

## Intelligent System and Renewable Energy: A Farming Platform in Precision Agriculture

**Authors :** Ryan B. Escorial, Elmer A. Maravillas, Chris Jordan G. Aliac

**Abstract :** This study presents a small-scale water pumping system utilizing a fuzzy logic inference system attached to a renewable energy source. The fuzzy logic controller was designed and simulated in MATLAB fuzzy logic toolbox to examine the properties and characteristics of the input and output variables. The result of the simulation was implemented in a microcontroller, together with sensors, modules, and photovoltaic cells. The study used a grand rapid variety of lettuce, organic substrates, and foliar for observation of the capability of the device to irrigate crops. Two plant boxes intended for manual and automated irrigation were prepared with each box having 48 heads of lettuce. The observation of the system took 22-31 days, which is one harvest period of the crop. Results showed a 22.55% increase in agricultural productivity compared to manual irrigation. Aside from reducing human effort, and time, the smart irrigation system could help lessen some of the shortcomings of manual irrigations. It could facilitate the economical utilization of water, reducing consumption by 25%. The use of renewable energy could also help farmers reduce the cost of production by minimizing the use of diesel and gasoline.

**Keywords :** fuzzy logic, intelligent system, precision agriculture, renewable energy

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