

Design and Development of Brown Planthopper (*Nilaparvata lugens* Stal) Extermination System Using Pico Hydro

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ABSTRACT

In 2020, there was a decrease in rice cultivation area in Indonesia by 0.19%. Particularly in the village of Lembengan, Jember Regency, which was the location of the research, rice production decreased by around 714 tons in 2020. The main factor causing the decline in rice production was the infestation of brown planthopper pests. Thus far, the handling of brown planthopper pests has been done using less safe techniques, such as pesticide usage. To improve the rapid, safe, and environmentally friendly pest control measures, this research proposes a solution using an extermination system based on UV-Trapping concept, using pico hydro as its energy source. This technology has several advantages, such as: 1) it can work automatically according to light intensity indicators; 2) it utilizes new renewable energy; 3) it has low current (DC) which is safe for farmers; 4) it can be used for rice fields located far from the PLN range, as the electricity source is derived from water flow; 5) it has low operational costs; 6) it is durable and can operate in the long term. The research was conducted over two days and two different conditions: Day 1 without rain and Day 2 with rain. The mechanism of the UV-Trapping extermination system works by attracting pests with UV light and then zapping them. The focus of measuring the effectiveness of this extermination system was done by comparing the energy output produced by pico hydro of 229.151 Wh/day and the energy required by the load (light and zapper) of 58.790 Wh/day. The final results showed that the load's energy needs could be met by pico hydro.

Keywords: *brown planthopper extermination system, pico hydro, UV-Trapping, energy.*