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Case Study Analysis: Integrating Particle Swarm Optimization with Deep Learning for Enhanced Agricultural Intelligence

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ABSTRACT

This case study explores the integration of Particle Swarm Optimization (PSO) with Deep Learning (DL) to enhance agricultural intelligence in multicropping systems. A PSO- enhanced DL model was applied to crop yield prediction and crop selection optimization using seasonal, soil, and irrigation data from Marulpatti village, Tamil Nadu. The study demonstrated improved model accuracy, reduced manual tuning, and actionable decision- making insights for farmers. The hybrid model offers a promising pathway for intelligent, data-driven agriculture.

Keywords*:* *Particle Swarm Optimization, Deep Learning, Crop Yield Prediction, Multicropping, Smart Farming, Agricultural Intelligence*