

A Study on Effectiveness of Field Water Tube as a Practical Indicator to Irrigate SRI Rice Field in Alternate Wetting and Drying Irrigation Management Practice

Submitted By- MD. ABDUL LATIF, ID-47086865

Session: October, 2008-September, 2010

GPSS, University of Tokyo

Supervisor: YAMAJI Eiji, Professor, International Studies, University of Tokyo

Co-Supervisor: YARIME Masaru, Associate Professor, GPSS, University of Tokyo

Abstract

A roof-top Lysimeter scale experiment was conducted at the Kashiwa Campus, University of Tokyo to find out the effectiveness of Field Water Tube in terms of monitoring the depth of ponded water, determining the right timing of irrigation in Alternating Wetting and Drying Irrigation (AWDI) management regime of System of Rice Intensification (SRI) rice cultivation. The experimental layout was Demonstration Strip Design with replication where Diameter of Field Water tube was Treatment and it replicated twice. In the study 5 different diameter PVC Tube(viz. 5cm, 7.5cm, 10cm, 12.5cm and 15cm) which all were perforated used as treatment(5A, 5B, 7.5A, 7.5B, 10A, 10B, 12.5A, 12.5B, 15A and 15B respectively). When the water level went to 10cm below the soil surface level then irrigation was applied in the drying cycle of AWDI. Throughout the study period, Water level of different diameter Water Tube associated with prevailing moisture percentage, pressure, temperature were monitored to find out relationship among water level of Water Tube, moisture and pressure.

The study revealed that all the treatments measured the water level perfectly and determined the appropriate time of irrigation in AWDI management regime. The study disclosed that in measuring Water depth all the Water Tube exhibited close linked (in

same diameter maximum r^2 value 0.9955 and minimum r^2 value 0.9876, in different diameter maximum r^2 value 0.995 and minimum r^2 value 0.965) to each other. The study also found out that there was variation in ponded depth measurement by different diameter Water Tube when water level went -5cm below soil surface where narrower diameter demonstrated maximum ponded depth and wider diameter exhibited minimum ponded depth. The treatment 5B reached maximum lowest depth -18.1cm followed by -18.cm by 5A. On the other hand 12.5B reached minimum lowest depth -13.5cm followed by 14.0cm by 15A. The study also found that there was difference in decreasing rate in water level reduction in 24 hours where maximum is -15.4cm by 7B and minimum -11.5cm by 15B.

It is demonstrated that Water Tube measurement has strong relationship (r^2 value 0.9829) with Water Level sensor measurement (Hioki Meter). The study uncovered that there was significant relationship between ponded depth and pressure (maximum r^2 value is 0.5445 and minimum r^2 value is 0.4594) at 5cm depth Tensiometer. In the study no significant relationship was established between Water Tube measurement and Moisture sensor measurement.

The study unveiled that the AWDI practiced with Water Tube measurement formed huge crack (maximum 3.5cm width) in the soil and remained up to 35 days from its initiation and after flowering stage again crack formed for AWDI practicing. Plant height, number of tiller, leaf number, height and color were found in good condition and no stress was found on plant in the experiment.

Key words: Field Water Tube, Ponded depth, Diameter of Water Tube, Alternate Wetting and Drying Irrigation, SRI, soil crack.