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# An Approach for Prediction of Weekly Prices of Green Chili in Sri Lanka: Application of Artificial Neural Network Techniques

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## ABSTRACT

***Purpose:*** *Predicting the prices of crops is a principal task for producers, suppliers, governments and international businesses. The purpose of the study is to forecast the prices of green chili, which is a cash crop in Sri Lanka. Artificial neural networks were applied as they help to extract important insights from the bulk of data with a scientific approach.*

***Research Method:*** *The Time Delay Neural Network (TDNN), Feedforward Neural Network (FFNN) with Levenberg-Marquardt (LM) algorithm and FFNN with Scaled Conjugate Gradient (SCG) algorithm were employed on weekly average retail prices of green chili in Sri Lanka from the 1st week of January 2011 to the 4th week of December 2018. The performance of models was evaluated through the Mean Squared Error (MSE), Mean Absolute Error (MAE) and Normalized Mean Squared Error (NMSE).*

***Findings:*** *Among the three methods implemented, the FFNN model using the LM algorithm exhibited the highest accuracy with a minimum MSE of 0.0033, MAE of 0.0437 and NMSE of 0.2542. The model built using the SCG algorithm fitted data with a minimum MSE of 0.0033, MAE of 0.0458 and NMSE of 0.2549. Among the fitted TDNN models, the model with 8 input delays were a better model with an MSE of 0.0036, MAE of 0.0470 and NMSE of 0.3221. FFNNs outperformed TDNN in forecasting green chili prices of Sri Lanka.*

***Originality/ Value:*** *The neural network approach in forecasting the prices of green chili provides more accurate results to make decisions based on the trends and to identify future opportunities.*

**Keywords:** *Green Chili, Feedforward Neural Network, Levenberg-Marquardt algorithm, Prediction, Scaled Conjugate Gradient algorithm, Time Delay Neural Network*

## INTRODUCTION

Agriculture plays a prominent role in the economy of Sri Lanka. Over 24% of the total labor force of Sri Lanka is engaged in agriculture, and it contributes 7.42% to the national GDP (Plecher, 2020a; Plecher, 2020b). Green chili is one of the most important cash crops cultivated in Sri Lanka, consumed as a condiment. The main chili cultivating districts are Anuradhapura, Puttalam, Monaragala, Vavuniya, Kurunegala, and Mahaweli System H. It is cultivated in two seasons annually as Yala and Maha. According to the review done by Hector Kobbekaduwa, Agrarian Research Institute supply from major green chili production areas has slightly increased during November 2019 (Priyankara, 2019). Hence, the retail price of green chili was decreased by 37% compared to the same period of the previous year. Furthermore, high retail price fluctuations can be observed every year.

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