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Assessment of climate change effects on selected climatic parameters at six agro-ecological zones in Sri Lanka

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Global warming is a growing concern in this century. Green house gases that cause global warming are major contributors to global climatic changes. It is imperative to identify the effects of climate change in agricultural growing areas on water demand, crop suitability and production in all agro-ecological regions of the country. The study of climate change and assessment of its consequences are long felt needs.

This study focuses on the evaluation of the effects of climate change on six selected agro ecological zones (AEZs) in the Western, Southern and Central parts of Sri Lanka, and is aimed at creating GIS maps of spatial and temporal changes in rainfall (RF) and temperature (T) in these regions. This study used secondary data of 1980-2007 obtained from various sources. Data pertaining to six AEZs such as Low country wet zone (WL), Mid country wet zone (WM), Up country wet zone (WU), Up country intermediate zone (IU), Low country intermediate zone 3 (IL3), Low country intermediate zone 1 (IL1) were analyzed. Agro ecological maps and meteorological data were also used. Spatial data and information on attributes were incorporated into GIS to generate spatial maps of climatic parameters. Climatic factor maps were generated using rainfall and temperature data under two time frames (1980-1992 and 1993-2007) and they were compared to identify the temporal changes of each climatic parameter using ArcGIS Software. Dynamics of different climatic parameters were then identified. Geographic shifts of climatic classes were examined.

Data on 65 rain gauges were analyzed. Long term annual rainfall significantly decreased in WM; whereas the mean temperature of the study area has increased by 1.4 ^{0}C during 1980-2007. Although WL, WU, and IU indicated decreasing trends of rainfall and IL1 and IL3 demonstrated an increasing trend, these were not statistically significant. The rainfall class of 3500-4000 mm yr^{-1} moved 13.67 km South-West, which is reflected in declining rainfall in the WM zone. It is now possible for the authorities to selectively concentrate on these areas with special needs. Results of this study could help in planning appropriate land-use changes, not only for new plantations and in replanting, but also for formulating strategies to maximize returns.

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