**Title of the Project:** Deep Learning-Based Yield Forecasting For Rice Varieties

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**ABSTRACT:**

In many agricultural regions, farmers face significant yield losses due to unpredictable climate conditions, lack of localized forecasting systems and absence of planning tools tailored to specific rice varieties. These challenges result in poor crop selection, unstable productivity , reduced income, threatening food security and rural livelihoods.

This introduces a deep learning–based rice yield prediction model that integrates NDVI time-series data, daily climate parameters and rice variety characteristics to generate localized & variety-specific forecasts. The model leverages Long Short-Term Memory (LSTM) networks to learn temporal patterns from vegetation and weather trends, offering adaptive and accurate predictions.

NDVI data is sourced from Sentinel-2 satellite imagery via Google Earth Engine, while climate inputs such as rainfall, temperature and humidity are obtained from NASA POWER. Rice variety data is collected from agricultural institutions and farm records to account for genetic and phenotypic differences.

The model focuses on the Thanjavur district of Tamil Nadu, a major rice-producing region with diverse cultivated varieties. Experimental results show that the proposed model achieves promising prediction accuracy, effectively modelling the complex interactions between crop health, climate variability and varietal behaviour.

The LSTM-based pipeline provides actionable insights to farmers, helping them choose optimal varieties and plan for upcoming seasons. It supports climate-resilient agriculture and aligns with UN SDG-2 (Zero Hunger) by promoting sustainable food production and improved livelihood security.