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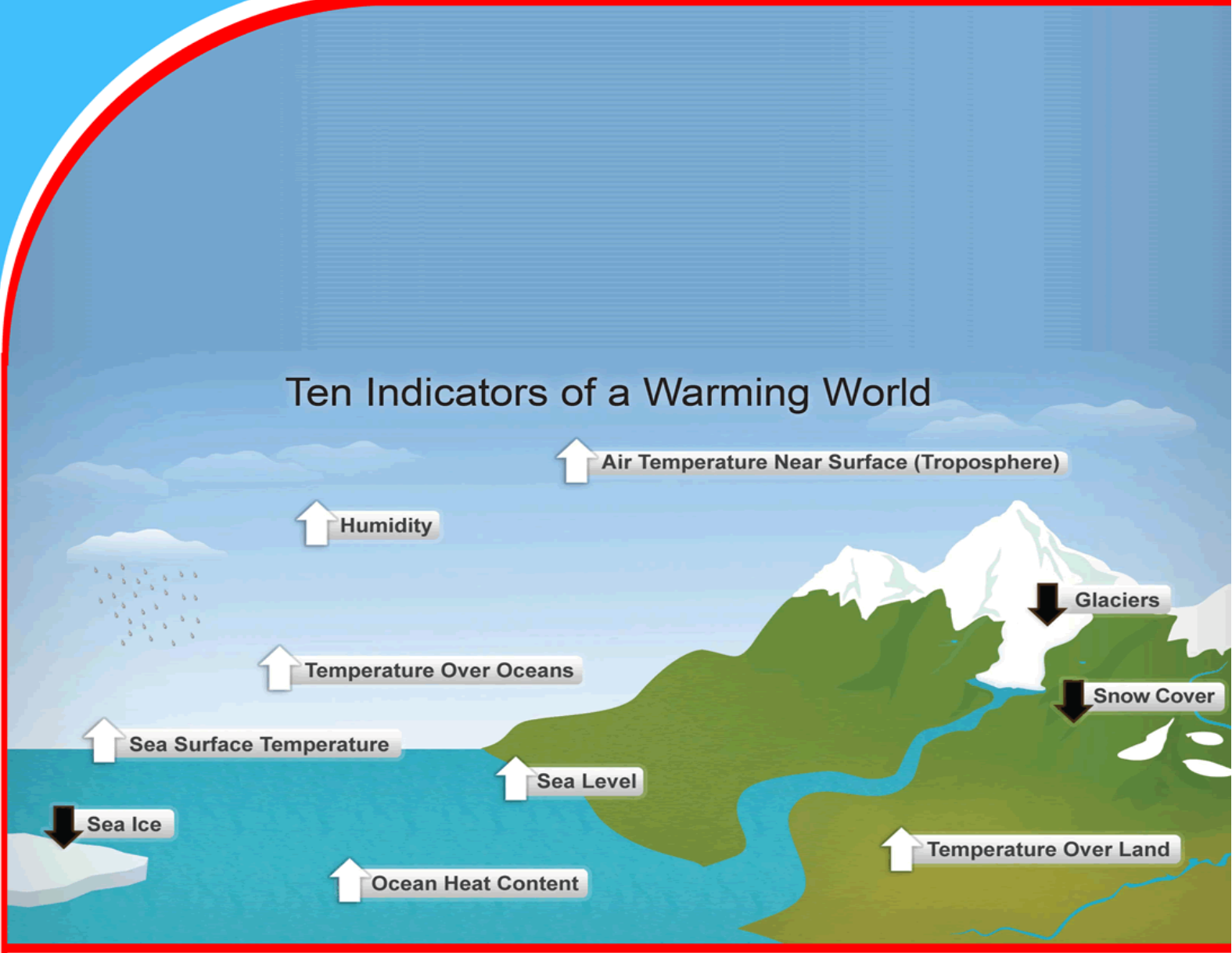

Climate Change Initiatives and Achievement of SDGS: A Paradoxical Analysis

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Abstract

Purpose: Climate change significantly threatens global sustainability, impacting ecosystems, economies, and societies. The Sustainable Development Goals (SDGs) by the United Nations aim to address these challenges, with Climate Action (SDG 13) being central. However, there is a paradox in balancing climate change initiatives and achieving other SDGs, such as poverty eradication, zero hunger, and good health. This study explores this paradox through a comprehensive analysis incorporating real-time data and examples from Kenya. The study aims to analyse the complex interactions between climate action and other SDGs, emphasising the challenges and opportunities in achieving sustainable development.

Materials and Methods: The investigation utilises case studies and data from various sources, including government reports and international organisations, to examine the impact of climate change on poverty, food security, health, and urban sustainability.

Findings: Climate change exacerbates poverty by disrupting livelihoods and increasing natural disasters, significantly impacting Kenya's GDP. Initiatives such as the Inua Jamii Cash Transfer Program and climate-smart agriculture practices have been introduced to mitigate these effects. Additionally, climate change affects food security and health, necessitating integrated strategies like the TWENDE project and the Climate Change Adaptation to Protect Human Health project. Despite efforts, there are tensions between economic growth and environmental conservation. Therefore, effective adaptation measures are crucial to address climate impacts.

Implications to Theory, Practice and Policy: Investing in healthcare, sustainable agriculture, and resilient infrastructure is imperative. Prioritising vulnerable communities and addressing inequalities can enhance climate resilience. This publication highlights the need for a holistic approach that integrates social, economic, and environmental considerations to balance climate action with sustainable development. By addressing these complexities, policymakers can promote resilience and inclusivity, contributing to a more sustainable future.

Keywords: *Climate Change, Sustainability, Sustainable Development Goals (SDGs), Adaptation, Environmental Policies, Paradox*

INTRODUCTION

Climate change remains one of the most pressing challenges of the 21st century, posing severe threats to ecosystems, economies, and societies worldwide. The impacts of rising global temperatures, extreme weather events, and environmental degradation necessitate urgent and coordinated global responses. International efforts such as the United Nations Sustainable Development Goals (SDGs) aim to address multifaceted challenges, including poverty (SDG 1), inequality (SDG 10), economic growth (SDG 8), and environmental sustainability (SDG 13) (United Nations, 2015). Specifically, SDG 13 – Climate Action focuses on mitigating climate change and adapting to its effects by promoting policies that reduce greenhouse gas emissions, enhance resilience, and foster sustainable environmental practices. However, the relationship between climate action and the achievement of other SDGs presents a paradoxical dilemma—while necessary for long-term sustainability, certain climate policies may create unintended trade-offs that hinder progress in other development areas.

One of the most evident paradoxes arises in the conflict between climate action and economic growth. Policies such as carbon taxes, fossil fuel regulations, and emissions reduction mandates are crucial in addressing climate change. However, they often impose short-term economic burdens, particularly on industries reliant on fossil fuels and developing economies striving for rapid industrialization (Bassi, Terlaak, & van Asselt, 2018). Another paradox emerges in the realm of poverty reduction and energy access (SDG 7). While global efforts to combat climate change emphasize reducing carbon footprints, some of these measures may inadvertently restrict energy access for low-income populations. Many developing countries depend on affordable fossil fuels for electricity and transportation. The paradox extends to food security (SDG 2) as well. Climate-smart agriculture promotes low-emission farming techniques, which are essential for mitigating agricultural carbon footprints. However, the shift towards sustainable farming often results in higher production costs and reduced crop yields in the short term, potentially leading to food shortages and higher prices (Lobell et al., 2011). This presents a difficult trade-off: while climate-friendly agriculture is crucial for long-term sustainability, it must be implemented in a way that does not compromise global food security and rural livelihoods.

To understand and analyze these complex trade-offs, the Policy Coherence for Sustainable Development (PCSD) framework provides a relevant theoretical lens. PCSD emphasizes integrating economic, social, and environmental policies to maximize synergies and minimize conflicts between different SDGs (Nilsson, Griggs, & Visbeck, 2016). This theory argues that climate action should not be pursued in isolation but rather aligned with broader sustainable development objectives. By applying PCSD, policymakers can design climate policies that are both environmentally effective and economically viable, reducing unintended trade-offs between sustainability and development. For instance, investing in green technologies can create new job opportunities, helping to offset employment losses in traditional sectors (OECD, 2019). Similarly, carbon pricing revenues can be redirected towards social welfare programs, ensuring that climate policies do not disproportionately burden lower-income populations (Jakob & Steckel, 2016).

Statement of the Problem

While climate action (SDG 13) is essential for sustainability, its implementation often presents trade-offs with other SDGs, creating a paradox that hinders comprehensive development. For instance, policies such as carbon taxes, emission reduction mandates, and renewable energy transitions can increase production costs, slow economic growth, and exacerbate poverty

(Sovacool et al., 2019; Jakob & Steckel, 2016). Additionally, climate-smart agriculture, while reducing emissions, can lower food production, threatening food security (Lobell et al., 2011). Despite the findings, these empirical studies reveal significant research gaps, particularly in identifying practical policy solutions that balance climate mitigation with economic growth, poverty reduction, and food security. Therefore, this study seeks to address these gaps through interdisciplinary and context-specific research.

Methods and Data

This publication employs a case study research design to explore the intricate relationships between climate change initiatives and achieving SDGs in Kenya. The research adopts a qualitative methodology, focusing on in-depth case studies to comprehensively understand how climate action impacts various SDGs. A qualitative research approach was chosen over quantitative or mixed methods because the study aims to explore complex interactions between climate action and SDGs in Kenya. Qualitative research allows for in-depth case study analysis, capturing contextual nuances, policy trade-offs, and stakeholder perspectives (Creswell & Poth, 2018). This involves analysing specific projects and initiatives implemented in Kenya. The target data sources include governmental agencies, international organisations, local communities, and stakeholders involved in Kenya's climate change initiatives and sustainable development. Additionally, the study utilises purposive sampling to select relevant reports and studies that illustrate the paradoxical relationship between climate action and SDGs.

Data from case studies and interviews are analysed thematically to identify key patterns and issues. Thematic analysis is the most suitable method as it identifies recurring patterns and themes across case studies, providing structured insights into policy impacts and conflicts (Braun & Clarke, 2006). It also allows for flexibility in data interpretation, making it ideal for analyzing diverse sources such as government reports, interviews, and project evaluations. To ensure reliability and validity, the study employs triangulation by cross-checking multiple data sources, member checking with stakeholders to verify interpretations, and peer review for objective validation (Lincoln & Guba, 1985). A systematic coding framework ensures consistency in thematic analysis, enhancing the study's credibility (Nowell et al., 2017). The findings are presented through detailed case descriptions and statistical evidence to communicate the complexities and interconnections observed in the study effectively.

Findings

Interconnection between SDG Goals and Climate Change Initiatives

One of the most crucial SDG goals of UNEP is No Poverty. The goal is to end poverty in all forms by 2030, ensuring that all people have access to basic resources, services, and opportunities to improve their lives. It encompasses eradicating extreme poverty, reducing inequalities, and promoting social protection systems for the most vulnerable populations. Likewise, climate change exacerbates poverty by disrupting livelihoods, reducing agricultural productivity, and increasing the frequency and intensity of natural disasters, which disproportionately affect poor and vulnerable populations. Kenya loses 2.0–2.4% of its gross domestic product (GDP) annually due to climate change effects, such as droughts and floods, and droughts alone cost Kenya 8% of GDP every five years (World Bank, 2022). Most nations have employed various climate change initiatives to control climate change hazards. In Kenya, the government has introduced the Inua Jamii 70 Years and Above Cash Transfer Program to reduce the cost of climate change-induced

drought on the national economy. It targets 620,000 people in 11 counties, including Garissa, Tana River, Isiolo, and Marsabit. The project focuses on restoring over 500,000 hectares of degraded rangelands (Isadora & Zhang, 2022). The 2021 Towards Ending Drought Emergencies (TWENDE) project, valued at USD 34 million in Kenya, is among the adaptation projects aimed at restoring degraded lands while benefiting over 620,000 people in 11 arid and semi-arid counties (IUCN, 2022). Therefore, Kenya's Inua Jamii Cash Transfer Program and TWENDE project align with global social protection models like Brazil's Bolsa Verde and Ethiopia's Productive Safety Net Program (PSNP), which link financial aid to environmental restoration (World Bank, 2021)

In addition, SDG goal two of zero hunger seeks to end hunger, achieve food security, improve nutrition, and promote sustainable agriculture. It aims to ensure that all people have access to nutritious food and that food systems are resilient, sustainable, and equitable. In relation to this, erratic rainfall patterns, extreme weather events, and changing temperatures due to climate change impact crop yields, food production, and food security, leading to hunger and malnutrition, especially in regions dependent on agriculture. In response, Kenya has introduced climate-smart agriculture practices such as preparing for extreme weather events and having weather-index insurance policies that compensate farmers during climate-related losses. According to the Ministry of Agriculture, the country has partnered with UNICEF Kenya to provide Ready-to-Use Therapeutic Food (RUTF) to malnourished children (UNICEF, 2022). Kenya's climate-smart initiatives mirror India's sustainable farming policies and Rwanda's climate-resilient agriculture, but scaling up irrigation and agroforestry could enhance impact (FAO, 2023).These initiatives seek to address climate change and ensure the attainment of the zero hunger goals.

Mental and physical health is also among the significant SDG goals. This objective seeks to promote physical and psychological health, reduce maternal and child mortality, combat communicable diseases, and ensure universal healthcare access. At the same time, climate change contributes to the spread of vector-borne diseases, heat-related illnesses, and other climate-related health risks, posing challenges to achieving good health and well-being for all, particularly in vulnerable communities. To counter this, the country has invested in healthcare infrastructure, disease surveillance systems, and emergency response mechanisms to address climate change impacts on health (World Bank, 2023). For instance, the country has pledged to combat climate change impacts on health through solarising health facilities, ensuring reliable and sustainable energy sources in healthcare facilities. Recent efforts have seen the healthcare ministry raise awareness regarding climate-related health risks. In particular, Kenya was one of the seven pilot countries in the Climate Change Adaptation to Protect Human Health project, jointly implemented by the World Health Organization (WHO) and the United Nations Development Programme (UNDP). Ideally, the project seeks to increase adaptive capacity within Kenya's health system institutions and field practitioners to respond effectively to climate-sensitive health risks such as Malaria (UNDP, 2023). Kenya's solarized healthcare facilities are comparable to Germany's Green Hospitals Initiative, yet further disease surveillance systems could improve climate-health resilience (WHO, 2022). Hence, the country is actively addressing climate-related health challenges through resilient systems and awareness campaigns to achieve mental and physical health goals collectively.

Similarly, one of the social-ecological values advocated by SDG goals is sustainable cities and communities, where every nation seeks to promote sustainable urbanisation, improve urban infrastructure, and enhance environmental sustainability in cities and communities. In the wake of

increased climatic changes, urban areas face climate-related challenges such as flooding, heat waves, and air pollution, which affect infrastructure, public health, and quality of life. Therefore, building resilient cities and communities is crucial for addressing these challenges and achieving sustainable urban development. In urban resilience, Kenya's US$150 million climate resilience credit is similar to South Africa's Cities Resilience Program, but expanding smart infrastructure investments could boost sustainability (World Bank, 2021). According to World Bank (2021), the country has accelerated the utilisation of participatory planning processes and climate science by incentivising counties to contribute to county climate change funds for long-term sustainability.

Paradox Relationship between Climate Change Initiatives and SDG Goals Implementation

As Kenya strives to implement climate change initiatives, there is tension between pursuing climate action, such as reducing greenhouse gas emissions or transitioning to renewable energy sources, and fostering economic growth. According to a recent report by someone, **f**uture climate change could lead to additional and potentially substantial financial costs, including threats to coastal zones, health burdens, energy demand, infrastructure, water resources, agriculture, and loss of ecosystem services. In addition, aggregate models suggest that additional net economic costs (on top of existing variability) could be equivalent to a loss of almost 3% of GDP each year by 2030 in Kenya (Stockholm Environment Institute, 2019). Immediate adaptation needs for addressing the current climate and preparing for the future in Kenya are estimated at $900 million per year (as of 2022). It further explains that by 2030, the cost of adaptation is expected to increase, likely reaching $1 to 2 billion per year. Besides, Kenya's emissions of greenhouse gases (GHGs) could double between 2005 and 2030. Therefore, addressing climate change is crucial for long-term sustainability while aligning with decent work and economic growth goals (SDG 8).

Climate change adaptation measures, such as building infrastructure to protect against rising sea levels or relocating communities from vulnerable areas, contribute to social inequalities. The World Bank's (2023) report on Kenya's Poverty and Equity Assessment established that while some segments of the population have benefited from climate change initiatives, others remain marginalised. As a result, this uneven progress can intersect with climate adaptation measures, potentially leading to differential impacts on vulnerable communities. In addition, Oxfam International's (2022) report on extreme inequalities in Kenya reveals that less than 0.1% of the population (8,300 people) own more wealth than the bottom 99.9% (more than 44 million people). Consequently, when adaptation measures involve relocation or infrastructure development, marginalised groups need more resources and support to avoid displacement. Such extreme inequality can contribute to the excessive effects of climate change, which makes it challenging to fulfil the goal of reducing inequality.

While the government and other stakeholders seek to conserve the environment through climatic change initiatives, there is a dilemma of whether to restore ecosystems or pursue agricultural practices that maximise production. Agricultural practices require land, water and other natural resources for food production. On the other hand, climatic change initiatives such as conservation seek to protect ecosystems, preserve biodiversity and restore degraded lands. Therefore, conflicts arise when these two goals compete for the same resources. For instance, converting forests or wetlands into agricultural land leads to habitat loss and disrupts ecosystems. The question remains, "How can policymakers promote sustainable agriculture while safeguarding natural habitats?" In addition, the recent incidences in Laikipia have seen armed pastoralist groups forcefully moving their livestock herds onto ranches or conservancies, leading to property destruction, wildlife

killings, and even tourists being caught up in clashes. The conflict underscores the delicate balance between agricultural expansion and conservation efforts. Thus, balancing conservation initiatives against climate change with the crucial need for food security remains a dilemma.

Similarly, while infrastructure development plays a pivotal role in advancing economies and improving human well-being, which is based on SDG goal 9 of sustainability, the paradox lies in the potential environmental degradation caused by such projects is questionable. For instance, the SGR is one of Kenya's largest infrastructure investments, with construction beginning in 2014; it traverses ecologically fragile ecosystems such as the Tsavo Conservation Area, home to about 40% of Kenya's elephant population, and the Nairobi National Park**.** As a result, there is massive soil erosion, land degradation, flooding, and habitat destruction (Nyumba et al., 2021). Similarly, the country has made remarkable strides in renewable energy adoption; 91% of energy comes from renewables, and 47% comes from geothermal sources**.** On the negative side, it has become a challenge for stakeholders to ensure energy access for all without compromising ecosystems or excluding marginalised communities. Hence, balancing infrastructure development with environmental preservation is a continuous challenge.

To address the trade-offs between climate action, economic growth, social equity, food security, and infrastructure development, Kenya must adopt integrated policy solutions. To begin with, expanding green financing mechanisms such as climate bonds and public-private partnerships can support low-carbon economic growth while promoting carbon trading initiatives to balance emissions reduction and profitability (World Bank, 2023). Ensuring inclusive relocation policies and strengthening community participation in climate adaptation projects will help mitigate social inequalities (Oxfam International, 2022). In agriculture, sustainable land-use planning and agroecological practices like agroforestry and regenerative farming can reconcile conservation efforts with food security goals (FAO, 2023). Additionally, Kenya should enforce strict Environmental Impact Assessments (EIAs) for infrastructure projects, invest in eco-friendly construction, and expand decentralized renewable energy access to ensure environmental sustainability while maintaining development momentum (Nyumba et al., 2021). Implementing these policies will help Kenya align climate resilience with economic and social sustainability.

Future Prospects

Climate change has a significant impact on health and wellbeing by directly increasing the incidences of diseases, including malaria and waterborne illness. World Bank (2023) predicts that by 2050, death and illness due to malaria and waterborne diseases are expected to rise significantly. Therefore, the strain on healthcare systems due to climate-related health issues will require substantial investment. The country is, thus, compelled to allocate resources for healthcare infrastructure, disease prevention, and emergency response. In addition, the current erratic weather patterns have proven to destroy crop yields, leading to food insecurity. This implies that Kenya's agriculture sector is vulnerable to climate shocks. It is, therefore, imperative for the country to adopt climate-smart agriculture, drought-resistant crops, and efficient water management to enhance food security. Additionally, the government should continuously assess climate impacts, vulnerabilities, and adaptation options, strengthen institutions, build technical expertise, and raise public awareness to ensure effective implementation of SDG goals while at the same time pursuing climate change initiatives.

While the projected GDP losses of up to 7% by 2050 due to climate change (World Bank, 2023) underscore the economic urgency of climate action, it is crucial to balance these concerns with

social and environmental dimensions. Addressing health challenges, such as rising malaria and waterborne diseases, requires investment in resilient healthcare systems and disease prevention measures. Likewise, food security must be reinforced through climate-smart agriculture and sustainable water management. Beyond economic costs, social equity must be prioritized, ensuring that low-income and vulnerable communities receive targeted adaptation support to avoid climate-induced poverty. Additionally, biodiversity conservation should complement Kenya's low-carbon growth strategy, preventing excessive environmental degradation in pursuit of economic gains. Thus, a holistic approach integrating economic stability, social inclusion, and environmental sustainability will be essential for Kenya's long-term climate resilience and sustainable development.

Conclusion

The paradoxical impacts of climate change on poverty and inequality underscore the urgent need for equitable and inclusive climate action. While vulnerable populations bear the brunt of climate impacts, adaptation measures must prioritise social justice and address the underlying drivers of poverty and inequality. Realising climate justice requires a holistic approach integrating social, economic, and environmental considerations into policy and planning processes. By addressing the root causes of vulnerability and promoting resilience-building measures that empower marginalised communities, we can mitigate the paradoxical impacts of climate change and work towards a more equitable and sustainable future.

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