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**Quantifying Unseen Contributions to the Global Carbon Emission from Local Anthropogenic Environments: A Case Study in Balangoda Divisional Secretariat Division, Sri Lanka**

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**Abstract**

Climate change is a profound challenge in the present world. Increase of population, consumption behaviors and land utilisation practices have been identified as the major drivers of anthropogenic greenhouse gas emission. Household level carbon emission also contributes considerably to anthropogenic carbon emission. In Sri Lanka, research has been carried out to assess industrial level carbon emission while household level carbon emission still remains untouched. Therefore, the present study was focused on identification of the major drivers and spatial differences of carbon emissions in Balangoda Divisional Secretariat Division (DSD), Sri Lanka, selecting six local administrative divisions having low; Pallekanda and Massenna, moderate; Ellepola and Jahinkanda and high; Balangoda and Pettigala carbon emission potentials. Prevailing population distribution, household fuel and electricity consumption, land surface temperature and Normalised Difference Vegetation Index (NDVI) of the study area were considered in determining the high medium and low magnitudes in the distribution of carbon encouraging factors. A total of 251 households representing 10% of the total households were selected using stratified sampling method. Questionnaire survey covered the consumption of electricity, fuel, transportation and secondary expenses. Carbon footprint calculation and Principal Component Analysis (PCA) were performed to analyse the data. The results revealed that the highest emission ranges from 0.8 MTCO<sub>2e</sub> to 4.35 MTCO<sub>2e</sub> in Balangoda, Pettigala from 0.36 MTCO<sub>2e</sub> to 4.29 MTCO<sub>2e</sub> and the lowest from 0.27 MTCO<sub>2e</sub>-1.7 MTCO<sub>2e</sub> in Pallekanda and in Massenna divisions. Results of the PCA confirmed that Pettigala has the highest emission. Estate settlements in this area are small in size and 82% of the population has very low education levels, leading to use of environmentally unfriendly sources of energy in their daily activities. 98% of households in the area are line settlements located closer to each other and 45% of the households accommodate families of more than five members. The findings of this study are highly important as the regional level carbon emission behaviors can influence on the microclimatic condition of the area, leading to global level climate changes.

**Keywords:** Climate change, Anthropogenic, Carbon footprint