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The Impact of Climate Change Across Sri Lanka Using Dengue Incidence as an Indicator

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Abstract

Climate change which is the ultimate outcome of global warming is now universally recognised as the fundamental human development challenge of the 21st century. Impact of climate change include extremes in weather events and increase in the ambient temperatures. Among many adverse consequences, health impacts are also very significant. The impact of climate change had been studied using dengue incidence as an indicator in the present study since the vector of the dengue fever, the *Aedes* mosquito is highly sensitive to climatic variations. Seven out of 25 administrative districts of Sri Lanka were randomly selected representing all climatic zones; wet zone, intermediate zone, dry zone for this study. The districts thus selected were Colombo, Gampaha, Kurunegala, Ratnapura, Batticaloa, Kandy and Nuwara-Eliya. Monthly dengue incidence data for selected seven districts were collected over a 10 years period from 2006 to 2015 from the Epidemiology Unit of the Ministry of Health. Monthly minimum and maximum temperature and mean rainfall data for the selected seven districts were collected from the Department of Meteorology. The significance of the impact of climatic parameters such as rainfall, temperature were tested on the incidence of dengue across years, across months in each year and across the districts. Poisson regression model was tested for all the 7 districts and the best model was fitted using the parameters; number of dengue cases in the previous month, number of dengue cases in the same month of the previous year, rainfall of the given month of the given year, minimum temperature of the given month of the given year, average temperature of the given month of the given year, difference of the maximum and minimum temperature of the given month of the given year. The results revealed that the incidence of dengue is at the highest in Colombo District, followed by Gampaha and then Kurunegala. Nuwara-Eliya District showed the lowest. In all the districts, the incidence showed a leap from 2009. There was a significant difference between the years and the districts in dengue cases. The incident rate of number of dengue cases of all the 7 districts in the given month of the given year increased by 0.03% for every unit increase in the rainfall of the given month of the given year. Similarly, the incident rate of the number of dengue cases of all the 7 districts in the given month of the given year increased by 4% for every unit increase in the difference of the temperature of the given month of the given year. This study concludes that the incidence of dengue is related to the climatic variations such as rainfall and temperature which are used as indicators of climatic change impact.

Keywords: Dengue, Climate change, Districts, Impact, Rainfall