

# **A MULTIVARIATE APPROACH TO ASSESS DISTRICT LEVEL HEALTH VULNERABILITY CONSIDERING HIGH END CLIMATE CHANGE IN BANGLADESH**

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## **ABSTRACT**

Climate change impacts result from the interaction between climatic and non-climatic drivers and vary significantly in national and regional scales. This paper adopts a multivariate approach to assess district level health vulnerability due to high end climate change in terms of temperature and precipitation. A total of 10 socio-economic indicators of which 7 indicators are for adaptive capacity, 3 indicators for sensitivity and 5 climate indices are selected as exposures to represent health vulnerability of the country. Socio-economic data are collected from BBS, climate data extracted from CMIP5, RCP8.5 scenario for the year 1971-2100. Three time periods – one for base period 1971-2000, and two future periods – 2050s (1941-2070) and 2080s (2071-2100) were selected for health vulnerability assessment. Data quality was evaluated using RCLimDex. Normalization was done using UNDP Human Development Index. Unbiased weight for each indicator was determined using multivariate technique Principal Component Analysis. Afterwards, Health Vulnerability Index (HVI) was calculated according to the IPCC guideline considering adaptive capacity, sensitivity and exposure of the hazard. Various aspects of future projections of temperature extremes as well as socio-economic changes over Bangladesh, as projected by RCP 8.5 scenario were assessed. Annual counts on very hot days, cold days, tropical nights, warm spell and cold spell duration indexes were mapped for Bangladesh for the base period and for the two future periods (2050s and 2080s). Finally ranking was performed for each district of Bangladesh according to HVI. It may be concluded that major part of Bangladesh would undergo vulnerable condition induced by extreme temperature change at the end of this century. The health vulnerability assessment through HVI shows a substantial increase of vulnerability towards the mid of this century and will face further severe condition in 2080s. The ranking of vulnerable districts shows that total 80% of districts fall in vulnerable zone constituting 56% in very high and 24% in high vulnerability zone.