

## Community Base Vulnerability Mapping for Lightning Strikes in Sri Lanka

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### ABSTRACT

Lightning is one of the oldest observed natural phenomena on earth. An average of 40 people dies every year due to lightning strikes in Sri Lanka. Persons who engage in outdoor activities such as farmers, heavy machinery operators and players are more vulnerable for lightning strikes. Human or animals live in unsafe partly covered shelters, particularly shelters with galvanized roof which trend for casualty of lightning strikes. Reported deaths and casualties due to lightning in rural areas by using electronic or electrical appliances in rural areas are more as compared to urban areas where mitigation mechanisms such as lightning protection systems are used for their residences, factories and offices. Not only that, geographical features like terrain, soil type (soil conductivity) also enhance the impacts of lightning. According to the latest statistics and surveys, it is revealed that the people who do not have proper shelters particularly with galvanized sheet roofs are more vulnerable for the lightning and it cause more casualties and deaths.

The aim of this study is to identify the vulnerabilities from the lightning due to different socio economic conditions (ie. to identify community base vulnerable area). Socio economic conditions reflect from their wealth, daily wage, living condition etc. Hazard areas were identified using the population density and the frequency of lightning Poverty index is the most appropriate factor to measure the socio economic conditions. Therefore, the poverty index is considered to be measured as a factor to find the vulnerabilities from the lightning.

Correlation has been done for the number of deaths and the casualties from lightning with the number of lightning days, population density and the poverty index. Hence identified the weighting factor of each for deaths and casualties and accordingly vulnerability maps have been developed by combining all these factors.

### 1 Introduction

Human and animal deaths and property damages are frequent in Sri Lanka due to lightning activities. 51 deaths were reported in 2011 and only 19 deaths were reported in 2013. There are less countrywide statistics on deaths due to lightning, but Disaster Management Centre (DMC), Sri Lanka is maintaining statistics for deaths and casualties from lightning in each district in Sri Lanka ([www.desinventar.lk](http://www.desinventar.lk)) since 1974. This was developed in collaboration with United Nations Development Agency (UNDP). Death and injuries statistics due to lightning are collected from newspapers, information from the Police, *Grama Niladari* (grass route level government officer in a village or area) and hospitals. This study is based on the existing statistical data.

In Sri Lanka more deaths and casualties due to lightning are reported during the evening or night, because climatologically, more lightning are occurred in the afternoon, evening or night. Figure 1 (Abhayasinghe,