

**Abstract 77 – Paper ID: 038****A Machine Learning Framework for Forecasting Rice Production, Cultivated Area, and Yield in Manipur using Feed Forward Artificial Neural Network**

Taibangjam Loidang Chanu<sup>1</sup>, Ksh. Mangijaobi Devi<sup>2</sup>, Ch. Birendrajit<sup>3</sup>

<sup>1</sup>College of Agricultural Engineering & Post Harvest Technology (CAU), Ranipool, Sikkim, India

<sup>2</sup>Department of Mathematics, Waikhom Mani Girl's College, Thoubal, Manipur, India

<sup>3</sup>Training & Monitoring Cell, Directorate of Extension Education, CAU Imphal, Manipur, India

*Email: loidangtt@gmail.com*

**Abstract**

Accurate forecasting of rice production is crucial, as rice is a staple food and a primary source of livelihood for the people of Manipur. This study examines variations in rice production, cultivated area, and productivity, aiming to identify significant contributing factors and propose strategies for future enhancement. Utilizing secondary time-series data from the Economic Survey of Manipur 2021–2022, published by the Directorate of Economics and Statistics, Government of Manipur, the research adopts a Multilayer Feed Forward Neural Network (FNN) approach. A three-layer Artificial Neural Network (ANN) model was developed to predict rice production, cultivated area, and yield. The ANN model formulates relationships between multiple input variables and output targets using the Rectified Linear Unit (ReLU) as the activation function. Training was conducted using the backpropagation algorithm. Specifically, a Feed Forward Neural Network (FNN) with a 7-64-32-1 architecture was employed to predict rice production, while a 5-64-32-1 FNN, 3-64-32-1 was used for predicting cultivated area—each model utilizing a different window size for input data.

**Keywords:** Time Series, Feed Forward Neural Networks, Rectified Linear activation unit, Backpropagation