

ABSTRACT

DESIGN OF AUTOMATIC DRIP IRRIGATION BASED ON CHANGE OF SOIL WATER CONTENT USING ARDUINO NANO MICROCONTROLLER

By

Rendy Franata

One of the irrigation system that allows to regulate the amount of water needed by crop is a drip irrigation system. Formerly, the schedule of water irrigation in drip irrigation only used a timer. This research makes a tool design which is able to overcome these problems, that is by designing a microcontroller which is able to regulate the provision of irrigation water in drip irrigation systems automatically based on change of soil water content. This study was conducted in May 2014 – August 2014 at the Greenhouse and Water and Land Resources Laboratory of Agricultural Engineering Department, University of Lampung. The parameters observed in this study are the change of soil water content, irrigation flow rate, bulk density of soil, and dripper uniformity. This study uses three types of growing medium, i.e. sand, red-yellow podzolic soil, and mix soil with organic nitrofosfat fertilizer. Calibration tests showed a linear function, for sand medium $y = -0.23x + 46.96$ with percent error $\pm 5.22\%$, for red-yellow podzolic soil and mix soil with organic nitrofosfat fertilizer medium $y = -0.71x + 104.07$ with percent error $\pm 2.92\%$. The results showed a high irrigation uniformity, the value of average CU = 96.50% and value of average SU = 96.85%.

Keywords: Drip irrigation, microcontroller, and soil water content.