

Smart Agriculture Optimization for Sustainable Potato Farming and CO₂ Emission Reduction Techniques

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Abstract:

Sustainable agricultural practices are essential for ensuring food security while minimizing environmental impacts. This study presents an optimization framework for smart potato farming, integrating advanced techniques to enhance crop yield and reduce CO₂ emissions. The framework employs Internet of Things (IoT) sensors to monitor soil moisture, temperature, and nutrient levels in real time. Using machine learning models and metaheuristic algorithms, the system optimizes irrigation, fertilization, and pesticide application to maximize crop production while minimizing resource consumption. Additionally, the integration of renewable energy sources and carbon footprint analysis contributes to reducing the carbon emissions associated with farming practices. Results from field experiments demonstrate the effectiveness of the system in promoting sustainable farming practices and achieving environmental goals.

Keywords:

Smart agriculture, potato farming, optimization, CO₂ emission reduction, IoT, sustainability.

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