ABSTRACT

Hydroponics is a system of agriculture that uses water as a growing medium, so it does not require soil or a very large area. Hydroponics requires special care such as maintaining nutrient levels and water levels. So far, officers have to manually check changes in nutrient levels and water levels to maintain hydroponic melons. Manual checking is considered less effective and efficient because officers must do it regularly. The methods used in this final project are quantitative, descriptive and evaluative methods. The design system is carried out in software and hardware which later the design is implemented to make a tool for automating nutrition and water levels in hydroponic melons.

In this Final Project, a tool for using a fuzzy logic control system in the Telkom University Greenhouse is carried out. Which can facilitate remote monitoring and be more efficient with time. The control system to be used is mamdani fuzzy logic, with input levels of nutrients and water levels, controlled by an ESP32 microcontroller to distribute nutrient solutions and the right water level, as well as the output of the duration of the servo water and nutrients for hydroponic melons. In fuzzy logic where there are three processes namely fuzzyfication, rule evaluation and defuzzyfication.

The result of this hydroponic research is that the tool can work well and the Fuzzy system that can automate according to the plan that has been made. By using the Fuzzy logic mamdani algorithm, it can increase the efficiency of time and reduce human errors in officers checking hydroponic melons in the Telkom University Greenhouse.

Keywords: *Fuzzy, Mamdani Method, ESP32, Nutrition and water level automation, melon, Hydroponics.*