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THE PAST, PRESENT AND FUTURE OF CLIMATE CHANGE IN SRI LANKA

Introduction

The intricate relationship between climate change and Sri Lanka's environment presents a compelling narrative that spans the past, influences the present, and holds implications for the future. Against the backdrop of its diverse ecosystems and vulnerable coastal communities, Sri Lanka has witnessed both gradual shifts and acute impacts of climate change over the years.

Goals

The overarching goal of this research is to elucidate the multifaceted dynamics of climate change in Sri Lanka, spanning across temporal scales from the past to the future. Firstly, it aims to analyze historical climate data and trends to discern patterns of variability and change, providing insight into the past climatic conditions and their impacts on the island nation's environment and society. Secondly, the research seeks to assess the current state of climate change in Sri Lanka, examining contemporary challenges such as rising temperatures, shifting precipitation patterns, and increasing frequency of extreme weather events. Finally, the research endeavors to forecast potential future scenarios of climate change in Sri Lanka, utilizing predictive modeling techniques to anticipate potential impacts on ecosystems, water resources, agriculture, human health, and socio-economic development.

Material and methods of research

Information was acquired by questioning several citizens and their ideas and opinions of the current changes. Furthermore, factual information from the Asian Bank, WHO and other prominent websites and research collections was used.

Results of the research and their discussion

Sri Lanka is a small island nation lying between 6°N and 10°N latitude and 80°E and 82°E longitude in the Indian Ocean, with a land area of approximately 65,000 square kilometers (km²). The island consists of a mountainous area in the south-central region and a surrounding coastal plain. The climate of Sri Lanka is wet and warm, ideal for forest growth; almost all of the nation's land area was at one time covered with forests. Over the last century, more than two-thirds of this forest cover, rich in biodiversity, has been removed to accommodate human use [1]. About 19 million people in Sri Lanka today live in locations that would become moderate or severe hotspots by 2050 [2]. Climate change is an important issue in Sri Lanka, and its effects threaten to impact both human and natural systems. Roughly 50 percent of its 22 million citizens live in low-lying coastal areas in the west, south, and south-west of the island, and are at risk of future sea level rise [3]. Mangroves, salt marshes and seagrasses are conspicuous and important features of the Sri Lankan coastline, playing an important role in delivering multiple ecosystem services including carbon sequestration

(the so-called blue carbon ecosystems) [4]. Little or no seasonal annual variation of temperature is experienced in Sri Lanka, with mean annual temperature in coastal areas ranging from 26.0 °C to 28.0 °C. At higher altitudes, above 1500 m, temperature ranges between 15 °C and 19 °C. Sri Lanka has a strong hourly variation in the mean temperatures throughout the year. Over the period 1961–1990, there was a general increasing temperature trend by 0.16 °C per decade, with the highest increase of minimum temperature around 2.0 °C at Nuwara Eliya. Sri Lanka’s 100-year warming trend from 1896 to 1996 is 0.003 °C per year, while it is 0.025 °C per year for the 10-year period 1987–1996, indicating a faster warming trend in more recent years. Scientists attribute this warming trend seen throughout the country to both the enhanced greenhouse (global) effect as well as the local heat island effect caused by rapid urbanization [5].

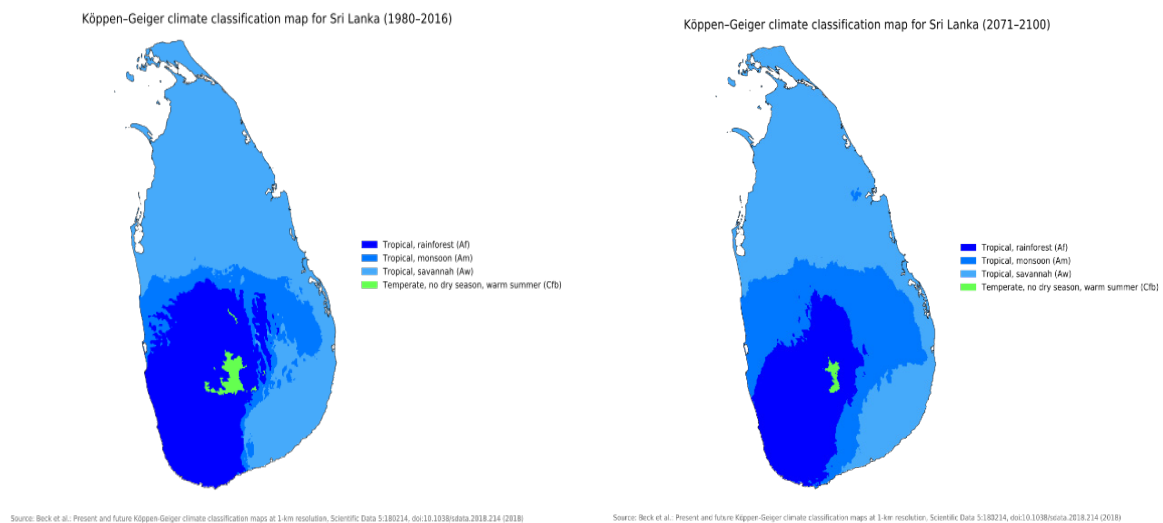


Figure 1 – Comparison of Past and Future Köppen-Geiger climate classification map for Sri Lanka [1]

Coastal areas: Sea-level rise (SLR) is anticipated to be one of the most crucial factors putting pressure on the livelihood of human life in the 21st century. The Jaffna Peninsula, located at the northern tip of Sri Lanka, is no exception. This area lies entirely within 10 km of the coast and has an almost flat topography with a maximum elevation of 15 m above mean sea level, whereas 50% of the total land area is less than 2 m, making it highly vulnerable to coastal hazards [6]. *Winds:* As for cyclones, the severity has been recorded to be moderate during the past experience. In the months of November and December the northern region of the county is affected by them. For the future surrounding the year 2050, an accelerated risk of coastal disasters is estimated. For instance, an expected increase of 10–20% in tropical cyclone intensities is triggered by a rise in sea surface temperature, amplification of storm surge heights, and low pressures with tropical storms [7]. As for the general future assumptions, (2030 (generally 2020–2049), the mean annual temperature in the country is projected to increase by 0.47 °C, 0.69 °C, and 1.08 °C by 2030 for the 10th, 50th, and 90th percentiles for the RCP4.5 model ensemble runs, and by 0.56 °C, 0.80 °C, and 1.12 °C for the RCP8.5 10th, 50th, and 90th percentile model ensembles, respectively. Maximum temperatures are projected to increase by 0.68 °C to 0.78 °C, and minimum temperatures by 0.69 °C and 0.80 °C for the RCP4.5 and RCP8.5 median model ensemble [2].

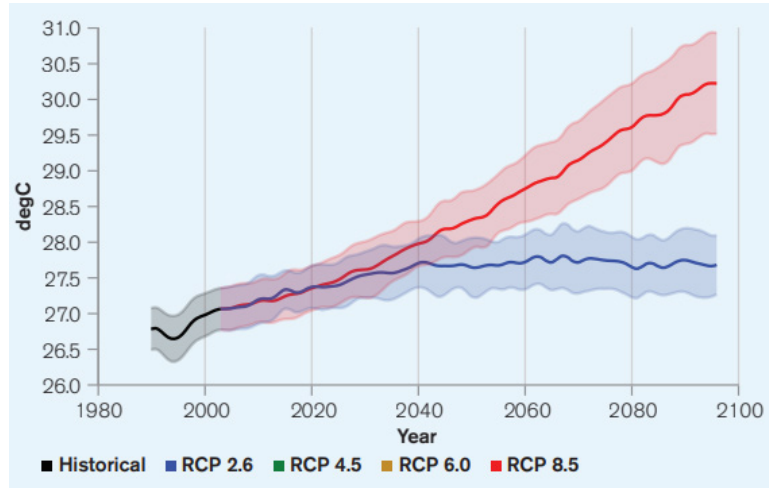


Figure 2 – Historic and projected average annual temperature in Sri Lanka under RCP2.6 (blue) and RCP8.5 (red) estimated by the model ensemble. Shading represents the standard deviation of the model ensemble [3]

Conclusion

In conclusion, examining the past, present, and future of climate change in Sri Lanka underscores the urgent need for comprehensive mitigation and adaptation strategies. By learning from historical trends, addressing current vulnerabilities, and implementing forward-thinking policies, Sri Lanka can navigate the challenges posed by climate change and build a more resilient and sustainable future for its people and ecosystems.

LITERATURE

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