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Climate Change Induced Variations in Rainfall Patterns & Potential Adaptation Options of DL1b Agro-Ecological Zone of Sri Lanka : A Case Study

N.W.B.A. Lahiru Udayanga¹ and M.M.M. Najim^{2*}

¹Department of Bio-Systems Engineering, Faculty of Agriculture & Plantation Management, Wayamba University of Sri Lanka, Makandura, Sri Lanka.

²Department of Zoology and Environmental Management, Faculty of Science, University of Kelaniya, Kelaniya, Sri Lanka.

*mnajim@kln.ac.lk

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Abstract

An analysis of the shifts and trends of climate patterns with respect to wet and dry events and rainfall seasonality is vital for the effective planning and management of water resources in tropical countries such as Sri Lanka, which have agriculture-based economies. Hence, temporal and spatial variations of climate extremes and rainfall seasonality in Sri Lanka, were evaluated in the DL_{1b} Agro-Ecological Zone through the Standardized Precipitation Index (SPI) and Seasonality Index (SI) utilizing 58 years of daily rainfall data of five selected localities. The Chi-square test of independence was used to statistically compare the percentage occurrence of each event recorded during 1961-1988 and 1989-2018. The dryness of all study areas denoted increments in terms of both severity and frequency of occurrence in accordance with SPI. However, among the studied localities of the DL_{1b} agro-ecological zone, only the increment of dryness in Vavuniya remained statistically significant ($X^2_{(df = 4)} < 9.78$; $P=0.04$) at 95% level of confidence. Rainfall seasonality of the localities was characterized with a markedly seasonal climatic condition with a long, dry season (0.95 – 0.97) with no significant variations and shifts. Cultivation of low water demanding crops, adjustment of cropping seasons, use of more efficient water smart irrigation methods, implementation of agro-forestry systems and employment of smart and integrated watershed management practices could be recommended as potential adaptation measures to compensate the impacts of climatic change.

Keywords: *Climate adaptations, climate change, rainfall, seasonality, Standardized Precipitation Index (SPI)*

Introduction

Any change in climate over the time whether due to natural variability or as a result of human activity has been described as climate change (IPCC, 2007). At present the whole world is experiencing adverse impacts of climate change, which is one of the most serious threats to sustainable