

ABSTRACT

Tea plants (*Camellia sinensis* (L.) O. Kuntze) are one of the leading plantation commodities in Indonesia. Tea plants are highly dependent on the microclimate surrounding them. In 2015, there was a decline in tea production in Indonesia. Although there was an increase in 2017, subsequent years experienced another decline. One of the causes of the declining tea production is the unpredictable and extreme weather changes, which hinder the optimal growth of tea. Tea plants thrive best within a temperature range of 18–25°C, with humidity not less than 70%, sunlight intensity at 70%, and soil moisture content above 30%.

The stability of the microclimate is crucial for tea plant productivity. One solution to help address this issue is by planting shade trees. Shade trees are planted in tea plantations to enhance tea plant productivity. They function to lower air temperature, harvest rainwater, reduce soil drought, and improve organic materials in the soil. The challenge faced in planting shade trees is determining the most effective locations for their planting. A system for identifying suitable locations for planting shade trees becomes a solution to provide recommendations for such locations within the environment of the Tea and Cinchona Research Center (PPTK) in Gambung, West Java.

The methods used by the author to provide recommendations for planting shade trees are fuzzy logic, which will be reevaluated using the confusion matrix method. The accuracy of the recommendations for planting shade trees reached 95,83% with the best data collection time at 09.00 - 11.30 WIB. The system created is also equipped with an IoT (Internet of Things) system using LoRa nodes and gateways, and there is a website used to display decision results and monitoring data obtained. The design of the system has the accuracy of the air temperature and humidity sensors reaching 95,55% and 92,2%, 98,93% for the light intensity sensor, then the soil moisture sensor accuracy is 93,68%, and the latitude and longitude error rate on the GPS sensor is 0,000404805. For data transmission, it is recorded to have 0% packet loss at 100 meters in the tea garden.

Keywords : *Shade Tree, Fuzzy Logic, LoRa, GPS, Tea*