

ABSTRACT

In the era of the Fourth Industrial Revolution, data-based technology and artificial intelligence (AI) transformed the agricultural sector, particularly through the implementation of smart farming. This technology utilizes real-time data from sensors that measure soil conditions, weather, and plant health. Using intelligent algorithms and machine learning, AI can detect patterns that are difficult for humans to see, such as plants that are vulnerable to pests and diseases. The application of this technology can improve operational efficiency and support more sustainable and efficient agriculture in Indonesia, although adoption by Indonesian farmers still faces various challenges.

This study aims to explore the implementation of smart farming in increasing agricultural efficiency and productivity in Indonesia. The focus of this research is on how this technology can support food security and farmers' welfare, as well as the challenges faced by farmers in adopting new technologies, especially traditional farmers.

The method used in this study is a quantitative method using a questionnaire as a data collection tool with 155 respondents as a research sample. The selection of this method aims to obtain data that is objective and can be processed statistically to support the validity of the research results.

Keywords: *smart agriculture, agricultural productivity, smart agricultural technology, technology adoption.*