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An Analysis of Temporal Changes of Human Comfort Index (HCI) in Colombo Metropolitan Area, Sri Lanka (1997-2022)

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Abstract

Human Comfort Index (HCI) is used to calculate Human Heat Stress (HHS). Heat stress management is an important area to address through policies and plans, including considerations related to extreme heat impacts in vulnerable communities. In this study, we analyze the historical trends in human comfort (measured by Temperature Humidity Index) in Colombo Metropolitan Area (CMA), Sri Lanka from 1997 to 2022. It would be very useful for future studies, planning purposes and making policies for various sectors of development activities in Sri Lanka. Air Temperature and Relative Humidity data of Colombo, Katunayake & Ratmalana were obtained from the Department of Meteorology and Statistical abstracts and then calculated the annual, monthly and seasonal HHS. Linear regression and MS Excel 2016 and ArcGIS 10.8 have been used in data analysis. Additionally, previous research's results were used for the comparison. Accordingly, a positive increasing trend in thermal discomfort (THI>26) is seen at three weather station areas in CMA throughout the 25 years and Katunayake area is slightly more comfortable than Colombo and Ratmalana. Monthly temporal analysis revealed that January & December are the most comfortable months during the last decade and April & May are the hottest and uncomfortable months. When considering seasonal analysis, Katunayake and Colombo have shown the discomfort level within the all four seasons-FIM, SWM, SIM & NEM. Heat Strokes highly to be prone in FIM and SWM. Comparison with the previous research also revealed that with the changes of NDVI, LST was increased and parallel to that HHS in CMA was increased. This study revealed a positive strong increasing trend of HHS in CMA from 1997 to 2022. It is not a big issue today, but the continuing increasing trend will cause several health complications in CMA, Sri Lanka.

Keywords: *Colombo Metropolitan Area, Human Comfort Index, Human Heat Stress, Sri Lanka, Weather Stations*