

**ASSESSMENT OF DROUGHT IMPACT ON PADDY
PRODUCTION IN AMPARA DISTRICT USING
STANDARDIZED PRECIPITATION INDEX (SPI)**

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by

U.I. MADUTRANGA

**Department of Export Agriculture
Faculty of Animal Science and Export Agriculture
Uva Wellassa University of Sri Lanka**

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ABSTRACT

Drought, described as a prolonged period of receiving insufficient rainfall, has a significant impact on paddy production. The objective of this study was to assess the impact of agricultural drought on paddy production in Ampara district using the standardized precipitation index. Rainfall and temperature data for the period of 1990-2020 from six sub-weather stations in the Ampara district, as well as annual paddy yield statistics from 2000 to 2020, were collected. The Mann-Kendall test and Sen's slope estimator were used to assess the trends of annual rainfall variability over 30 years. Drought occurrence was assessed using the SPI for standard periods (i.e., 1, 3, 6, 9, and 12 months). Yield prediction models were developed using SPI values and temperature for *Yala* and *Maha* seasons. To generalize SPI values across the study area, inverse distance weighting (IDW) interpolation was employed in ArcGIS software. Then, the selected drought events were reclassified into severity classes. Results revealed that the annual rainfall variability at five sub-weather stations showed no growing or decreasing trend from 1990 to 2020, except Maha Oya. There were 380 droughts with a duration of 3-month and 174 droughts of 6-month. In 2012, there was an extreme drought near Pottuvil area, and in 2019, near the Mahaoya area. According to the regression analysis, mean annual temperature and SPI had a significant effect on paddy production in Ampara district ($p < 0.05$). However, the yield prediction models with SPI and temperature products had low R^2 values of 37% and 45% for the *Yala* and *Maha* seasons, respectively, suggesting that more other predictors should be incorporated in future studies to increase model accuracy. Paddy production over 20 years showed positive and negative correlations with SPI at 6-month time scales during the *Yala* and *Maha* seasons, respectively. Overall, both drought and rising temperature have caused detrimental impacts on paddy production in Ampara District and decision-makers should consider adaptation and mitigation strategies to address these challenges.

Keywords: Ampara district; Drought; Paddy; Rainfall; Standardized Precipitation Index