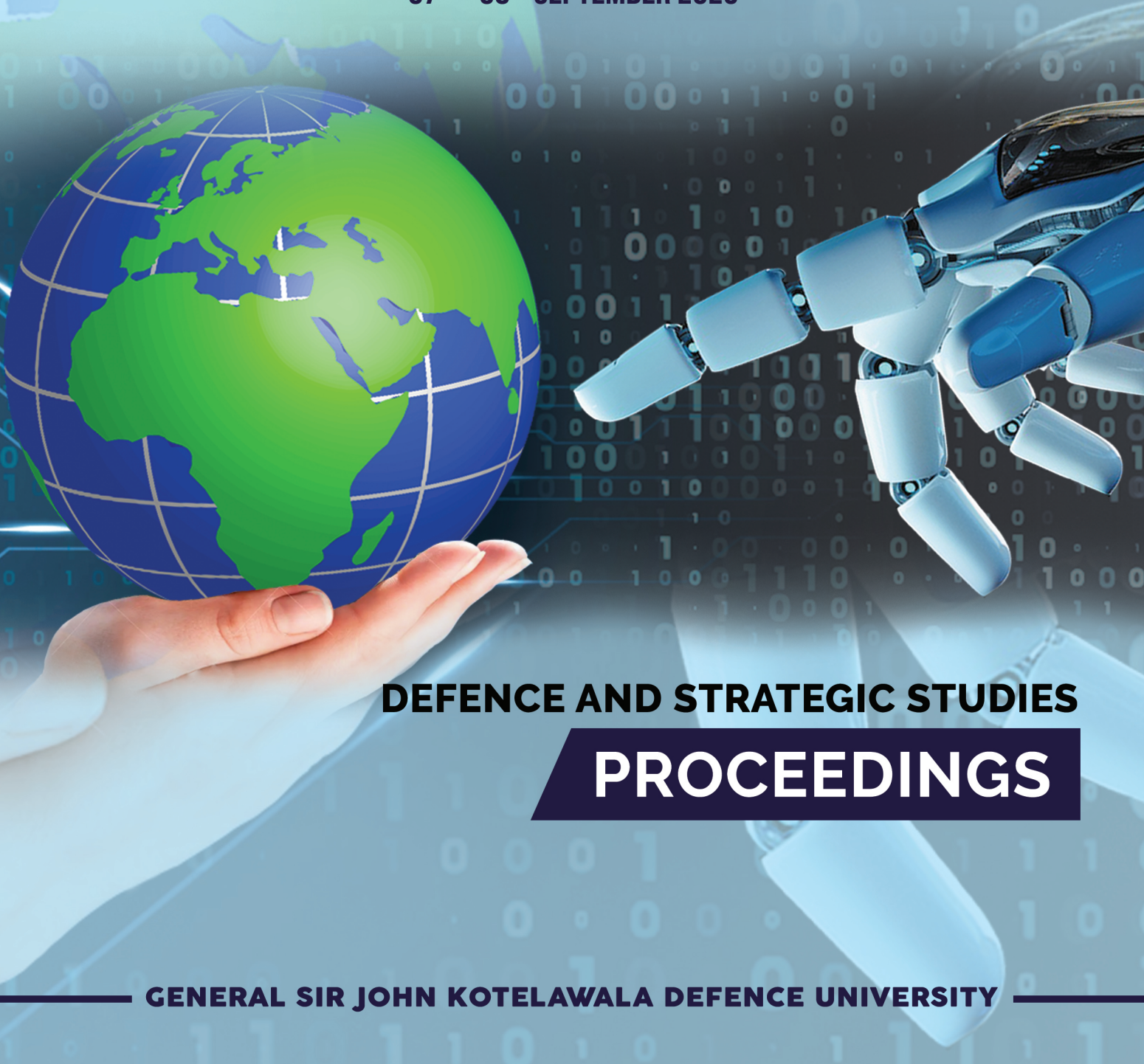




16TH INTERNATIONAL RESEARCH CONFERENCE

*Achieving Resilience through Digitalization,
Sustainability and Sectoral Transformation*

07TH - 08TH SEPTEMBER 2023



DEFENCE AND STRATEGIC STUDIES

PROCEEDINGS

GENERAL SIR JOHN KOTELAWALA DEFENCE UNIVERSITY



16TH INTERNATIONAL RESEARCH CONFERENCE

Achieving Resilience through Digitalization, Sustainability, and Sectoral Transformation

PROCEEDINGS FACULTY OF DEFENCE AND STRATEGIC STUDIES



General Sir John Kotelawala Defence University, Ratmalana, Sri Lanka.

Conference Chair

Dr Aruna Dharshan de Silva

Conference Secretary

Dr Thamarasi Senaratne

Conference Co-Secretaries

Mr Dulitha Hewadikaram LCdr

Sujith Senadhipathi

Mr Sithija Priyankara Fernando

Steering Committee

Brigadier DCA Wickramasinghe USP USACGSC – President

Cmde (E) MCP Dissanayake

Col RKARP Ratnayake RWP USP psc

Lt Col JDB Jayaweera RWP RSP psc

Prof KAS Dhammika

Prof CL Goonasekara

Snr Prof SR de Senevirathne

Dr HR Vidanage

Mr VD Kithsiri

Dr LS Liyanage

Dr KW Samarakoon

Editorial Committee

Editor-in-Chief: **Snr Prof Swarna Piyasiri**

Assistant Editors: Dr FMMT Marikar

Dr TWKIM Dias

Dr NPW Rathuwadu

Lt Col GJP de Silva

Dr TKJBM Jayasundera

Maj JPWK Abeywickrama

Ms NAK Weerasinghe

Dr N Gunawickrama

Dr KSC de Silva

Mr VRP Maddumage

Ms JAD Jayakody

Ms MPC Wijesooriya

Mrs SCM de S Sirisuriya

Mrs PRD Wijesinghe

Dr EKDHD Siriwardena

Dr PATM Wijerathne

Snr Prof RN Pathirana

Dr R Vijitha

Dr JMKB Jayasekara

Eng PPSS Pussepitiya

Dr PPCR Karunasekara

Dr PM Athauda-arachchi

Dr FN Mubarak

Archt Assoc Prof MNR Wijetunge

Ms HP Alahakoon

Mr SSPV Karunakalage

Lt Col (Rtd) TC Kathriarachchi

Panel of Reviewers

Colonel RKARP Rathnayake RSP USP psc - General Sir John Kotelawala Defence University

Dr. A Senevirathna - General Sir John Kotelawala Defence University

Dr. B. Senaratne - General Sir John Kotelawala Defence University

Dr. H Vidanage - General Sir John Kotelawala Defence University

Dr. KSC de Silva - General Sir John Kotelawala Defence University

Dr. M Wakkumbura – University of Colombo

Dr. P Kalansooriya - General Sir John Kotelawala Defence University

Dr. GIH Cooke - University of Colombo

Major DAH Egalla Lsc SLEME - General Sir John Kotelawala Defence University

Mr. A Fuard - Resurge

Mr. KKP Ranaweera - General Sir John Kotelawala Defence University

Mr. P Abhayaratne - National American University, USA

Mr. S Satheesmohan - General Sir John Kotelawala Defence University

Ms. N Sanjeevani - General Sir John Kotelawala Defence University

Mr. V. Maddumage - General Sir John Kotelawala Defence University

Session Coordinators

Defence and Strategic Studies

Col RKARP Ratnayake – President

Maj DAH Egalla

Mr KKP Ranaweera

Table of content

<i>Unleashing the Power of Strategic Communication: A Shield Fortifying National Security</i>	01
<i>Heating the Battle Space: Consequences of Climate Change on Air Operations</i>	09
<i>An Investigative Study on the Recent Geopolitical Tension in the Indian Ocean Region; With Special Reference to String of Pearls & Necklace of Diamond Strategies</i>	18
<i>Changing Threat Dimensions; Preventing Extremism in The Digital Age</i>	24
<i>Resurgence of Islamic State in Iraq & Syria and Its Propaganda</i>	29
<i>Small Team as a Successful Strategy to Win the War against LTTE</i>	35
<i>Geopolitical Struggle in Indo-Pacific: A Case Study on AUKUS</i>	45
<i>Role of Social Media and Online News in 2022 Sri Lankan Riots and Utilization of OODA Loop Based OSINT Framework</i>	54
<i>Drone-Enable Security: Advancing an Operational Framework for Sri Lanka</i>	64
<i>Regional security implications of the hybrid war in Afghanistan</i>	73
<i>Nexus Between Climate Change and Human Security in Sri Lanka: Implications for Small Island Developing States in the Indian Ocean Region</i>	84
<i>A comparative analysis of Clausewitz and Liddle Hart's Military Theories and their applicability in modern warfare</i>	100
<i>Evaluating Weather Warfare in Alternative Futures: A Game Changer in Future Power Rivalry</i>	107
<i>Achieving Resilience through Digitalization, Sustainability and Sectoral Transformation - What are the Long Term Strategic Options and Reforms for Sri Lanka Armed Forces</i>	112

Nexus Between Climate Change and Human Security in Sri Lanka: Implications for Small Island Developing States in the Indian Ocean Region

APA Prasanga^{1#}

¹Commander - Sri Lanka Navy, Military Research Officer, Institute of National Security Studies, Ministry of Defence

[#]apa.prasanga@gmail.com

Abstract – This study explores the interconnectedness of climate change and human security in Sri Lanka and its broader implications for Small Island Developing States (SIDS) in the Indian Ocean region. The research addresses a critical gap in understanding the complex relationship between climate change impacts and the challenges faced by human security in Sri Lanka, with implications for similarly vulnerable island nations in the Indian Ocean region. The research problem stems from the recognition that climate change poses substantial risks to human security in Sri Lanka, particularly in SIDS in the Indian Ocean region. The objectives of this research are to examine the specific impacts of Climate Change on Human Security in Sri Lanka, assess the climate change-induced Human Security challenges faced by Sri Lanka, and recommend evidence-based adaptation and mitigation strategies to Sri Lanka and other SIDS in the IOR. The research methodology features a qualitative approach blending desk review with participatory methods, like case studies, enabling a comprehensive exploration of the research problem. A participatory approach involves Focus Group Discussions (FGDs) and semi-structured interviews with affected communities, local leaders, and experts. Data analysis employs the Conflict Tree Visualization tool to illustrate causes, problems, and effects. To bolster reliability, a triangulation approach cross-references data from various sources. The results demonstrate that climate change exacerbates existing vulnerabilities and poses significant threats to human security in Sri Lanka and other SIDS in the Indian Ocean region. The findings reveal the interconnected nature of climate change impacts and human security challenges, highlighting the necessity of integrated approaches that address social, economic, and environmental dimensions. In conclusion, this study emphasizes the significance of enhancing resilience measures and strategies to protect vulnerable communities and ensure sustainable development in SIDS in the Indian Ocean region.

Keywords: Climate Change, Human Security, Sri Lanka, Small Island Developing States, Indian Ocean Region

I INTRODUCTION

Climate change poses significant risks to human security, particularly in small island states within the Indian Ocean region (IPCC, 2022). The impacts of climate change, such as rising sea levels, increased frequency and intensity of extreme weather events, and changes in precipitation patterns, have far-reaching consequences for the well-being and livelihoods of the population in these vulnerable island nations (UNEP, 2020). Among these countries, Sri Lanka stands as a compelling case study to explore the intersection between climate change and human security. This small island state faces a range of climate-related challenges, including coastal erosion, loss of land, water scarcity, and disruptions to agriculture and food security (Ministry of Mahaweli Development and Environment, 2016). Understanding the implications of climate change on human security in Sri Lanka can provide valuable insights into the broader context of climate change impacts on Small Island Developing States (SIDS) in the Indian Ocean region and inform the development of effective adaptation and mitigation strategies to safeguard the well-being of vulnerable communities.

Studies have extensively examined the impacts of climate change on various scales, including global, regional, and local levels (Smith et al., 2019; UNEP, 2020). However, there is a noticeable gap in comprehensive research that specifically addresses the unique challenges and vulnerabilities faced by SIDS in the Indian Ocean region. These SIDS, including Sri Lanka, possess distinct socio-economic and geographical characteristics that significantly influence the way climate change impacts human security (IPCC, 2022). Despite the existing literature on climate change and human security, it often fails to provide in-depth insights into the specific risks and coping mechanisms of vulnerable communities in SIDS like Sri Lanka, thereby leaving a research gap that necessitates focused

Nexus Between Climate Change and Human Security in Sri Lanka: Implications for Small Island Developing States in the Indian Ocean Region

investigation (Smith et al., 2019; Ministry of Mahaweli Development and Environment, 2016).

The research problem at hand delves into the intricate relationship between climate change and human security in Sri Lanka, with a broader perspective on its implications for SIDS in the Indian Ocean region. This study seeks to address a critical research gap by providing a comprehensive understanding of the specific challenges confronting vulnerable communities in the face of climate change.

The primary objective of this research is to investigate and analyze the precise impacts of climate change on human security within the context of Sri Lanka. Another objective is to assess and identify the specific human security challenges exacerbated by climate change in Sri Lanka. The final objective of this study is to provide evidence-based recommendations for adaptation and mitigation strategies, not only for Sri Lanka but also for other SIDS in the Indian Ocean region facing similar challenges.

This research endeavours to shed light on the complex interplay between climate change and human security in Sri Lanka, ultimately offering valuable insights and actionable strategies to safeguard the well-being and livelihoods of vulnerable populations, both within Sri Lanka and across the broader Indian Ocean region.

II. LITERATURE REVIEW

The nexus between climate change and human security has gained increasing attention on the global arena. The United Nations (UN) was founded in the aftermath of World War II with a core mission of ensuring international peace and security, as articulated in the charter's preamble: "*to save succeeding generations from the scourge of war*" (UN, 1945). This historical context underscores the foundational role of peace and security in the UN's mission. In 1992, the United Nations Framework Convention on Climate Change (UNFCCC) was adopted during the Rio Earth Summit. This landmark framework aimed to prevent "dangerous" human interference with the climate system. Importantly, it acknowledged the critical importance of both climate change mitigation and adaptation in maintaining peace and preventing conflicts (UNFCCC, 1992).

National security comprises "*measures taken by a state to ensure the safety and well-being of its citizens, protect its sovereignty, and safeguard its territorial integrity against internal and external threats.*"

It encompasses various dimensions, including military, economic, political, and environmental security (Mendis, 1992). The UN General Assembly report entitled "Climate Change and its Possible Security Implications" (A/64/350) addresses various points related to the impact of climate change on SIDS and their security implications (UN General Assembly, 2009).

The report recognizes climate change as a significant threat to SIDS due to their geographical vulnerabilities. It highlights the security implications of climate change for SIDS, including the potential for increased conflict over scarce resources, displacement of populations, and damage to critical infrastructure.

Additionally; UN General Assembly, 2009 emphasizes the concept of human security, which includes protection from climate-induced threats such as food and water scarcity, loss of livelihoods, and forced migration. Furthermore; it highlighted that the climate change mitigation and adaptation efforts can contribute to conflict prevention in SIDS by addressing the root causes of potential conflicts related to resource scarcity.

Within the UNFCCC framework, the National Adaptation Plan (NAP) process was established. This process assists countries in identifying their specific adaptation needs and formulating strategies to address these needs effectively (McGray, 2014). A significant milestone occurred in 2015 during the Conference of Paris, where 196 countries collectively adopted the Paris Agreement. This legally binding international treaty on climate change aims to limit global warming to below 2 degrees Celsius, with a preference for 1.5 degrees Celsius. To contribute to the global goals outlined in the Paris Agreement, countries have committed to developing and implementing their Nationally Determined Contributions (NDCs). These NDCs encompass national climate action plans that include targets for reducing Greenhouse Gas emissions and enhancing adaptation efforts (Streck et al., 2016).

The United Nations Security Council is an important instrument for integrating climate change and environmental considerations into peace and security policymaking. As of May 2021, the Security Council has recognized the adverse effects of climate change among other factors. For example, in its Resolution 2527 (2020) on Somalia, the Council recognizes "the adverse effects of climate change, other ecological changes, natural disasters, among other factors, on the stability of Somalia, including through drought, desertification, land degradation, and food insecurity (UN Security Council, 2020).

Nexus Between Climate Change and Human Security in Sri Lanka: Implications for Small Island Developing States in the Indian Ocean Region

For the first time, the 2020 annual report of the UN Secretary-General on women, peace, and security includes a dedicated section on climate change and its peace and security implications. The report urges governments to integrate climate change considerations into their National Action Plans on women, peace, and security.

To help countries achieve the ambitious global prevention agenda, United Nations Common Country Analyses (UN CCAs) are carried out as an inclusive, multi-stakeholder process to assess gaps, opportunities, and strategic direction at the country level. Ensuring that UN CCAs are informed by integrated climate security analysis is an important step in delivering on key inter-related SDGs. To this end, several existing global frameworks provide the foundation for policy-making to address climate-related security risks.

Further, the 2030 Agenda, adopted by world leaders in 2015, is a comprehensive "plan of action for people, planet, and prosperity." It includes 17 Sustainable Development Goals and 169 targets. Responsive action on climate security can help us achieve goals on climate action (Goal 13), inclusive peace (Goal 16), among other goals on sustainability, inclusion, and peace.

This recognizes that climate change and human security are deeply interconnected. Beyond armed conflict, insecurity exists in various forms and at multiple levels, including political, economic, community, and personal. This comprehensive understanding highlights that "sustaining peace" encompasses activities aimed at preventing the outbreak, escalation, continuation, and recurrence of conflict (United Nations, 2017).

To broaden the understanding of security, the concept of human security has gained prominence. This approach encompasses a range of security risks that affect people's daily lives globally, including threats related to climate change, such as food insecurity, displacement, and health issues (UNDP, 1994). The literature highlights contemporary challenges in the context of climate change, and human security. Rising internal displacements associated with both disasters and conflicts (IDMC, 2023), coupled with an increasing number of people in need of humanitarian assistance (OCHA, 2023), underscore the urgency of addressing these interrelated issues. Nevertheless, a significant funding gap hinders effective humanitarian responses (OCHA, 2023).

Effective strategies for addressing climate-related security risks must involve diverse stakeholders, including local communities, and indigenous peoples

(IAGN, 2023). Initiatives like the Local Communities and Indigenous Peoples Platform (LCIPP) under the UNFCCC aim to facilitate knowledge exchange and best practices for holistic mitigation and adaptation.

Fragility, as defined by the Organisation for Economic Co-operation and Development (OECD), encompasses the combination of exposure to various risks and the limited coping capacity of governments, systems, or communities to manage, absorb, or mitigate these risks. Fragility manifests across multiple dimensions, including environmental, political, societal, economic, and security aspects. This multifaceted nature of fragility can result in adverse outcomes, such as violence, poverty, inequality, displacement, and environmental and political degradation (OECD, 2020).

Resilience, in contrast, refers to the capacity of individuals, communities, and states to withstand and rebound from shocks while positively adapting to long-term changes. Resilience efforts may involve substantial transformations in core structures and institutions, making them better suited to evolving environments (OECD, 2018). Building resilience hinges on inclusive and sustainable development, addressing inequalities, reinforcing institutions, and ensuring that development strategies integrate risk considerations. This approach, as emphasized by the United Nations and World Bank, represents a powerful means of prevention in the face of fragility and climate-related challenges (United Nations and World Bank, 2018).

Sri Lanka's extensive coastline, including major cities like Colombo and Galle, is exposed to sea-level rise and coastal erosion. Studies indicate that this threatens infrastructure, displaces communities, and disrupts livelihoods (Seneviratne et al., 2020). The island experiences an increasing frequency of extreme weather events, including cyclones and heavy rainfall. These events lead to flooding, landslides, and property damage, particularly in hilly regions (Munasinghe et al., 2019).

Irregular monsoons and shifting rainfall patterns impact agriculture, the backbone of Sri Lanka's economy. Crop failures result in food insecurity, affecting both rural and urban populations (Hettiarachchi et al., 2018). Prolonged droughts have intensified water scarcity issues in Sri Lanka. This has implications for drinking water supply, agriculture, and hydropower generation (Fernando et al., 2021).

Vulnerability is often tied to socioeconomic status. Low-income and marginalized communities lack the resources to adapt effectively. Women, in particular, face gender-specific vulnerabilities due to societal norms

and limited access to resources (UNDP Sri Lanka, 2020). Coastal communities are at the forefront of climate impacts. Vulnerability is exacerbated by inadequate housing, sanitation, and infrastructure in these areas (Hapuarachchi et al., 2017).

Climate change exacerbates health risks, including the spread of waterborne diseases during floods and heat-related illnesses during extreme heatwaves. Vulnerable populations face increased health disparities (WHO Sri Lanka, 2019). Communities heavily reliant on natural resources, such as forests and fisheries, are vulnerable to ecosystem changes and degradation caused by climate change. Disruptions in these sectors affect livelihoods (ADB, 2020).

Sri Lanka has implemented a range of policies and strategies aimed at enhancing climate resilience, disaster preparedness, and adaptation. These initiatives encompass the establishment of early warning systems, the implementation of climate-resilient infrastructure projects, and the development of comprehensive disaster management plans (UNDP Sri Lanka, 2020).

Local communities have developed adaptive strategies through community-based organizations, sharing traditional knowledge, and implementing local-level projects. These initiatives enhance resilience and coping capacity (Jayatilleke et al., 2019). Sri Lanka receives support from international organizations and donors to enhance its climate resilience efforts, including infrastructure development and capacity-building programs (World Bank, 2021).

Given the increasing urbanization in Sri Lanka, there is a need for in-depth studies on urban vulnerability to climate change and the effectiveness of urban adaptation measures. Assessing the effectiveness of climate policies and their alignment with the needs of vulnerable communities is essential for informed policy-making (World Bank, 2021).

III. METHODOLOGY

This study employs a qualitative research approach, combining both desk review and participatory methods, including case studies. This approach enables a comprehensive exploration of the research problem by drawing from existing knowledge and engaging with affected communities directly.

To capture the nuanced perspectives and experiences of those most impacted, this study incorporates a participatory approach. This involves conducting Focus Group Discussions (FGDs) with

affected communities and conducting semi-structured interviews with community members, local leaders, and subject matter experts. FGDs promote open dialogue among community members, fostering a collective understanding of their challenges, while interviews provide in-depth insights from key stakeholders.

Data analysis is facilitated by utilizing a Conflict Tree Visualization tool. In this method, the causes of the issues under investigation are depicted as the roots of the tree, the core problems as the trunk, and the resulting effects as the branches and leaves. This visual representation offers a clear and structured way to understand the complex web of causation, problems, and effects.

To enhance the validity and reliability of the findings, a triangulation approach is adopted. Triangulation involves cross-referencing multiple data sources and research methods. By combining information gathered from desk reviews, FGDs, and interviews, the study can ensure that the findings are robust and consistent. This method reduces bias and enhances the overall credibility of the research.

Throughout the research process, ethical considerations are diligently addressed. This includes obtaining informed consent from all participants, ensuring confidentiality and anonymity of sensitive information, and adhering to established ethical guidelines for research involving human subjects. The ethical framework underpinning this study safeguards the well-being and rights of all individuals involved in the research.

IV. ANALYSIS OF THE STUDY

In Sri Lanka, the impacts of climate change are evident in various sectors. According to the Climate Risk Index 2021, Sri Lanka ranks among the countries most affected by climate change in terms of extreme weather events (Germanwatch, 2021). The country has experienced an increase in the frequency and intensity of extreme weather events, such as floods and cyclones. For instance, between 2000 and 2019, Sri Lanka witnessed 19 major floods, affecting over 12 million people and resulting in significant economic losses (National Disaster Management Centre, 2020).

The impacts of climate change also extend to coastal areas in Sri Lanka, where sea-level rise and coastal erosion pose significant challenges. According to Dissanayake et al., 2021, Sri Lanka's coastline has been experiencing an average erosion rate of 0.3 to 0.6 meters per year, resulting in the loss of land and displacement of

coastal communities. These coastal vulnerabilities not only disrupt livelihoods but also create social and economic tensions, potentially leading to conflicts over resources and displacement.

Sri Lanka is projected to experience a substantial loss of 1.5% of its GDP by 2050 due to climate-related issues. This stark prediction underscores the pressing urgency of taking decisive climate action to mitigate these impacts effectively. Sri Lanka's climate ambition encompasses a dual-pronged approach. Firstly, it involves the launch of Sri Lanka's Climate Prosperity Plan 2022, which focuses on achieving green growth through the generation of renewable energy. This plan leverages the advantages of wind and solar energy to facilitate economic restructuring, particularly following the financial crisis of 2022.

Secondly, Sri Lanka is actively supporting the establishment of a Climate Justice Forum, a platform designed to foster international collaboration in addressing climate-related challenges. These challenges encompass a wide range of issues, including loss and damage, adaptation, and mitigation. Recognizing the finite nature of global resources, Sri Lanka places strategic emphasis on areas where maximum results can be achieved in the realm of climate action and environmental sustainability.

Sri Lanka has presented two noteworthy proposals on the global stage in 2022. First, it advocates for the establishment of an International Climate Change University, envisioned as a research and development platform dedicated to advancing climate mitigation actions. Second, Sri Lanka has introduced the Tropical Belt Climate Ambition Project, which centres on biodiversity conservation, renewable energy adoption, nature-based solutions, and pollution control within the tropical belt. This project aims to make a positive global impact in the fight against climate change.

This comprehensive research delves into the multifaceted realm of climate-induced vulnerabilities and their far-reaching effects in the context of Sri Lanka. Four distinct case studies were meticulously conducted, each in different geographical areas, carefully selected based on their susceptibility and the frequency of particularly devastating natural disasters.

The analysis employed a Conflict Tree Visualization tool, a robust method that unveils the intricate relationships between the *core causes*, *core problems*, and *profound effects* stemming from these environmental vulnerabilities.

A. *Analysis of Case Study 1: Coastal Vulnerability in Jaffna Peninsula*

The case study of coastal vulnerability in the Jaffna Peninsula illuminates a grave and multifaceted issue exacerbated by climate change. The analysis of this case study encompasses an examination of the causes, problems, and effects of coastal vulnerability in Jaffna peninsula.

1) *Core Causes*

Rising Sea Levels: The documented average sea-level rising rate of 1.4 to 3.5 mm per year over the past few decades presents a significant challenge. This dangerous trend amplifies the risk of coastal erosion, coastal flooding, and saltwater intrusion, all of which threaten the livelihoods of coastal communities.

Irregular Weather Patterns: The erratic weather patterns resulting from climate change bring irregular precipitation to Jaffna. These unpredictable climatic fluctuations undermine the resilience of coastal communities, rendering them ill-equipped to cope with the unpredictability of their changing environment.

Inadequate Infrastructure Development: Unplanned and insufficient infrastructure development along the coast exacerbates the region's vulnerability. Poorly constructed buildings and roads in flood-prone areas amplify the risks faced by residents.

Land Degradation: Activities such as deforestation, improper land use, and unsustainable agricultural practices collectively lead to soil erosion and weaken the natural buffer against coastal vulnerabilities.

Lack of Climate Adaptation: Traditional agricultural practices and livelihoods in the Jaffna are often ill-suited for the evolving climate. Communities struggle to adapt to changing conditions, which further compounds the economic and livelihood challenges they face.

2) *Core Problems*

Coastal Erosion: This issue is pressing, and data from the Sri Lanka Department of Coast Conservation and Coastal Resource Management (2019) indicates an alarming average coastal recession rate of 1.2 meters per year. Coastal erosion threatens infrastructure and habitats in Jaffna.

Coastal Flooding: IPCC, 2022 predicts a surge in extreme weather events, including heavy rainfall and storms, leading to coastal inundation. Recent data

indicates a 25% increase in the frequency of floods over the past decade in the Jaffna Peninsula. Further, coastal flooding disrupts communities and infrastructure.

Saltwater Intrusion: Saltwater intrusion significantly affects crop yields, with fertile paddy fields lost due to this issue. Additionally, it compromises the quality of drinking water, posing health risks and increasing vulnerability to waterborne diseases.

Agricultural Loss: The intrusion into arable lands results in the loss of fertile paddy fields, affecting local food security and the nutritional well-being of communities.

Resource Scarcity: Prolonged coastal vulnerability exacerbates resource scarcity, particularly in terms of potable water. The intrusion of saltwater into freshwater sources intensifies the shortage of clean drinking water.

3) *Profound Effects*

Food Insecurity: Saltwater intrusion disrupts crop yields, leading to local food insecurity and increased dependence on external aid for sustenance. This affects not only the quantity but also the quality of food consumed by the affected population, with implications for their overall nutritional well-being.

Community Displacement: Pervasive coastal vulnerability forces communities to contemplate relocation, potentially displacing generations from their ancestral homes, culture, and traditions. This migration disrupts the social fabric of these communities and creates challenges in terms of resettlement, livelihoods, and preserving cultural heritage.

Economic Vulnerability: Households reliant on agriculture and fisheries confront economic hardships, affecting their overall well-being and access to essential services such as healthcare and education. Income reductions due to saltwater intrusion and land loss have led to a staggering 30% decrease in annual incomes for affected households.

Health Risks: The intrusion of saltwater into freshwater sources poses health risks as it compromises the quality of drinking water, increasing vulnerability to waterborne diseases. This exacerbates the vulnerability of the population, particularly affecting the health and well-being of children, the elderly, and those with pre-existing health conditions.

Social Disruption: The pervasive coastal vulnerability in the Jaffna peninsula has triggered profound social

disruption. This social upheaval reverberates through these close-knit communities, disrupting the very fabric of their societies and eroding their cultural heritage. The complex challenges posed by such social disruption call for comprehensive and culturally sensitive responses, recognizing the deeply rooted connections to land and traditions held by these communities. Addressing these social dimensions is paramount in formulating effective strategies for climate resilience in the Jaffna peninsula.

In summary, the case study of the coastal vulnerability in the Jaffna Peninsula underscores the severity and complexity of this issue. Climate change-induced factors, inadequate infrastructure, and a lack of adaptation measures compound the challenges faced by this region. Addressing these issues requires not only environmental measures but also social and economic interventions to safeguard the well-being and livelihoods of the coastal communities in the Jaffna peninsula.

B. Analysis of Case Study 2: Landslide Risk in Badulla

The case study on landslide risk in Badulla illuminates a series of complex issues caused by climate change and human activities that threaten both the environment and the well-being of the local population. The analysis will delve into the core causes, core problems, and profound effects of landslide vulnerability in Badulla.

1) Core Causes

Irregular Rainfall: One of the primary causes of landslides in Badulla is irregular rainfall patterns exacerbated by climate change. These unpredictable weather events, characterized by unprecedented rainfall in recent years, contribute significantly to soil instability. As climate change continues, these irregular weather patterns are likely to persist, further increasing the susceptibility to landslides.

Deforestation: Extensive deforestation, primarily driven by agricultural expansion, poses a critical environmental challenge. It has left the region's steep slopes vulnerable to erosion and has compromised soil structure. The removal of trees and vegetation disrupts the natural balance of the environment, making landslides more likely and more severe.

Urbanization: The rapid urbanization in Badulla, fueled by population growth and inadequate urban planning, has led to the haphazard construction of buildings and infrastructure on slopes prone to landslides. This reckless

expansion contributes to the increased risk of landslides in urban areas.

Weak Regulatory Frameworks: Inadequate regulatory frameworks governing construction and deforestation in vulnerable areas have allowed dangerous development to persist. The absence of robust enforcement and clear land use policies further exacerbates the problem. Legal and policy measures are urgently needed to address this aspect of landslide vulnerability.

Limited Awareness: Many communities in Badulla lack awareness of landslide risks, and there are insufficient preparedness measures in place. Educational initiatives and community-based programs are essential to improve awareness and readiness for landslides.

2) Core Problems

Community Exposure: Vulnerable communities living on steep slopes are directly exposed to the heightened risk of landslides. Their proximity to landslide-prone areas puts them in immediate danger, and the lack of resources and infrastructure further amplifies their vulnerability.

Infrastructure Vulnerability: The proliferation of infrastructure in landslide-prone areas increases the risk of damage and loss during landslides. Roads, buildings, and public structures are all at risk, disrupting daily life and the overall development of the region.

Resource Scarcity: Landslide-affected areas struggle with resource scarcity, particularly in terms of accessing clean water, food, and shelter. The aftermath of landslides can result in a shortage of essential resources, deepening the challenges faced by residents.

3) Profound Effects

Infrastructure Loss: Landslides lead to the loss and damage of infrastructure, including homes, roads, and public buildings. This disrupts daily life, hampers development efforts, and creates significant economic challenges.

Displacement and Loss of Lives: Landslide occurrences have directly impacted more than 5,000 families in recent years, leading to displacement, loss of lives, and profound trauma within these communities. The social and economic consequences of such displacement are substantial.

Health Risks: Landslides disrupt access to healthcare services, posing significant challenges in responding to

injuries and trauma. The physical and mental health of affected individuals, especially children, the elderly, and those with pre-existing health conditions, is at risk.

Economic Vulnerability: Economic instability caused by landslides affects the overall well-being of households, limiting their capacity to access essential services, including education and healthcare. Households have experienced substantial reductions in their annual incomes.

In summary, the case study underscores the urgent need for comprehensive mitigation and preparedness measures to safeguard the communities in Badulla from the looming threat of landslides. Addressing the landslide vulnerability requires a multi-faceted approach involving environmental conservation, urban planning, regulatory reform, education, and support for affected communities.

C. Analysis of Case Study 3: Drought in Ampara

The case study on drought in Ampara reveals the multi-faceted challenges posed by climate change in a region heavily reliant on agriculture. This analysis delves into the core causes, core problems, and profound effects of drought vulnerability in Ampara.

1) Core Causes

Shifting Rainfall Patterns: Climate change has induced unpredictable and shifting rainfall patterns in Ampara. Irregular monsoon seasons and variations in precipitation have led to prolonged dry periods. Climate projections suggest that these shifting patterns will continue, intensifying the vulnerability to drought in the region.

Deforestation: Extensive deforestation, often driven by agricultural expansion and urbanization, has disrupted local ecosystems. Trees play a crucial role in retaining moisture in the soil. The reduction of forested areas has diminished the region's natural capacity to store water, exacerbating the impact of drought.

Agricultural Practices: Conventional agricultural methods and practices in Ampara are often ill-suited to cope with changing climate conditions. The lack of adaptation measures in farming contributes to the region's vulnerability. The need for sustainable, climate-resilient agricultural practices is evident.

2) Core Problems

Crop Failures: Prolonged droughts result in widespread crop failures in Ampara. The changing rainfall patterns

undermine agricultural stability, leading to significant economic losses and food insecurity among the affected communities. Crop diversification and improved water management are essential strategies to address this problem.

Agricultural Dependency: Ampara's heavy reliance on agriculture makes communities particularly susceptible to economic setbacks during droughts. The lack of diversification in livelihoods exacerbates the problem. Encouraging alternative income sources can help mitigate economic hardship.

Water Shortages: The decreasing availability of freshwater resources during droughts poses significant challenges, affecting both drinking water access and agricultural irrigation. This can lead to increased competition for limited water resources.

3) *Profound Effects*

Food Insecurity: Prolonged droughts lead to widespread food insecurity in Ampara, affecting both the availability and affordability of nutritious food for the communities. The provision of food assistance and support for sustainable farming practices can help alleviate this problem.

Economic Hardship: Households heavily reliant on agriculture suffer from economic hardship, limiting their overall well-being and access to essential services such as healthcare and education. Diversifying livelihoods and strengthening social safety nets are essential to mitigate these economic challenges.

Health Risks: Drought conditions, compounded by water scarcity, elevate health risks, particularly concerning waterborne diseases and healthcare challenges. Improving access to clean water and healthcare services is vital.

Social Disruption: The disruption of traditional livelihoods due to drought forces communities in Ampara to seek alternative income sources, altering their way of life. Supporting livelihood diversification initiatives can facilitate a smoother transition and reduce the overall impact of drought.

In summary, the case study on drought in Ampara underscores the critical need for climate-resilient agricultural practices, diversified livelihoods, and improved water resource management. Addressing these aspects can enhance the region's ability to adapt to changing climate conditions, ultimately reducing the vulnerabilities and challenges associated with drought.

D. *Analysis of Case Study 4: Flood Vulnerability in Colombo*

The case study on flood vulnerability in Colombo provides insights into the intricate relationship between climate change, urbanization, and the recurring issue of urban flooding. The analysis dissects the core causes, problems, and effects of flood vulnerability in Colombo.

1) *Core Causes*

Irregular Weather Patterns: Colombo's susceptibility to floods is intrinsically linked to climate change-induced irregular weather patterns. These patterns result in intense and unpredictable rainfall, overwhelming existing drainage systems and triggering urban flooding. The irregular weather underscores the urgency of adapting to changing climate conditions.

Sea-Level Rise: Rising sea levels, attributed to climate change, significantly contribute to the increasing vulnerability of low-lying areas in Colombo. Higher sea levels worsen the impacts of heavy rainfall by causing coastal flooding and inundation. As sea levels continue to rise, this threat will persist, emphasizing the need for robust mitigation and adaptation strategies.

Urbanization Pressures: Rapid urbanization, driven by population growth and inadequate urban planning, has led to the haphazard construction of buildings and infrastructure in flood-prone areas. The urban expansion amplifies the risk of flooding. Effective urban planning and sustainable development practices are imperative to mitigate this risk.

Inadequate Infrastructure: The inadequacy of drainage and flood control infrastructure in urban areas further exacerbates the flooding problem. Poorly designed or maintained drainage systems struggle to cope with heavy rainfall. Infrastructure investment and maintenance are crucial for enhancing flood resilience.

Informal Settlements: Approximately 45% of Colombo's urban population resides in informal settlements characterized by inadequate housing and infrastructure. These vulnerable populations are highly exposed to floods due to their precarious living conditions. Addressing the needs of these communities is paramount in reducing flood vulnerability.

2) *Core Problems*

Infrastructure Damage: Recurrent floods result in the damage of critical infrastructure, including homes, roads,

and public buildings, hindering overall development and recovery efforts. Investment in resilient infrastructure is essential for mitigating the impact of floods and facilitating recovery.

Resource Scarcity: Flood-affected areas often face resource scarcity, including clean water and shelter, deepening the challenges faced by residents and impeding recovery efforts. Ensuring a steady supply of resources during and after floods is critical.

Community Vulnerability: Vulnerable populations residing in informal settlements are particularly susceptible to floods. Limited access to resources and healthcare further amplifies their challenges, emphasizing the need for targeted interventions to protect these communities.

3) *Profound Effects*

Infrastructure Loss: Flooding results in the loss and damage of critical infrastructure, affecting homes, roads, and public buildings. This hinders overall development and recovery efforts, reinforcing the need for resilient construction and urban planning.

Health Risks: Floods disrupt access to healthcare services, exacerbating health risks and hindering responses to injuries and diseases. Improving healthcare access and preparedness is essential for minimizing health-related challenges during and after floods.

Economic Strain: The economic upheaval caused by floods affects the overall well-being of households, limiting their capacity to access essential services and education. Supporting economic recovery and livelihoods is pivotal in reducing the economic strain imposed by floods.

Resource Depletion: Flood-affected areas suffer from resource scarcity, particularly in terms of clean water, food, and shelter. Enhancing resource management and supply chain resilience is crucial for minimizing the challenges faced by residents.

Community Disruption: Pervasive flood vulnerability strains social fabrics, compelling communities to contemplate migration and displacement, potentially leading to the erosion of cultural heritage. Preserving community cohesion during and after floods is essential.

In summary, the case study on flood vulnerability in Colombo underscores the pressing need for comprehensive strategies that encompass urban

planning, infrastructure development, community support, and climate adaptation to effectively address the recurring issue of urban flooding and its far-reaching impacts.

IV DISCUSSION AND RESULTS

The impact of climate change on human security in Sri Lanka, particularly in the context of SIDS, is contingent upon their exposure, vulnerability, and coping capacity in the face of these environmental stressors (IPCC, 2019).

Exposure, in the context of SIDS like Sri Lanka, pertains to the physical presence of populations, infrastructure, and other critical assets within regions susceptible to climate-related stressors and shocks, including but not limited to sea-level rise, tropical cyclones, and coastal erosion (IPCC, 2019).

Vulnerability, which is particularly acute in island states, reflects the inclination of these exposed elements, such as communities, infrastructure, and other essential assets, to suffer adverse consequences due to climate change hazards. The inherent factors of small landmass, limited resources, and geographic isolation render island states highly vulnerable to climate change impacts. These encompass elevated risks of flooding, land erosion, and disruptions to vital services and livelihoods (UNEP, 2019).

Coping capacity, an integral facet of vulnerability, signifies the capacity of island states and their populace to effectively manage the repercussions of climate change. This encompasses various determinants, including institutional capabilities, financial resources, access to technology, and the presence of robust social and community networks. These factors collectively empower the adoption of adaptive strategies and the fortification of resilience against climate-induced challenges (IPCC, 2019).

Furthermore, climate change impacts manifest in various ways, particularly in SIDS like Sri Lanka situated in the Indian Ocean region. These impacts can be categorized into sudden onset stressors/shocks and slow onset stressors, each posing distinct challenges.

Sudden Onset Stressors/Shocks: These are conspicuous, immediate events that include extreme weather phenomena like cyclones, floods, and droughts. These events have the potential to inflict extensive damage on property, infrastructure, and livelihoods, often resulting in the displacement of communities.

Nexus Between Climate Change and Human Security in Sri Lanka: Implications for Small Island Developing States in the Indian Ocean Region

Slow Onset Stressors: In contrast, slow onset stressors are less overt and exert a gradual influence. They encompass phenomena such as rising sea levels, Ocean acidification, and shifting precipitation patterns. These phenomena incrementally affect the ability of communities to access fundamental resources like food and water.

Understanding the different types of climate change impacts, both sudden onset and slow onset, are crucial for SIDS in developing effective adaptation and mitigation strategies. By addressing both immediate and long-term challenges, island states can enhance their resilience and well-being in the face of these evolving environmental conditions (IPCC, 2022; UNEP, 2020).

To provide a more comprehensive understanding, it's essential to consider various factors that amplify vulnerability to climate change impacts in Sri Lanka and similar island nations in the Indian Ocean region.

Geographic Location: Proximity to climate change impacts significantly influences vulnerability. Coastal and low-lying areas are particularly exposed due to their susceptibility to rising sea levels and extreme weather events (World Bank, 2022).

Socioeconomic Status: Individuals and communities grappling with poverty and marginalization confront heightened vulnerability. Limited resources hinder their capacity to cope with the multifaceted effects of climate change (UNDP, 2022).

Gender: Gender dynamics play a pivotal role, with women and girls facing elevated vulnerability. They often bear the responsibility for securing water and food, tasks that become more challenging in the face of climate change (United Nations Women, 2022).

Age: Vulnerability is also associated with age. Both older individuals and children exhibit increased susceptibility to climate change impacts due to their diminished resilience (World Health Organization, 2022).

Disability: Persons with disabilities confront augmented vulnerability as they may encounter difficulties accessing essential resources and evacuating during climatic disasters (Disability Rights International, 2022).

Education: Education serves as a critical determinant of coping capacity. Those with higher levels of education tend to be more equipped to navigate climate risks and employ mitigation strategies (UNESCO, 2022).

Access to Resources: The availability of essential resources, such as food, water, and shelter, significantly influences an individual's or community's ability to withstand climate change impacts (Food and Agriculture Organization of the United Nations, 2022).

The study scrutinizes the multifaceted impacts of climate change on human security in Sri Lanka, with a special focus on SIDS. Human security encompasses various dimensions, including health, economic, political, food, environmental, personal, and community security, all of which are significantly influenced by climate change (UNDP, 2020).

Health Security: In Sri Lanka, climate change poses considerable threats to health security, particularly regarding water quality and sanitation. Rising temperatures and altered precipitation patterns exacerbated water scarcity issues, impacting around 11.7 percent of the Sri Lankan population with limited access to improved water sources. This elevates the risk of waterborne diseases, with vulnerable communities, especially children, facing substantial health challenges (OHCHR & WFP, 2022).

Economic Security: Economic security in Sri Lanka is intimately linked to employment opportunities and income stability. Climate change-induced events such as extreme weather events and sea-level rise disrupted livelihoods, posing severe economic challenges (Central Bank of Sri Lanka, 2020). This is especially concerning in areas with existing poverty and income inequality issues, predominantly rural areas (World Bank, 2020).

Political Security: Political stability and protection of human rights are pivotal aspects of political security. Climate change exacerbated political tensions, as resource scarcity and displacement due to environmental factors may trigger conflicts. Sri Lanka has previously experienced political unrest and ethnic tensions, underscoring the fragile nature of political security (UNDP, 2020).

Food Security: Climate change-induced shifts in precipitation and temperature patterns can substantially affect crop yields and food production in Sri Lanka. Ensuring access to nutritious food for all individuals becomes increasingly challenging with around 17% of the Sri Lankan population already experiencing moderate to severe food insecurity (WFP, 2022).

Environmental Security: Sri Lanka's environmental security is under duress due to climate change. The nation faces a slew of environmental challenges including deforestation, land degradation, and pollution. Sri Lanka

witnessed the loss of approximately 29% of its forest cover between 1990 and 2020, resulting in dire ecological consequences (Global Forest Watch, 2020).

Personal Security: In the context of climate change, Sri Lanka faces specific challenges related to personal security. The implications of climate change exacerbated these existing personal security challenges. Climate-induced events, such as extreme weather events and environmental degradation, can disrupt livelihoods and communities. Displacement resulting from climate-related disasters can lead to overcrowded living conditions and heightened tensions, potentially increasing the risk of domestic violence and conflicts within communities.

One notable concern is the prevalence of domestic violence, crime, and child abuse in the country. The Sri Lanka Police Department recorded a significant number of cases in 2020, with 22,941 reported incidents of domestic violence alone (Sri Lanka Police, 2021). This alarming statistic underscores the urgency of addressing these issues within the framework of personal security.

Community Security: Fostering social cohesion and preventing intercommunal conflicts is pivotal for community security in Sri Lanka. The nation has a history of tensions between different ethnic and religious groups. Climate change-induced resource scarcity and displacement can further exacerbate these issues (UNDP, 2020). Therefore, initiatives aimed at promoting dialogue, reconciliation, and respect for diversity are essential for building resilient and inclusive communities.

In the context of climate change, these dimensions of human security are profoundly interconnected, underscoring the necessity of a comprehensive approach to address the evolving challenges faced by Sri Lanka, particularly for SIDSs in IOR.

V RECOMMENDATIONS

A. *Recommendations for Sri Lanka*

Sri Lanka should prioritize the development and implementation of robust adaptation measures to address the specific climate change impacts it faces. Raise awareness about climate change impacts and adaptation strategies among coastal communities. Education and training programs can help communities understand the risks and adopt resilient practices.

Sri Lanka should promote climate-resilient agricultural practices in vulnerable regions like Jaffna.

This includes introducing salt-tolerant crop varieties and efficient water management techniques.

Sri Lanka should invest in resilient infrastructure, especially in coastal areas. This includes constructing flood-resistant buildings and improving drainage systems to reduce the impact of inundation.

Sri Lanka should empower local communities to be part of the solution. Encourage the formation of community-based organizations to manage resources sustainably and implement climate adaptation strategies.

Sri Lanka should develop and maintain early warning systems for extreme weather events, including storm surges and heavy rainfall. Ensure that these systems are accessible and understandable to the local population.

Sri Lanka should implement integrated coastal management strategies in vulnerable regions like Jaffna. This includes shoreline protection, mangrove restoration, and sustainable land use planning to reduce the impacts of saltwater intrusion and inundation.

B. *Recommendations for SIDS in the Indian Ocean Region*

Foster regional collaboration among SIDS in the Indian Ocean Region to share knowledge, resources, and best practices for climate adaptation. Collaborative efforts can enhance the resilience of all member states.

Establish a regional network for climate data collection and sharing. Accurate and timely data is crucial for understanding climate change impacts and formulating effective adaptation strategies.

Invest in capacity-building programs for SIDS to enhance their ability to assess vulnerabilities, formulate adaptation plans, and implement climate-resilient projects.

Promote ecosystem-based adaptation approaches, such as mangrove restoration and coral reef protection. These natural barriers can help mitigate the impacts of rising sea levels and storms.

Support the development of climate-resilient infrastructure in SIDS, especially in vulnerable coastal areas. This includes building resilient roads, buildings, and energy systems.

Strengthen disaster preparedness and response mechanisms. SIDS should have well-defined plans in

Nexus Between Climate Change and Human Security in Sri Lanka: Implications for Small Island Developing States in the Indian Ocean Region

place for responding to climate-related disasters, including evacuations and relief efforts.

Involve civil society organizations, local communities, and indigenous knowledge in the development and implementation of climate adaptation initiatives. Their insights and participation are invaluable.

VI CONCLUSION

In conclusion, this study highlights the intricate relationship between climate change and human security, particularly in the context of Sri Lanka and other SIDS in the Indian Ocean region. The findings underscore the urgent need for comprehensive and integrated approaches to address the multifaceted impacts of climate change on vulnerable communities.

In implementing these recommendations, it is crucial to strengthen institutional capacity, enhance data collection and knowledge sharing, and prioritize the most vulnerable populations, including women, children, and marginalized groups. A comprehensive and inclusive approach that considers the interconnectedness of the different dimensions of human security is key to sustaining peace and promoting climate resilience.

REFERENCES

1. Adelphi. (2019). Climate Fragility Risk Brief: Lake Chad Basin. Retrieved from https://www.adelphi.de/en/system/files/mediathek/bilder/adelphi_climate_fragility_risk_brief_lake_chad_basin.pdf
2. Central Bank of Sri Lanka. (2020). Annual Report 2019. Retrieved from https://www.cbsl.gov.lk/sites/default/files/cbslweb_documents/publications/annual_report/2019/e_ar_2019.pdf
3. Dissanayake, D. M. S., Hettiarachchi, S., & Ratnayake, R. M. S. (2021). Impacts of Climate Change on the Coastal Zone of Sri Lanka. Proceedings of the Institution of Civil Engineers - Maritime Engineering, 174(1), 3-14.
4. Fernando, S., et al. (2018). Impacts of Extreme Weather Events on Vulnerable Coastal Communities in Sri Lanka. Journal of Climate Change, 2(1), 45-60.
5. Germanwatch. (2021). Climate Risk Index 2021. Retrieved from https://www.germanwatch.org/sites/germanwatch.org/files/20-201e%20Global%20Climate%20Risk%20Index%202021_14.pdf
6. Global Forest Watch. (2020). Sri Lanka: Deforestation Rates. Retrieved from <https://www.globalforestwatch.org/dashboards/country/LKA>
7. Gunawardena, I., et al. (2020). Climate Change Impacts on Agriculture and Food Security in Sri Lanka: A Review. International Journal of Climate Change Strategies and Management, 12(4), 577-594.
8. IPCC. (2019). Special Report on the Ocean and Cryosphere in a Changing Climate. Intergovernmental Panel on Climate Change.
9. IPCC. (2022). IPCC AR6 Synthesis Report: Climate Change 2022. Intergovernmental Panel on Climate Change.
10. Ministry of Mahaweli Development and Environment. (2016). Climate Change Adaptation Plan for Sri Lanka. Colombo, Sri Lanka: Ministry of Mahaweli Development and Environment.
11. National Disaster Management Centre. (2020). Annual Performance Report 2019. Retrieved from <http://www.ndmc.gov.lk/srilankanew/wp-content/uploads/2020/10/APR-2019-Final.pdf>
12. OECD. (2018). States of Fragility 2018. Retrieved from <https://www.oecd-ilibrary.org/sites/9789264302075-en/index.html?itemId=/content/publication/9789264302075-en>
13. OECD. (2020). OECD Fragility Framework. Retrieved from <https://www.oecd.org/dac/conflict-fragility-resilience/oecd-fragility-framework.htm>
14. OECD. (2020). Salinization. OECD Glossary of Statistical Terms. Retrieved from <https://stats.oecd.org/glossary/detail.asp?ID=2392>
15. Smith, J., et al. (2019). Rising Sea Levels and Coastal Erosion: Impacts on Small Island States in the Indian Ocean Region. Environmental Research Letters, 14(8), 085003.

16. Smith, M., Jones, R., & Brown, D. (2019). Impacts of Climate Change on Small Island States. *Wiley Interdisciplinary Reviews: Climate Change*, 10(2), e569. <https://doi.org/10.1002/wcc.569>
17. Sri Lanka Police. (2021). Annual Performance Report 2020. Retrieved from http://www.police.lk/images/pdf/Annual_Report/Annual_Performance_Report_2020.pdf
18. UNEP. (2019). Global Environment Outlook: Summary for Policy Makers. United Nations Environment Programme.
19. UNEP. (2020). Climate Change and Human Security: A Review of the Literature. Nairobi, Kenya: United Nations Environment Programme.
20. UNEP. (2020). Global Linkages: A Graphic Look at the Changing Arctic. United Nations Environment Programme.
21. United Nations Security Council. (2016). S/Res/2282. Retrieved from [https://undocs.org/S/RES/2282\(2016\)](https://undocs.org/S/RES/2282(2016))
22. World Bank. (2020). Poverty and Shared Prosperity 2020: Reversals of Fortune. Retrieved from <https://openknowledge.worldbank.org/bitstream/handle/10986/34496/9781464816028.pdf>
23. World Bank. (2020). Sri Lanka - Climate Change and Disaster Risk Reduction Program for Resilience. Retrieved from <https://www.worldbank.org/en/news/press-release/2020/06/18/sri-lanka-world-bank-supports-implementation-of-climate-change-and-disaster-risk-reduction-program-for-resilience>
24. World Food Programme. (2021). Sri Lanka Country Brief. Retrieved from <https://www.wfp.org/countries/sri-lanka>
25. World Health Organization. (2018). Sri Lanka Country Cooperation Strategy 2018-2022. Retrieved from
26. https://apps.who.int/iris/bitstream/handle/10665/272967/ccsbrief_lka_en.pdf
27. Achala, T. D., et al. (2020). Green Climate Fund and its prospects in Sri Lanka: An assessment. *Sustainability*, 12(17), 7094.
28. Amaratunga, K. S. P., et al. (2017). Evaluation of vulnerability and adaptation to climate change in urban coastal centres: A case study from Colombo, Sri Lanka. *Natural Hazards*, 87(3), 1587-1609.
29. Banneheka, S., et al. (2016). Farmers' perception on climate change and factors affecting adaptation: A study in the dry zone of Sri Lanka. *Environmental Economics*, 7(4), 61-66.
30. Fernando, K., et al. (2019). Community-based adaptation to climate change in Sri Lanka: Lessons from the 'Giribawa' project. *Climate and Development*, 11(4), 295-304.
31. Gunawardena, K. R., et al. (2014). Gendered vulnerability to climate change in Sri Lanka: Learning from the 2004 tsunami recovery. *Climate and Development*, 6(3), 216-227.
32. Hettiarachchi, M., et al. (2016). Assessment of adaptive capacity and livelihood diversification of farming communities in Sri Lanka to climate variability and change. *Environmental Management and Sustainable Development*, 5(1), 93-107.
33. Iqbal, M. M., et al. (2017). The socio-economic impact of climate change on the small-scale fisheries sector in Sri Lanka: A review. *Marine Policy*, 82, 32-38.
34. Jayasuriya, S., et al. (2015). Urbanization and climate change: Exploring the intersections in Colombo, Sri Lanka. *Urban Climate*, 14(4), 340-357.
35. Kumara, K. A. R., et al. (2015). Vulnerability of coastal fisheries and livelihoods to climate variability and change: A case study from a natural disaster-prone coastal area of Sri Lanka. *Fisheries Research*, 161, 100-108.
36. Marambe, B., et al. (2019). Community-based adaptation to climate change in the agricultural sector in Sri Lanka: Lessons from two case studies. *Climate and Development*, 11(5), 448-462.

37. Nandasena, L., et al. (2018). Climate variability and extreme weather events in Sri Lanka: Recent changes, impacts, and implications for agriculture. *Climate and Development*, 10(3), 279-292.
38. Nandasena, L., et al. (2019). Projected climate change impacts on agriculture in Sri Lanka: A Ricardian analysis. *Journal of Environmental Management*, 234, 1-11.
39. Sivakumar, M. V. K. (2015). Climate change and food security in Sri Lanka: Adaptation and mitigation strategies. *Wiley Interdisciplinary Reviews: Climate Change*, 6(5), 535-556.
40. Sundaresan, J., et al. (2017). A comparative analysis of disaster governance in India and Sri Lanka: The role of civil society. *International Journal of Disaster Risk Reduction*, 24, 215-225.
41. Wickramarachchi, S. A., et al. (2018). Foreign aid and climate change adaptation: Evidence from Sri Lanka. *Sustainability*, 10(11), 4147-4172.
42. United Nations General Assembly. (2009). Sixty-fourth session of an agenda related to climate change and its possible security implications. A/64/350). United Nations.
43. Gopalakrishnan, T. and Kumar, L., 2021. Linking long-term changes in soil salinity to paddy land abandonment in Jaffna Peninsula, Sri Lanka. *Agriculture*, 11(3), p.211.
44. United Nations Security Council. (2009). Mandate of United Nations Assistance Mission in Somalia, (2527/2020). United Nations.
45. McGray, H., 2014. Clarifying the UNFCCC national adaptation plan process. World Resources Institute.
46. United Nations Development Programme (UNDP). (1994). Human Development Report.
47. United Nations Development Programme (UNDP). (2019). Adelphi Report.
48. Mendis, V.L., 1992. National security concepts of states: Sri Lanka. UNIDIR United Nations Institute for Disarmament Research Geneva.
49. Streck, C., Keenlyside, P. and Von Unger, M., 2016. The Paris Agreement: a new beginning. *Journal for European Environmental & Planning Law*, 13(1), pp.3-29.
50. Adger, W. N., Arnell, N. W., & Tompkins, E. L. (2005). Successful adaptation to climate change across scales. *Global Environmental Change*, 15(2), 77-86.
51. Homer-Dixon, T. F. (1999). *Environment, Scarcity, and Violence*. Princeton University Press.
52. OECD. (2018). *States of Fragility 2018*. OECD Publishing.
53. OECD. (2020). *States of Fragility 2020*. OECD Publishing.
54. United Nations and World Bank. (2018). *Pathways for Peace: Inclusive Approaches to Preventing Violent Conflict*. World Bank Group.
55. United Nations. (1945). Charter of the United Nations. <https://www.un.org/en/about-us/un-charter>
56. United Nations Framework Convention on Climate Change. (1992). United Nations Framework Convention on Climate Change. <https://unfccc.int/resource/docs/convkp/conven g.pdf>
57. Intergovernmental Panel on Climate Change. (2022). *Climate change 2022: Impacts, adaptation and vulnerability*. Geneva, Switzerland: Author.
58. United Nations Development Programme. (2022). *Gender, climate change and disaster risk reduction: A synthesis of evidence from the Indian Ocean region*. New York, NY: Author.
59. United Nations Framework Convention on Climate Change. (2022). *The Paris Agreement: A guide for policymakers*. Geneva, Switzerland.
60. United Nations Office for Disaster Risk Reduction. (2022). *Global assessment report on disaster risk reduction 2022*. Geneva, Switzerland: Author.

Nexus Between Climate Change and Human Security in Sri Lanka: Implications for Small Island Developing States in the Indian Ocean Region

61. World Meteorological Organization. (2022). State of the climate in 2021. Geneva, Switzerland: Author.
62. IPCC. (2019). IPCC Special Report on the Ocean and Cryosphere in a Changing Climate. Retrieved from <https://www.ipcc.ch/srocc/>
63. UNEP. (2019). Global Linkages - A graphic look at the changing Arctic. United Nations Environment Programme. Retrieved from
64. <https://www.unep.org/resources/publication/global-linkages-graphic-look-changing-arctic>
65. World Health Organization. (2022). Climate change and health: A guide for policymakers. Geneva, Switzerland: Author.
66. Food and Agriculture Organization of the United Nations. (2022). The state of food security and nutrition in the world 2022. Rome, Italy: Author.
67. ADB. (2020). Sri Lanka: Climate Risk and Vulnerability Assessment. Asian Development Bank.
68. Fernando, N., et al. (2021). Climate Change, Water Scarcity, and Agricultural Adaptation in Sri Lanka: A Review. *Sustainability*, 13(7), 3611.
69. Hapuarachchi, H. A. P., et al. (2017). Assessing Vulnerability of Coastal Communities to Climate Change: A Case Study from Sri Lanka. *Sustainability*, 9(10), 1898.
70. Jayatilleke, A. U., et al. (2019). Community-Based Adaptation to Climate Change: Lessons from Sri Lanka. *Sustainability*, 11(10), 2785.
71. Munasinghe, D., et al. (2019). Climate Change and Extreme Weather Events: Impacts on Agriculture in Sri Lanka. *Climate*, 7(3), 34.
72. UNDP Sri Lanka. (2020). Climate Change and Human Development in Sri Lanka: Challenges, Priorities, and Opportunities. UNDP Sri Lanka.
73. WHO Sri Lanka. (2019). Climate Change and Health: A Country Profile 2015. World Health Organization.
74. World Bank. (2021). Sri Lanka: Climate Change and Development Policy Operations. World Bank.
75. World Bank. (2022). Climate change adaptation: A guide for development practitioners. Washington, DC:
76. United Nations Development Programme. (2022). Gender, climate change and disaster risk reduction: A synthesis of evidence from the Indian Ocean region. New York, NY:
77. United Nations Women. (2022). Gender and climate change: A toolkit for action. New York, NY:
78. World Health Organization. (2022). Climate change and health: A guide for policymakers. Geneva, Switzerland:
79. Disability Rights International. (2022). Disability and climate change: A call to action. Washington, DC:
80. UNESCO. (2022). Education for climate action: A guide for policy-makers. Paris, France: Author.
81. Food and Agriculture Organization of the United Nations. (2022). Climate change, agriculture and food security: A handbook for policy-makers. Rome, Italy:
82. The Island. (2013). Navy claims no destruction of coastal ecosystems by their ammunition dump. <https://www.island.lk/navy-claims-no-destruction-of-coastal-ecosystems-by-their-ammunition-dump/>
83. The Island. (2015). 35,000 acres of forest destroyed by security forces. <https://www.island.lk/35-000-acres-of-forest-destroyed-by-security-forces/>
84. UNDP Sri Lanka. (2020). National Human Development Report 2020: Forging Unity. Colombo, Sri Lanka: United Nations Development Programme.
85. OHCHR & WFP. (2022). Food Security Crisis in Sri Lanka: A Rapid Assessment. Retrieved from https://srilanka.un.org/sites/default/files/2022-06/LKA_HNP_FoodSecurityCrisis_20220609_0.pdf
86. Lakshika, P., Sandaruwan, R.A., Ranjith, P.H., Ratnayake, N.P., Jinadasa, K., Nimila, D., Shanaka,

87. W. and Panchala, W.W., 2020. Sea-level inundation and risk assessment along the south and southwest coasts of Sri Lanka. *Geoenvironmental Disasters*, 7(1).

ACKNOWLEDGMENT

I hereby acknowledge the Institute of National Security Studies for providing inspiration and guidance towards the successful accomplishment of this research.

AUTHOR BIOGRAPHY



Commander Amila Prasanga is a Military Research Officer at the Institute of National Security Studies, with a BSc in Management and Technical Sciences (Defence Studies) from KDU, MBA from the University of Sri Jayewardenepura, and MSc in Defense and Strategic Studies from KDU and Masters in Conflict and Peace Studies from the University of Colombo. He's presented research at national and international conferences and authored esteemed journals. Notably, he holds a Research Associateship at Ohio State University, recognizing his contributions in Human Trafficking. His research interests include Maritime Security, Climate Change, Human Trafficking, and Military Wellbeing Management.

