water saving

Article History

Received in 2nd November 2020

Received in revised form 06th December 2020

Accepted in final form 07th December 2020

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How to cite this article?

Ayyadurai *et al.*, 2020. Alternate Wetting and Drying Irrigation (AWDI) with Field Water Tube – A Best Water Saving Technology in Rice. Biotica Research Today 2(12): 1239-1241.

Abstract

Water is becoming more precious commodity than anyone commodity, which is used for household activities, industry and agriculture across the world. Since rice is a staple food for the entire world. Due to the geometrical progression of the human population, the consumption of water is increasing day by day screening crucial limiting factor in all over the world. In this limiting available situation, the need of food to the world population by essential by increasing the rice production with new technologies which are enhance the food grain production by less available water. About 84 percent of water withdrawal is for agriculture, with major emphasis on flooded rice irrigation. Alternate wetting and drying irrigation (AWDI) with field water tube is a best water management technology in irrigated lowland rice that saves water and reduces greenhouse gas (GHG) emissions, number of irrigation and pest and disease while maintaining yields.

Introduction

Land and water are the basic inputs for agricultural and economic development of the country. The pressure on these two natural resources is continuously increasing to produce more food grain per unit area and time due to population increase. Water is becoming more precious commodity than anyone commodity, which is used for household, industry and agriculture across the world. Since rice is a staple food for the entire world, it is majorly consumed food grain more than half of the world population. Due to the geometrical progression of the human population, the consumption of water is increasing day by day screening crucial limiting factor in all over the world. In this limiting available situation, the need of food to the world population by essential by increasing the rice production with new technologies which are enhance the food grain production by less available water. Producing more rice with less water is therefore a formidable challenge for food, economic, social and water security. About 84 percent of water withdrawal is for agriculture, with major emphasis on flooded rice irrigation. By 2025, 15 to 20 million hectares of irrigated rice fields may suffer from water scarcity.

What is AWDI?

Alternate Wetting and Drying Irrigation (AWDI) is a water-saving technology that farmers can apply to reduce their irrigation water consumption in rice fields without decreasing the yield. Alternate wetting and drying (AWD) is the method of irrigation to rice field by flooding (wetting) the rice field and allowed the ponded water into disappearance (drying). This disappeared (drying) condition may be allowed for one or two days, then it is again flooded. The same will be continued in alternative manner. The number

of days of drying of soil between irrigations can vary from 1 to 10 days depending upon soil type, weather and crop growth stage.

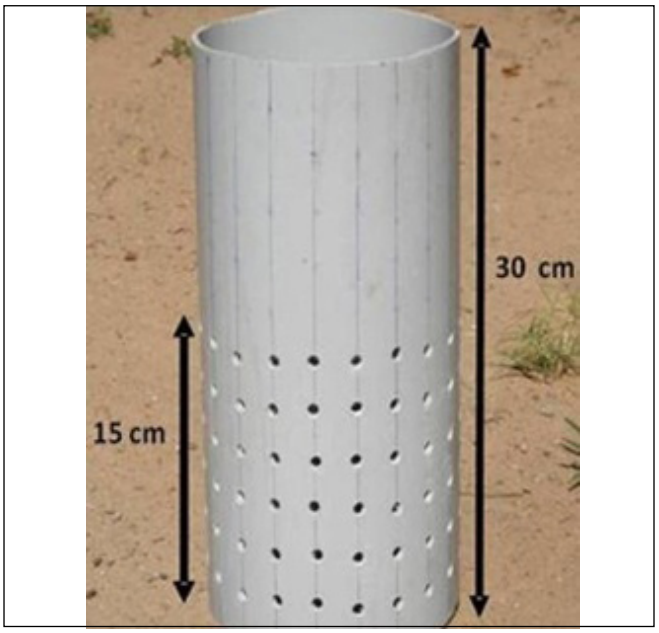

Figure 1: Field water tube made up of PVC

Figure 2: A field tube in flooded field

How to Implement AWD?

A practical way to implement AWD safely is by using a 'field water tube' to monitor the water depth on the field. After irrigation, the water depth will gradually decrease. When the water level has dropped to 15 cm below the soil surface, irrigation should be given to the field to a height of 5 cm. During the initial stage of the crop, *i.e.,* from date of planting to flowering, a height of 5 cm water should be maintained.

The Field Water Tube (Pani Pipe)

The field water tube can be made of 30 cm long plastic pipe or bamboo, and should have a diameter of 10–15 cm so that the water table is easily visible and it is easy to remove soil inside. A three inch or four inch diameter PVC pipe can be perforated and placed inside the rice field. The PVC can be lammed into soil upto a depth of 15 cm. The inflow and outflow of water can be done through the holes present on the PVC tube. The soil present inside the PVC pipe will be removed by hand and make as hole in the field.

Figure 3: Removal of the soil inside PVC pipe

Figure 4: Irrigation scheduling when the water depths below 15 cm

When the field is irrigated normally, assess the water level inside the PVC pipe to the water level in the field. Then allow the water into infiltration the level of water inside the PVC pipe also gone down. A keen observation can be made and measure the depth of water level inside PVC pipe, if it reaches 15 cm, then we can go for irrigation to the height of 5 cm above ground level.

Advantages of AWDI

- Water saving upto 40 percent without reduction of rice yield.
- Increasing of water productivity by 16.9% as compared to

flood irrigation.

• Reducing the cost of irrigation by reducing pumping costs and fuel consumption.

• Reducing the number of irrigation.

• Reducing of seasonal CH_4 emissions up to 85%.

• Reduces the pest and disease incidence in rice field.

• Reduces the labour costs by improving field conditions *viz*., soil stability at harvest, allowing for mechanical harvesting.

Disadvantages of AWDI

• Increased N_2O emission.

• Needs skilled farmers in fixing the system.

• Higher weed growth.

Conclusion

Alternate Wetting and Drying Irrigation (AWDI) with field water tube is a best water-saving technology for rice growing farmers, reduced the number of irrigation and registered higher yield.

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