



**Journal of
CONTEMPORARY
SOCIETY & EDUCATION
(JCSE)**

**ISSN: 2709-832X (Print)
2709-8338**

DOI: <https://doi.org/10.69778/2709-8338/2026/5.2/EN>

Editorial Note:

This latest issue of the Journal of Contemporary Society Education (JCSE) arrives at a moment when the boundaries between the academic, the social, and the urgently practical have never been more porous. A glance at the twenty-one articles in this forthcoming collection reveals a publication that understands its mandate: to serve not merely as a repository of scholarship, but as a sharp, coherent lens through which to examine the pressing complexities of contemporary society, with a firm grounding in education as a transformative force.

What distinguishes this issue is its refusal to settle for disciplinary comfort. The contributions, drawn from institutions across Africa, demonstrate a welcome intellectual restlessness. We see scholars interrogating the intimate, such as Mudau et al.'s exploration of language as a source of family conflict within Vhavenda families alongside those grappling with structural questions, such as Sikwela and Diedericks' critical look at performance management as "a mirror of inertia" in public administration. This range is not a sign of incoherence; it is a testament to the journal's understanding that societal education occurs in classrooms, in homes, in municipal water governance (as Zulu and Nojiyeza's work on Zululand shows), and in the very language we use to communicate.

Several pieces stand out for their conceptual bravery. Maungedzo's reframing of academic literacy through sociocultural theory for rural teacher development tackles a perennial challenge with fresh theoretical rigour. Similarly, Lubombo and Zethi's work on "linguistic justice" and the Disciplinary Literacies framework asks a question that South African higher education can no longer afford to postpone: how do we re-imagine instructional communication not as a barrier, but as an equitable foundation? These are not abstract debates; they are core pedagogical interventions.

The journal also demonstrates a commendable commitment to surfacing marginalised voices and experiences. Nkumane's exploration of intersectionality and the lived experiences of Black women scholars at UNISA, and Sibango's ethnographic look at how belonging is negotiated in Anthropology departments, remind us that the university itself is a site of intense social contestation. When Lekoa and Nojiyeza connect off-campus housing to "ecologies of distress" affecting student mental health, they do what good contemporary scholarship must: they trace the material conditions of life directly into the outcomes of education.

If there is a through-line to this collection, it is the insistence that no social phenomenon, whether climate governance under the AU (Yemisi and Ani), the antinomies of decolonisation in literature (Moopi), or the gendered nexus of marital status and poverty (Dunga), exists outside the purview of rigorous inquiry. The JCSE is building a platform where scholars can hold those complex phenomena up to the light.

This volume does not offer easy answers. It offers something more valuable: a coherent, sharply focused set of questions, pursued with methodological care and regional relevance. For a journal of contemporary society and education, that is precisely the work that matters.

Editor: Professor TJ Mudau
Institute of Gender and Youth Studies
University of Venda, South Africa
Thizwilondi.Mudau@univen.ac.za

TABLE OF CONTENT

1. Exploring the Influence of Language on Family Conflicts Among Vhavenda Families Mudau S.D., Raphalalani M.R., Tshikota S.L., & Mathabi Mashudu	6-22
2. Academic Literacy Reframed: Sociocultural Theory and Rural Teacher Development Robert Maungedzo	23-39
3. Analysis Of Omission Errors In The Academic Writing Of Level One Students At A South African University Ndishunwani Vincent Demana, Ernest Kwesi Klu, Mzamani Johannes Maluleke	40-57
4. The Perceptions of Students on Sexual Harassment at the Rural University Mudau Thizwilondi Josephine	58-88
5. Understanding how belonging and originality are negotiated in three South African Anthropology Departments Asemahle Sibango	89-101
6. Employee Retention and Talent Management In The Hospitality Sector. Does Employer Branding Matter? Costa Hofisi&Munyaradzi Chikove1, Lilliosah Dowo	102-129
7. African Union (AU) and Climate Change Governance in Africa, 2002-2022 Olawale Yemisi, Kelechi Johnmary Ani	130-149
8. A Gendered Analysis of the Nexus of Marital Status and Poverty Hannah Mayamiko Dunga	150-167
9. The Influence of Authenticity, Credibility and Cultural Relatability on Consumer Trust and Purchasing Behaviour Aphelele Hlengwa and Andrisha Beharry-Ramraj	168-188
10. Performance Management: A Mirror of Inertia and a Lens on Public Administration's Evolution and Progress in South Africa Shereen Sikwela, Melvin Diedericks	189-211
11. The Underrepresentation Of Women's Leadership In Water Governance: A Case Study Of Zululand District Municipality, South Africa Nomfundo Nomcebo Zulu, Innocent Simphiwe Nojiyeza	212-234

12. Intersectionality and Academic Marginalisation: Exploring the Lived Experiences of Black Women Scholars at the University of South Africa
Dr Khabonina Grace Nkumane

235-251
13. A Philosophical Appraisal Of René Girard’S Archetypal Scapegoat Hypothesis In The Light Of Nigerian Migrants In Germany
Stanley Ekwugha & Kingsley Ekene Amaechi

252-268
14. The Effect Of Flood Risk Management Control On Property Protection In Lagos State, Nigeria
Margaret N. Jinadu & Akinseye Olowu

268-285
15. Antinomies of Afro-radical and liberal democratic decolonization in Zimbabwe and South Africa in Sue Nyathi’s *The Gold-Diggers* (2018)
Peter Moopi

286-304
16. A Collaborative or Disputed Space? Teacher Unions and The Professionalization of School Leadership
Thembinkosi Zwane, David Matsepe, Mugwena Maluleke

305-325
17. Dialectics On Humanitarian Action: A Necessary Action To The Less Privilege And Nations In Crisis Anselm Oyon
Anselm Oyon, Kelechi Johnmary Ani

326-338
18. Music As A Pedagogical Tool And Epistemology Within A Multiliteracies Approach To University Education
Maricel Botha

339-353
19. Ecologies Of Distress: How Off-Campus Housing Affects Student Mental Health In Rural South Africa
Mammusa Rosinah Lekoa & Innocent Simphiwe Nojiyeza

354-370
20. Post-COVID-19 Challenges Faced by Enterprises in Richards Bay, KwaZulu-Natal
Selena Moodley, Beharry-Ramraj, A

371-388
21. Linguistic Justice And Higher Education Futures: Leveraging The Disciplinary Literacies Framework To Re-Imagine Instructional Communication In South African Higher Education
Musara Lubombo, Thato Zethi

389-408

DOI: <https://doi.org/10.69778/2709-8338/2026/5.2/a7>

AFRICAN UNION (AU) AND CLIMATE CHANGE GOVERNANCE IN AFRICA, 2002-2022

Olawale Yemisi

Department of History, University of Ibadan, Ibadan, Nigeria

yemisiwaleisaac@gmail.com

ORCID: <https://orcid.org/0000-0002-2817-9765>

Kelechi Johnmary Ani

School of Public Management, Governance and Public Policy,

University of Johannesburg, South Africa

kani4christ@gmail.com

ORCID ID: <https://orcid.org/0000-0001-6617-1484>

Abstract

The effects of climate change continue to ripple through various human spheres, drawing increasing attention over the years. Given the global implications, addressing these challenges through multi-stakeholder collaboration has become more critical than ever. Although African countries are not exempt from the impacts of climate change despite their low global emissions, both African states and non-state actors recognize the importance of implementing policies and practical measures to adapt to and mitigate these effects. While many studies have explored the roles of state actors in climate change governance, little focus has been given to non-state actors, such as the African Union. Therefore, using secondary sources, this article examines the African Union's role in climate change governance in Africa between 2000, which marked the inception of the organisation, and 2022, which marked the institutionalisation of a comprehensive framework: the African Union Climate Change and Resilient Development Strategy and Action Plan (2022–2032). Addressing the evolving challenges of climate change across the continent aligns with the African Union's objectives. Despite the inherent difficulties, the African Union has made significant contributions to the continent's climate change governance. Hence, this article provides a comprehensive view of the African Union's initiatives, collaborations, successes, and challenges in promoting continental climate governance architecture.

Keywords: *Africa, African Union, Environment, Climate Change*

Introduction

The global political-economic consequences of the climate change debate cannot be overemphasised and are visible in global affairs. The far-reaching effects of climate change on Africa's water resources, natural resources, sources of livelihood, economic activities, agriculture, health, and other related sectors, and the environment cannot be overstated (Morton et al. 2021; Olawale, 2025; Breen & DeYoung, 2025). However, given the transcontinental and generational implications of climate change, addressing the challenges through multi-stakeholder collaboration is more important than ever. The African continent has not been excluded from the effects and governance of climate change. In terms of global governance, all fifty-four (54) African countries have signed the Paris Agreement on Climate Change, adopted in 2015 and ratified by forty-five (45). In addition, forty-four (44) African countries have submitted their Nationally Determined Contribution (NDC) to the United Nations Framework Convention on Climate Change (UNFCCC).

Although Africa's contribution to climate change has been viewed as low and the continent has been portrayed as vulnerable, it is clear that African countries contribute to climate challenges. Africa only accounted for 3.3% of global emissions. Asia, Europe, and North America have emitted more than eight times as much carbon as Africa (Mo Ibrahim Foundation, 2022). Greenhouse gas emissions from flared gas totalled 144 billion cubic metres in 2021. However, the top 10 (10) countries accounted for 50% of global oil

production and 75% of gas flared (on an absolute volume basis). Iraq, Russia, the United States, Iran, Algeria, Venezuela, and Nigeria have all remained in the top ten (10) emitting countries over the last decade. The final three, China, Mexico, and Libya, have recently seen significant flare-ups. Nigeria is ranked seventh among gas-flaring states in the 2022 Global Gas Flaring Tracker report. Furthermore, in Africa, the combined emissions of South Africa, Egypt, and Algeria exceed the total emissions of all other fifty-one (51) African countries. Furthermore, only six countries account for 80 percent of the continent's emissions: Algeria, Egypt, Libya, Morocco, Nigeria, and South Africa.

Although, over the last two decades (1990-2019), Africa received only 3.8 percent of global climate-related research funding and had the lowest number of locally based climate research publications, existing extensive research has primarily focused on the effects of natural and human-induced climate change on Africa's environmental system and economic activities, as well as the role of different African states in pursuing adaptation strategies to climate change. Although these studies are critical to understanding the state of climate affairs and governance, the negative effects of climate change, and ongoing climate-governance efforts, the existing literature has paid little attention to the African Union's role in addressing the climate change crisis and providing the necessary governance architecture for African states. Although there are reports of African Union efforts, no codified analysis integrates the African Union's contribution within the broader scope of climate governance. The study

provides a comprehensive view of the African Union's initiatives, collaborations, successes, and challenges in promoting continental climate governance architecture. The study of the African Union's role seeks to reconstruct the African continent's identity as a taker, a dependent, and a peripheral actor in global affairs (William et al., 2013; Christopher, 1996).

The article uses a qualitative research approach. It depends on secondary data collected from books, peer-reviewed journals, online publications, and government reports. The data was gathered through consistent and targeted library and internet searches using keywords such as 'climate change,' 'African Union's climate change policies,' 'climate change governance,' 'climate change in Africa,' among others. The article also reviews African Union (AU) reports and relevant periodicals from climate-focused organizations that discuss climate change in the context of the African continent and the AU. The data were analysed using content analysis to explore issues in climate change governance and to prepare for more detailed causal analysis to examine the connection between the African Union and climate change governance. These secondary data were carefully examined through qualitative descriptive and content analysis methods to produce comprehensive findings and conclusions.

Situation Report: Climate Change Vulnerabilities and Impacts in Africa

Climate change has been described as "the defining development challenge of our time", with Africa being

the continent most vulnerable to its consequences (African Union 2015; UN Environment, 2019). Climate change has practical consequences in Africa that rival the global impact of the COVID-19 pandemic. Climate change significantly impacts the continent, exacerbating existing vulnerabilities and impacting every aspect of society, the economy and the environment. Due to its diverse ecosystems and heavy reliance on climate-sensitive sectors such as agriculture, water resources, and coastal areas, Africa is especially vulnerable to the negative effects of climate change (Obah-Akpowoghaha et al, 2022). Various factors, including human activity and natural phenomena, determine the consequences. Climate change and human activity are intertwined in many aspects of life, including farming, weather, health, and the environment. Human activity has significantly contributed to global warming (Nwankwoala 2015; Trenberth 2018). These activities include cutting down trees, open/bush burning, illegal mining, fossil fuel emissions and industrialisation.

Climate change has significantly impacted Africa's agricultural sector, which employs and feeds many of the population. Climate change poses significant risks and consequences for African agriculture. The difficulties faced by African agriculturists are exacerbated by erratic rainfall patterns, rising temperatures, pests and diseases, water scarcity, and livelihood vulnerability. These consequences affect food security, rural livelihoods, and overall development. Climate change has caused unpredictable rainfall patterns, longer droughts, and more intense rainfall events. These changes

have a substantial impact on agricultural productivity and water availability. According to Lobell et al. (2013), changing rainfall patterns in Africa harm crop yields, particularly in rain-fed agriculture. Between 2010 and 2022, 29 African countries experienced at least one drought event. Kenya and Somalia were the worst-affected African countries, with six drought events each from 2010 to 2022, followed by Mauritania (5), Ethiopia, Lesotho, Madagascar, Niger, South Africa, and Zimbabwe (4 each) (Mo Ibrahim Foundation, 2022). This could reduce agricultural productivity and increase food insecurity. According to statistics, approximately 800 million people in Africa are already affected by moderate to severe food insecurity, and 281.6 million are undernourished. In 2019, approximately 1.0 billion people on the African continent could not afford a healthy diet. Over two-thirds of the population in Kenya, Mozambique, and Uganda, the third and fourth most disaster-affected countries, are food insecure.

In Madagascar, the continent's second-most disaster-affected country, 43.2 percent of the population is malnourished, the third-highest rate after the Central African Republic and Somalia. The Horn of Africa faced the worst locust outbreak in 25 years in 2020, putting nearly 20 million people at risk of food insecurity. High temperatures can also affect crop development and reduce photosynthesis rates. According to Kotir's (2011) research, high temperatures can harm cereal crop yields in Africa, potentially jeopardising food security and economic stability. Climate change has broader implications for rural livelihoods in

Africa. Smallholder farmers, who employ a sizable proportion of the agricultural workforce, are especially vulnerable. The challenges they face are exacerbated by their reliance on rain-fed agriculture, limited access to resources, and a lack of adaptive capacity. Deressa et al. (2019) emphasised the importance of support mechanisms, such as credit, technology, and climate information, for improving resilience. The climate change crisis has also affected water resources. The availability and accessibility of water vary greatly across Africa. While some African countries may have adequate per capita water resources, access to water remains a major challenge due to insufficient infrastructure. As a result, economic water scarcity exists in these areas. Climate change and variability aggravate the problem by putting additional strain on Africa's water availability, accessibility, and demand. Rising temperatures and erratic rainfall challenge water resource management because they affect surface water availability, groundwater recharge, and water storage capacities (Hulme et al., 2001; Conway et al., 2009).

Climate change impacts human populations differently depending on their geographic location and living conditions, leading to migration. People in small island developing states and low-lying regions such as Cape Verde, Comoros, and Gambia are vulnerable to severe tropical storms, which increase the risk of death, injury, and destruction of public health infrastructure. Rising sea levels also cause salinization of water resources and agricultural land, exacerbating local concerns (McMichael & Lindgren, 2011). Furthermore, urban populations, particularly those in

tropical megacities like Lagos, Dakar, Nairobi, and Cairo, face health risks due to rising global temperatures and the urban heat island effect. Heat waves, floods, infectious diseases, and air pollution are just a few of the risks that city dwellers face as the climate changes (Satterthwaite, 2007).

Water scarcity, flooding, landslides, and infectious diseases endanger these people's health and well-being. Malaria, for example, is highly sensitive to climate, and changes in rainfall patterns can affect mosquito breeding and disease transmission. Climate change has been linked to the expansion of the malaria transmission zone in countries such as Cameroon, Kenya, and Uganda, putting vulnerable populations at risk. 2022; Suhr and Steinert). In addition, twenty (20) African countries have experienced at least ten water-related protests or riots since 2010 (Mo Ibrahim Foundation, 2022). Algeria, Morocco, South Africa, Sudan, and Tunisia are the five countries with the most protests and riots over water access. They all have moderate-to-severe water stress. In terms of flooding, all African countries except two (Equatorial Guinea and Eritrea) have had at least one flood event between 2010 and 2022. Angola (24 cases), Kenya (22), Nigeria, Tanzania (21 each), and the Democratic Republic of the Congo (DR Congo) are the five worst-affected African countries by floods (20) (Mo Ibrahim Foundation, 2022).

Climate change effects have also translated into conflicts in Africa. One of the most notable aspects has been the resources affected by climate change. Pastoralists – Fulani herders and farmers' crisis have been particularly on the rise, given the ongoing effects of

climate change, as resources are particularly vulnerable to climate-resource competition (Olawale, Ani and Obah-Akpowoghaha, 2023; Ani, 2023). Since 2010, violent crises involving pastoralists have increased tremendously (Olawale, 2025; Olawale, 2026). Almost three-quarters (74.6%) of all pastoralist violence since 2010 has occurred in just five countries: DR Congo, Nigeria, Somalia, South Sudan and Sudan. Climate change-induced persistent natural disasters have also contributed to the rise in the number of displaced citizens in several African countries (Mo Ibrahim Foundation, 2022). In nine African countries – DR Congo, Ethiopia, Kenya, Mozambique, Niger, Nigeria, Somalia, South Sudan and Sudan – at least one million people have been internally displaced by natural disasters since 2010 (Mo Ibrahim Foundation, 2022). Climate change has also affected migration patterns in rural and urban areas across Africa. Mo Ibrahim Foundation (2022) forum report claims that without climate action, sub-Saharan Africa is expected to see the displacement and migration of up to 85.7 million people, equivalent to 4.2% of the continent's population

Women and children are also among the most vulnerable groups regarding the health risks associated with climate change (Filho et al., 2018). Sub-Saharan African children already face serious health risks exacerbated by climate change. Higher temperatures and shifting rainfall patterns, for example, can aggravate childhood malnutrition, waterborne diseases, and respiratory illnesses (Watts et al., 2018). Climate-related disruptions in healthcare systems and infrastructure can limit access to essential services for needy

children. The reproduction and survival rates of infectious agents, such as viruses and bacteria, and their vector organisms, such as mosquitoes, ticks, and sandflies, are affected by temperature fluctuations. Although it is difficult to establish direct links between disease incidence and warming trends, some associations have been observed in countries such as Ethiopia and Kenya. As a result, addressing climate change vulnerabilities and impacts in Africa requires a multifaceted, multi-stakeholder approach that focuses on climate adaptation measures while emphasising sustainability practices.

African Union and Climate Change Governance in Africa

The African continent has contributed significantly to international climate cooperation. This includes the design of the multilateral climate change regime, with a focus on adaptation and international assistance through climate finance, technology, and capacity building. Since its inception in 2002, the African Union has been critical in coordinating African countries during crises, periods of uncertainty and vulnerability and amid changing phases of global affairs. By explanation, responding to the global and continental effects of climate change has remained critical to one of the institution's goals in realising the African Union Agenda 2063 on “The African We Want.” The African Union explicitly states as one of its goals the need to create “environmentally sustainable and climate resilient economies and communities critical to an integrated, prosperous, and peaceful Africa” (AU Agenda 2016; Olawale and Idris, 2024; Olawale and Ani, 2023).

The importance of exploring the African Union’s contributions and challenges in climate-related matters cannot be overstated. Given the importance of non-state actors (intergovernmental organisations) in global affairs, their contributions are significant because of their role in harnessing available resources across bilateral and multilateral frameworks to realize a sustainable environment and other global governance architectures, such as the Sustainable Development Goals. The African Union’s efforts to provide the continent with a sustainable climate environment have consistently pushed the institution into bilateral and multilateral frameworks, agreements, and collaborations to govern climate framework work to reduce the vulnerabilities of the African continent. The defunct Organisation of African Unity (OAU) adopted the African Convention on the Conservation of Nature and Natural Resources in 1968, before the formation of the African Union.

The convention obligated member countries to “adopt measures to ensure the conservation, utilisation, and development of soil, water, flora, and fauna resources following scientific principles and with due regard for the best interests of the people.” With the formation of the African Union, the organization’s Constitutive Act emphasized the need to ensure a sustainable environment and to regulate economic activities that directly affect the environment. The African Union’s 2007 Declaration on Climate Change and Development in Africa places climate change vulnerability at the forefront of the continent's concerns. The African Union resolution concludes

in the Declaration that “climate change could endanger the future well-being of Africa’s population, ecosystems, and socioeconomic progress.” Among African Union-led initiatives are Africa Environment Day (March 3) (2002), the Sharm El-Sheikh Declaration on Water and Sanitation (2007), the Action Plan of the NEPAD Environment Initiative (2003), the Decision and Declaration of the Africa Union on Climate Change and Development in Africa (2007), the Tunis Declaration and Action Plan (2007), the Algiers Declaration on Climate Change (2008), the Decision on the Implementation of the Green Wall for the Sahara Initiative (2007), the Tunis Declaration and Action Plan (2007), the Tunis (2007).

Beyond 2009, the African Union’s efforts to ensure compliance with global climate governance for sustainable living have been pragmatic. During the 12th AU Summit in Addis Ababa, Ethiopia, in 2009, the African Union (AU) established the Committee of African Heads of State and Government on Climate Change (CAHOSCC). CAHOSCC focuses on high-level political leadership and advice on African climate change issues. The committee comprises African Heads of State and Governments who have joined forces to represent Africa’s interests in global climate negotiations and develop strategies for climate change adaptation, mitigation, and resilience building on the continent (AU, 2022).

The ultimate focus of CAHOSCC is to strengthen Africa’s voice and influence in international climate negotiations such as the UN Framework Convention on Climate Change (UNFCCC) and its Conference

of the Parties (COP). The committee actively participates in these forums, ensuring that global climate policies and agreements reflect African perspectives and priorities. It advocates that developed countries treat Africa fairly and equitably in providing financial assistance, technology transfer, capacity building, and adaptation assistance (Hoste & Anderson, 2011). It also facilitates collaboration among African countries, regional economic communities, and international partners to implement climate change projects and initiatives on the continent. The committee encourages capacity-building efforts, knowledge sharing, and the exchange of best practices among member countries, which has aided in developing Africa’s common position and climate change strategies (AUDA, 2015).

The African Union’s climate governance architecture is based on the African Ministerial Conference on Climate Change (AMCEN), which was established in December 1985 (under the defunct OAU) by the United Nations Environment Programme (UNEP) to advance climate action in Africa. The primary objective of AMCEN is to improve policy coordination, collaboration, and cooperation among African governments addressing climate change. The Ministerial Council provides a forum for African states’ high-level officials and stakeholders responsible for environmental and climate change to discuss strategies and perspectives, and to coordinate regional and international actions (UNEP, 2022). One of AMCEN’s major accomplishments has been the formulation and adoption of the African Common Position on Climate Change,

which represents the collective interests and priorities of African countries in international climate negotiations, such as the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement (Egeruoh-Adindu, 2022).

The AMCEN also focuses on capacity building and knowledge sharing in African countries. It promotes the exchange of best practices, technical expertise, and innovative solutions to mitigate climate change and build resilience. Through initiatives such as the African Climate Policy Centre (ACPC) and the African Climate Change Fund, AMCEN assists African countries in developing and implementing climate change policies, strategies, and projects (ACCF). AMCEN has also been instrumental in raising financial resources for African climate action. It collaborates with international financial institutions, donor organisations, and other stakeholders to secure funding for African climate initiatives and projects (Azevedo, 2022). The Nairobi Declaration on the African Process for Combating Climate Change, endorsed in May 2009 in Nairobi under the auspices of AMCEN, was one of the major outcomes of AMCEN's efforts in climate governance. The Declaration demonstrates the AU's eagerness to address climate change. The Declaration outlined climate change policies, plans, approaches, and strategies. Thus, the AU has proposed another adaptation strategy, the AU Climate Change Strategy, to guide African countries in mitigating climate change (Aminga & Floria, Climate-related Security Risks and the African Union, 2020).

The African Climate Policy Centre (ACPC), founded in 2010, is

another important step toward climate governance under the African Union. The ACPC primarily aims to enhance climate change adaptation and mitigation activities. The ACPC is a vital institution within the African Union, providing technical assistance, conducting research, and carrying out capacity-building initiatives for its member countries. Through these efforts, the ACPC hopes to strengthen the continent's ability to respond effectively to the challenges posed by climate change (EfD, nd). The primary function of the ACPC is to provide technical assistance to member countries. Assisting governments and other relevant stakeholders in developing climate change policies, strategies, and action plans is part of this. The ACPC assists countries in navigating the complexities of climate change adaptation and mitigation, ensuring that their efforts align with international best practices. The ACPC also places a high value on research. It researches and generates knowledge on climate change topics, including impacts, vulnerability assessments, and potential African adaptation and mitigation measures. This study helps to inform evidence-based policy development and decision-making at the continental level. Capacity-building initiatives are another important aspect of the ACPC's work. The centre is actively involved in activities aimed at strengthening African countries' capacity to address climate change effectively. It organises workshops, training programmes, and knowledge-sharing events to assist policymakers, practitioners, and other climate change stakeholders in improving their skills and knowledge (EfD, nd).

The African Union's Agenda 2063, which emphasises the importance of sustainable development, recognises climate change as a critical challenge. One of the main aims of Agenda 2063 is to promote renewable energy sources. The African Union understands the importance of shifting away from fossil fuels and toward renewable energy to reduce greenhouse gas emissions and mitigate climate change (AU, 2015; Mutezo & Mulopo, 2021). The African Union hopes to increase access to clean, sustainable energy across all African nations by promoting renewable energy technologies such as solar, wind, and hydroelectric power. Since then, South Africa, Egypt, and Nigeria have emerged as the three leaders in renewable energy for long-term development (Aliyu et al., 2018). Another critical aspect of Agenda 2063 is improving climate resilience. The African Union recognises African countries' vulnerability to the effects of climate change and aims to build resilience to mitigate the negative consequences. Developing and implementing adaptation strategies in various sectors, including agriculture, water management, and infrastructure, is required. Climate-smart agriculture techniques, such as conservation agriculture and agroforestry, can help farmers adapt to changing climatic conditions and ensure food security (Thierfelder et al., 2017).

Agenda 2063 emphasises the importance of strengthening adaptation strategies. Climate change must be factored into national development plans and policies. By mainstreaming climate change adaptation, African countries can improve their ability to cope with climate change impacts and minimise potential losses. 2020 (Addaney). The

African Union also recognises the significance of long-term water resource management. Water scarcity and variability are major issues across much of Africa, and climate change exacerbates them. Agenda 2063 emphasises the importance of integrated water resource management and efficient water use to ensure water security for all. Kenya is a pioneer in the adaptation to climate change through sustainable water resource management (Asokan, 2020). The African Union also endorsed the African Renewable Energy Initiative (AREI), which aims to achieve at least 300 GW of renewable energy capacity in Africa by 2030. This initiative seeks to address limited access to clean energy, high greenhouse gas emissions, and promote sustainable development across the continent. The primary goal of the AREI is to increase access to clean, reliable energy across Africa. A sizable portion of the population currently lacks access to electricity, particularly in rural areas. The initiative seeks to close the energy gap by increasing renewable energy capacity, thereby improving the quality of life for millions of people and promoting economic growth (Ackah & Graham, 2021).

AREI also recognises the critical importance of reducing greenhouse gas emissions to mitigate climate change. The use of fossil fuels for energy generation significantly contributes to global warming. African countries can significantly reduce their carbon footprint by shifting to renewable energy sources such as solar, wind, hydro, and geothermal. This transition will help to mitigate climate change and promote the continent's long-term viability (Schwerhoff & Sy, 2017). In addition to

environmental benefits, the African Renewable Energy Initiative prioritises sustainable development. By embracing renewable energy technologies, African countries can diversify their energy mix, improve energy security, and reduce their reliance on imported fossil fuels. For example, the BRICS countries, Ghana, and Nigeria have embraced renewable energy as an alternative in Africa (Joshua et al., 2020). The initiative also provides opportunities for job creation, local economic development, and the transfer of clean energy technologies, all of which contribute to long-term, sustainable growth.

The African Union (AU) created the African Risk Capacity (ARC) in 2012 to provide insurance coverage against climate-related risks and support early warning systems and disaster risk reduction initiatives. This was done to recognize the significance of supporting regional climate change adaptation programmes and projects. The ARC initiative works by pooling resources from participating African nations to establish a financial mechanism that offers insurance against particular climate risks. This strategy's assistance reduces the overall economic and social impacts in improving disaster response and preparation in countries. In a climate-related disaster, ARC enables countries to quickly access funding by offering insurance coverage, enabling prompt response and recovery efforts (Kramer et al., 2020).

ARC focuses on early warning systems, disaster risk reduction strategies, and insurance. This includes improving data collection and analysis of meteorological and hydrological data, enhancing forecasting capabilities, and

developing effective communication channels to provide timely warnings to vulnerable communities (Perera et al., 2019). By strengthening early warning systems, ARC assists countries and communities in taking proactive measures to mitigate the effects of climate-related hazards. The African Union's support for the ARC initiative demonstrates the organization's commitment to increasing climate resilience and decreasing the vulnerability of African countries to climate change (Steiner, 2020). By providing insurance coverage, ARC helps countries manage the financial risks associated with climate-related disasters, allowing them to better allocate resources for disaster response, recovery, and long-term adaptation strategies (Leppert et al., 2021).

Furthermore, the African Union adopted an Environment Action Plan (EAP) within the AU/NEPAD framework to address the continent's environmental challenges. The NEPAD Agency, the AU Commission, in collaboration with UNEP, AMCEN, and the Global Environment Facility, coordinated this action plan (GEF). The action plan aims to promote the sustainable use of Africa's natural resources. It increases public and political backing for environmental initiatives. The environment initiative promotes the integration of environmental issues into poverty reduction strategies and contributes to NEPAD implementation. Africa provides leadership and resources to bilateral and multilateral climate change diplomacy. With support from the German government, NEPAD successfully launched a Climate Change Fund in 2014. This Fund provides

technical and financial assistance to AU member states, RECs, and institutions that meet the eligibility criteria and clearly defined support target areas.

The African Development Fund, the AU Commission, the AfDB, and UNECA jointly launched Climate for Development in Africa (ClimDev-Africa), which aims to anchor climate-resilient economic growth and SDGs by mainstreaming climate risk management (CRM) in vulnerable sectors. The goal of ClimDev-Africa was to increase funding for investments in climate and weather observation networks throughout Africa, to create partnerships for group investments in weather observation systems and cutting-edge risk financing mechanisms, and to improve Africa's capacity to use climate information for policymaking. The African Union has consistently used dialogue as part of its approach to combating climate change. The African Union's Peace and Security Council held an open session in 2016 to discuss climate change, state fragility, peace, and security in Africa. During the dialogue session, participants emphasized the importance of increasing national resilience capacity and incorporating climate-focused policies into national development agendas. The Institutional and Operational Framework for Multi-Hazard Early Warning Systems and Early Action were adopted by the African Union in October 2021. The Africa Multi-Hazard Early Warning and Early Action System Situation Room for disaster risk reduction was opened in February 2022.

Other African Union collaborative policies and programme that are designed to enhance collaboration and sustainable climate governance include the Integrated

African Strategy on Meteorology; the Hydromet Africa Programme; Global Monitoring for Environment and Security and Africa (GMES & Africa); Weather and Climate Information Services for Africa (WISER); Comprehensive Africa Agriculture Development Programme (CAADP); African Resilient Landscapes Initiative (ARLI); African Forest Landscape Restoration Initiative (AFR100); Africa Renewable Energy Initiative (AREI); Great Green Wall for the Sahara and Sahel Initiative (GGWSSI); Africa Adaptation Initiative (AAI); Africa Blue Economy Strategy; African Youth Charter, Youth Decade Plan of Action (2009-2018), and the Malabo Decision on Youth Empowerment; Extreme Climate Facility (XCF); African Risk Capacity (ARC).

African Union Climate Change Governance Success Outcomes

Since its inception, the African Union's climate policies and programmes have resulted in positive outcomes. The primary success outcome is that African countries' regional (under the auspices of the Regional Economic Cooperation) and national governments have prioritised climate change governance. The African Union's involvement has advanced climate research, strengthened institutions, and improved collaboration with other institutions, such as the European Union and the African Development Bank (AFDB). African Union efforts to implement adaptation to climate change challenges have yielded positive results over the last two decades. Although various African states pursue and implement these outcomes, the focus of these states and the success recorded can

be directly or indirectly attributed to the African Union's climate change policies and programmes.

The eventual development of a climate development and strategy plan is an important success outcome of African Union climate action. The African Union heads of state adopted the first continental climate change and resilient development strategy and action plan (2022-2032), referred to as the 'AU climate strategy' below, in February 2022. The policy document stems from the African Union's consistent efforts to bring the African continent into the League of Nations, prioritizing climate-related crises and striving for sustainable climate and environmental governance. The African Union expanded on the existing green recovery action plan (2021-2027), launched on July 15, 2021, in response to the COVID-19 pandemic's impact on the continent. The strategy is consistent with provisions for climate change mitigation in pre-existing continental frameworks such as the Africa Renewable Energy Initiative, the Africa Blue Economy Strategy, and the African Continental Free Trade Area (AfCFTA). The African Union Climate Strategy's objectives are as follows:

1. Increasing affected communities' adaptive capacity and managing the risks associated with climate change.
2. Pursuing equitable and transformative low-emission, climate-resilient development pathways.
3. Enhancing Africa's capacity to mobilise resources and improve technology access and

development for ambitious climate action.

4. Enhancing inclusion, alignment, cooperation, and ownership of climate strategies, policies, programmes and plans across all government and stakeholder groupings spheres.

Another successful outcome of African Union climate governance has been the increased adoption of renewable energy in African countries. Several African countries are rapidly shifting to renewable energy. Between 2010 and 2019, African governments more than tripled public investment in renewables, rising from \$13.4 billion in the previous decade to \$47.0 billion. Renewable energy is already the primary source of power in 22 African countries. Eight African countries generate more than 90% of their electricity from renewable sources: Central African Republic (96.3%), Democratic Republic of the Congo (98.9%), Eswatini (99.8%), Ethiopia (100%), Lesotho (99.9%), Mozambique (95.4%), Namibia (91.0%), and Uganda (91.0%). (97.7percent) (Mo Ibrahim Foundation, 2022). There are also more collaborative mechanisms to encourage African countries to use renewable energy. In May 2022, Egypt, Kenya, Mauritania, Morocco, Namibia, and South Africa formed the African Green Hydrogen Alliance to increase access to clean and affordable energy. The alliance's priorities are to implement regulatory and policy reforms, build local capacity, and encourage investments in green hydrogen production to meet domestic demand. African countries' commitment to renewable energy is also setting

global precedents. In Namibia, solar accounts for nearly one-fifth of electricity generation (19.1%), the fourth-highest share globally, while in Kenya, geothermal energy accounts for nearly half (46.0%) of electricity generation, the highest share globally (Mo Ibrahim Foundation, 2022).

Furthermore, the African Union's emphasis on climate change has led to the Regional Economic Cooperation's pursuit of climate-focused governance in its region of operations. Regional Economic Cooperation (REC) has been critical to realizing African Union climate governance. Through monitoring and evaluation of these policies, the RECs play a critical role in implementing the AU-Climate Framework for policies designed to be pursued continentally or with jurisdictional specifics. These RECs also pursue regional climate policies to extend climate governance to remote areas with limited climate knowledge. In October 2021, IGAD will open its Climate Prediction and Application Centre (ICPAC), linked to the AU Situation Room. The Southern African Development Community (SADC) has also established a Climate Change Mitigation and Adaptation Programme. In a sign of growing institutional complexity, the EAC, SADC, and another regional economic community (REC)—the Common Market for East and Southern Africa (COMESA)—have also launched a joint initiative called “The African Solution” as part of the “Tripartite Programme on Climate Change Adaptation and Mitigation.” In addition, the ECOWAS Commission adopted the ECOWAS Environmental Policy in 2008. It launched the Regional Climate Strategy

(RCS) in 2020 to consolidate and harmonise a framework of action for the ECOWAS region's fight against climate change, taking into account both adaptation and mitigation dimensions, and aligned with the Paris Agreement and the SDGs.

The African Union's emphasis on climate governance and collaboration has also produced positive results, with bilateral and multilateral collaborating institutions now pursuing climate-related initiatives and governance within the broader scope of the African Union's affairs. The contribution of one of the African Union's major partners, the African Development Bank (ADB), cannot be overstated. The second massive electricity-generation project in the Sahel, this time in the Noor Ouarzazate complex, is being funded by ADC. The Desert-to-Power (D2P) project, one of the most significant renewable energy programmes, was initially funded by the African Development Bank. The Desert-to-Power (D2P) project will transform the Sahel into one of the world's largest solar-power-generating areas. The \$20 billion programme aims to generate 10 gigatonnes of electricity by 2025, providing power to 250 million people, at least 90 million of whom will be connected to the electricity grid for the first time. In Sudan, a photovoltaic water pumping system project in North and West Kordofan meets the demand for an efficient energy supply for irrigation, allowing diesel-powered pumps to be replaced with novel technology based entirely on solar energy” (African Development Bank, 2021). The African Development Bank's foreseeable success has piqued the interest of other institutions, including The European

Investment Bank, the French Development Agency, the International Renewable Energy Agency (IRENA), Power Africa (a US project), Africa50, and the Green Climate Fund (GCF), all of which have pledged to fund and support the initiative (African Development Bank, 2021). As a result, this initiative is a direct success story of the AU's emphasis on addressing climate change through the continental pursuit of renewable energy to reduce fossil fuel use. As a result, these renewable energy solar plants aim to reduce reliance on fossil fuels, increase agricultural output, lower costs, and improve farmers' livelihoods.

Furthermore, the African Union's focus on climate change has increased climate literacy. Several climate-focused organisations are now integrating global and continental climate ideas to increase citizens' knowledge of climate change and adaptation techniques in rural areas. Reforestation has been one of the climate actions pursued in Rwanda to reduce GHG emissions from land use and the forestry sector. According to McNeish (2018), the Rwandan government has prioritised climate literacy by providing training in interpreting weather forecasts, addressing climate-related issues, and fostering a resilient, sustainable environment. African populations are becoming more aware of the human-caused climate crisis. Protests against carbon emissions and gas flaring have occurred across the continent. Total, the multinational oil company, voluntarily decided to limit the Tilenga project's impact on Uganda's Murchison Falls National Park. Although the current licences cover roughly 10% of the park's

surface area, development will be limited to less than 1%, and undeveloped areas will be ceded without delay. Furthermore, the project's temporary and permanent amenities will occupy less than 0.05 percent of the park's total surface area. As a result, while Total has agreed to reduce its carbon footprint to combat climate change by investing in more environmentally friendly renewable energy, this decision and development resulted from activists, stakeholders, and non-governmental organisations (NGOs) protests.

African Union and the Challenges of Climate Governance

Following the adoption of the Paris Agreement and the Sustainable Development Goals (SDGs), which reflect the significance of climate governance, the immediate challenge is to promote inclusive and sustainable climate governance across all continents and countries. The African Union's contributions remain critical in this context. Over the last two decades, the African Union has mainstreamed climate change transformative actions into African countries' national policies and programmes. Despite progress in the African Union's programmes and initiatives, there remain obstacles to implementing climate-related adaptation and mitigation governance. These obstacles limit the overall overhaul and implementation of climate actions.

Climate change literacy remains at an all-time low in Africa. Despite the African Union and other related organisations' advocacy, a large proportion of the African population still lacks understanding of what constitutes climate change and its obvious effects. Climate change literacy refers to how

Africans understand the causes and effects of climate change and how to pursue a climate-sustainable environment. According to Afrobarometer research, one in every four Africans (28%) is fully “climate change literate,” meaning they have heard of climate change, understand its negative consequences, and recognise it is partly caused by human activity. Mauritians led the way with 57%, making them the only country with a majority understanding of climate change. In six countries, less than one in five people are aware of climate change (Liberia, Mozambique, Namibia, Niger, South Africa, and Tunisia) (Mo Ibrahim Foundation, 2022). Formal education has been linked to climate change literacy. Given Africa’s high illiteracy rate, this has significantly contributed to climate-change awareness and the successful implementation of adaptation techniques.

Furthermore, despite African countries’ efforts to pursue a resilient, sustainable climate, many people lack access to clean cooking fuel. According to recent research by the Mo Ibrahim Foundation on the road to COP27, 930 million people in Sub-Saharan Africa (SSA) still rely on traditional technologies and fuels to meet their daily cooking needs. According to the 2021 SDG7 progress report on access to clean cooking technologies and fuels, the access deficit in SSA has increased by more than 50 percent since 2000, leaving the region with more people without access to clean cooking technologies and fuels. Over half of Africa’s population (54.6%) cooks with solid biomass fuels like wood. Given African population projections, it is clear that African countries must prioritise access to clean

cooking fuel, as the number of Africans using biomass and other unclean sources will grow dramatically, posing a significant challenge to African climate governance architecture.

African leaders’ political commitment to pursuing climate change adaptation and mitigation policies remains a major challenge. Although climate change is an environmental challenge, the implementation of international and continental policies relies heavily on state leadership and the willingness to pursue climate-friendly policies. However, an examination of African countries revealed that while leaders have committed to climate-focused policies and programmes over the years, implementation of various aspects of these policies has been abysmally low. Africa, for example, accounts for 40% of the world’s total solar potential. Africa has five of the top ten countries in the world in terms of potential energy generation per solar panel: Namibia (1st), Egypt (4th), Lesotho (8th), Libya (9th), and Botswana (10th) (Mo Ibrahim Foundation, 2022). However, solar remains a minor component of Africa’s energy mix. Despite having some of the greatest potential, Africa only hosts 1% of the world’s panels. In 2019, solar technologies generated less than 2% of Africa’s electricity (Mo Ibrahim Foundation, 2022). Furthermore, African countries have not tapped into wind power or geothermal resources to achieve the non-conditional elements of their NDCs, address the energy deficit, build green economies and supply chains, and climate-proof their development agendas. African leaders must mobilise domestic revenue more effectively.

Furthermore, the financial foundations for African countries to pursue climate adaptation have been a major source of difficulty. Adaptation is a policy priority for African countries, as Africa is home to the world's 10 most climate-vulnerable countries. According to the UN, developing countries currently require \$70 billion per year to cover adaptation costs and will require between \$140 and \$300 billion by 2030. However, only \$20.1 billion was spent on adaptation in 2019. This amounted to roughly one-quarter of all climate finance, with the vast majority, more than \$50 billion, going toward mitigation. The need to provide a sustainable financial basis for African countries' adaptation policies and programmes prompted a discussion at COP about establishing a loss and damage fund.

Conclusion

The study examined the African Union's efforts to establish a sustainable climate governance framework amid the global climate change crisis from 2002 to 2022. Climate change has significantly affected African socioeconomic and environmental systems. Within this context, African countries' efforts to comply with various global adaptation and mitigation policies remain important. Climate change is a key issue in global affairs, requiring bilateral and multilateral cooperation, as well as a multi-stakeholder approach to address its impacts through adaptation and mitigation. In addition to global frameworks, such as the Paris Agreement, all state and non-state actors are responsible for pursuing climate-sustainable policies to make the Earth habitable. The African Union has played

a vital role in coordinating climate change policies to support its Agenda 2063, the Sustainable Development Goals, and other international agreements related to climate and environmental sustainability. The AU has contributed through various climate-related initiatives, policies, and programs, collaborating with organizations like the European Union and the African Development Bank, promoting climate literacy, and participating in regional economic cooperation platforms to advance climate policies. Despite these efforts, several factors have hindered the achievement of its climate goals, including climate illiteracy, political leadership challenges, and a lack of funds to finance adaptation programs. Nevertheless, with the adoption of the first continental climate change and resilient development strategy and action plan (2022-2032)—referred to here as the 'AU climate strategy'—it is clear that before the action plan's completion in 2032, the African Union will further shape the continent and realize a sustainable climate. In doing so, the AU aims to improve climate resilience and safeguard the well-being of African communities against the increasing impacts of climate change.

References

- Ackah, I., & Graham, E. (2021). Meeting the targets of the Paris Agreement: an analysis of renewable energy (RE) governance systems in West Africa (WA). *Clean Technologies and Environmental Policy*, 23, 501-507.
- Addaney, M. (2020). Strengthening Africa's adaptive capacity to climate change: African Union law and implications of China's Belt and Road policy. *Climate Change, Hazards and Adaptation Options: Handling the Impacts of a Changing Climate*, 481-503.
- African Union (2022). Meeting of the Committee of African Heads of State and Government on Climate Change (CAHOSCC). Retrieved from [https://au.int/en/newsevents/20220206/meeting-committee-african-heads-state-and-government-climate-change-cahoscc#:~:text=Thepercent20Africanpercent20Unionpercent20Assemblypercent20in,onpercent20Climatepercent20Changepercent20\(CAHOSCC\).](https://au.int/en/newsevents/20220206/meeting-committee-african-heads-state-and-government-climate-change-cahoscc#:~:text=Thepercent20Africanpercent20Unionpercent20Assemblypercent20in,onpercent20Climatepercent20Changepercent20(CAHOSCC).,)
- African Union Development Agency (AUDA-NEPAD) (December 28, 2015). Committee of African Heads of State and Government on Climate Change (CAHOSCC) meeting. Retrieved from <https://www.nepad.org/news/committee-of-african-heads-of-state-and-government-climate-change-cahoscc-meeting>.
- Aliyu, A. K., Modu, B., & Tan, C. W. (2018). A review of renewable energy development in Africa: A focus on South Africa, Egypt and Nigeria. *Renewable and Sustainable Energy Reviews*, 81, 2502-2518.
- Ani, K. J. (Ed.). (2023). *Resource conflict and environmental relations in Africa*. Singapore: Palgrave Macmillan.
- Asfaw, S., Coronado, M., & Lipper, L. (2015). *Adaptation to climate risk and food security: Evidence from smallholder farmers in Ethiopia*. Italy: The United Nations Food and Agriculture Organization (FAO), Rome.
- Asokan, S. M., Obando, J., Kwena, B. F., & Luwesi, C. N. (2020). Climate change adaptation through sustainable water resources management in Kenya: Challenges and opportunities. *African Handbook of Climate Change Adaptation*, 1-11.
- Azevedo, N. K. G. T. D. (2022). From conflict to coexistence: Exploring impacts of non-formal environmental education activities for inter-generational knowledge transfer regarding Human-Elephant Interaction, Ph.D Dissertation.
- Breen, K., & DeYoung, S. E. The Palgrave Handbook of Human-Animal Interactions in the Global Context of Climate Change, Disasters, and Other Crises.
- Campbell, B. M., Vermeulen, S. J., Aggarwal, P. K., Corner-Dolloff, C., Girvetz, E., Loboguerrero, A. M., ... Wollenberg, E. (2016). Reducing risks to food security from climate change. *Global Food Security*, 11, 34-43. doi:10.1016/j.gfs.2016.06.002.

- Conway, D., Persechino, A., Ardoin-Bardin, S., Hamandawana, H., Dieulin, C., & Mahé, G. (2009). Rainfall and water resources variability in sub-Saharan Africa during the twentieth century. *Journal of Hydrometeorology*, 10(1), 41-59.
- Deressa, T. T., Hassan, R. M., Ringler, C., Alemu, T., & Yesuf, M. (2019). Determinants of farmers' choice of adaptation methods to climate change in the Nile Basin of Ethiopia. *Global Environmental Change*, 55, 124-134.
- EfD (nd). African Climate Policy Center (ACPC). Retrieved from <https://www.efdinitiative.org/about-efd/organisation/african-climate-policy-center-acpc>.
- Egeruoh-Adindu, I. (2022). Global Climate Change Governance: The Efficacy of Multilateral Approaches. *Beijing L. Rev.*, 13, 320.
- Filho, Walter Leal, Abul Quasem Al-Amin, Gustavo J. Nagy, Ulisses M. Azeiteiro, Laura Wiesböck, Desalegn Y. Ayal, Edward A. Morgan et al. "A comparative analysis of climate-risk and extreme event-related impacts on well-being and health: Policy implications." *International journal of environmental research and public health* 15, no. 2 (2018): 331.
- Gething, P. W., Smith, D. L., Patil, A. P., Tatem, A. J., Snow, R. W., & Hay, S. I. (2010). Climate change and the global malaria recession. *Nature*, 465(7296), 342-345.
- Hinkel J, Brown S, Exner L, Nicholls RJ, Vafeidis AT, Kebede AS (2011) Sea-level rise impacts on Africa and the effects of mitigation and adaptation: an application of DIVA. *Reg Environ Change*, 12(1):207–224. Doi:10.1007/s10113-011-0249-2.
- Hoste, J. C., & Anderson, A. (2011). *African dynamics at the climate change negotiations*. Egmont Institute.
- Hulme, M., Doherty, R., Ngara, T., New, M., & Lister, D. (2001). African climate change: 1900-2100. *Climate research*, 17(2), 145-168.
- Joshua, O. O., Michael, O. O., & Ufua, D. E. (2020). The legal regime on renewable energy as an alternative source of energy in Nigeria's power sector: the impacts and the potentials. *Acad Strategic Manag J*, 19(3).
- Kebede, A. S., Nicholls RJ, Hanson, S., Mokrech, M. (2012) Impacts of climate change and sea-level rise: a preliminary case study of Mombasa, Kenya. *J Coastal Res* 278:8–19. doi:10.2112/JCOASTRES-D-10-00069.1.
- Kotir, J. H. (2011). Climate change and variability in Sub-Saharan Africa: a review of current and future trends and impacts on agriculture and food security. *Environment, Development and Sustainability*, 13, 587-605.
- Lobell, D. B., Schlenker, W., & Costa-Roberts, J. (2011). Climate trends and global crop production since 1980. *Science*, 333(6042), 616-620.
- Kovats, R. S., Bouma, M. J., Hajat, S., Worrall, E., & Haines, A. (2015). El Niño and health. *The Lancet*, 386(10006), 847-848.
- Kramer, B., Rusconi, R., & Glauber, J. W. (2020). Five years of regional risk pooling: An updated cost-benefit analysis of the African risk capacity.

- Leppert, G., Köngeter, A., Moull, K., Nawrotzki, R., Römling, C., & Schmitt, J. (2021). Evaluation of interventions for climate change adaptation: Instruments for managing residual climate risks.
- Lobell, D. B., Burke, M. B., Tebaldi, C., Mastrandrea, M. D., Falcon, W. P., & Naylor, R. L. (2008). Prioritizing climate change adaptation needs for food security in 2030. *Science*, 319(5863), 607-610.
- McMichael, A. J., & Lindgren, E. (2011). Climate change: present and future risks to health, and necessary responses. *Journal of Internal Medicine*, 270(5), 401-413.
- Measham, T. G., Preston, B. L., Smith, T. F., Brooke, C., Gorddard, R., Withycombe, G., & Morrison, C. (2011). Adapting to climate change through local municipal planning: Barriers and challenges. *Mitigation and Adaptation Strategies for Global Change*, 16(8), 889–909. doi:10.1007/s11027-011-9301-2.
- Morton, J. F., Shiferaw, B., & Yohannes, H. (2021). Climate change impacts and adaptations in Africa: A review. *Climate and Development*, 1-19.
- Mutezo, G., & Mulopo, J. (2021). A review of Africa's transition from fossil fuels to renewable energy using circular economy principles: Renewable and Sustainable Energy Reviews, 137, 110609.
- Obah-Akpowoghaha, N. G., Tarro, M. L., Bah, M., & Mendy, S. (2022). Climate Change and the African Union's Role in the International System: A Brief Situational Analysis. *Journal of African Union Studies*, 11(1), 31.
- Olawale, Y. (2026). African Union and Sustainable Maritime Security Governance: Current Trends, Contours and Opportunities. In *Maritime Security Challenges in Africa: Piracy, Armed Robbery, Smuggling, Kidnapping, and Terrorism* (pp. 485-501). Cham: Springer Nature Switzerland.
- Olawale, Y., & Ani, K. J. (2023). Africa Union@ 20: The Context, Current Practices and Contours of Diaspora Initiative in Africa's Development Strategy. *Journal of African Union Studies*, 12(1), 23.
- Olawale, Y., & Tosho, I. R. (2024). African Union Agenda 2063 and the resurgence of military Coup d'état in Africa. *Journal of African Union Studies*, 11-33.
- Olawale, Y., (2025). Human-Cow Encounters Under Climate Change in Nigeria: The Entanglements of Violence, Politics, and Environment Contestation. In *The Palgrave Handbook of Human-Animal Interactions in the Global Context of Climate Change, Disasters, and Other Crises* (pp. 137-158). Cham: Springer Nature Switzerland.
- Olawale, Y., Ani, K. J., & Obah-Akpowoghaha, G. N. (2023). Introducing resource conflicts and governance in Africa. In *Resource conflict and environmental relations in Africa* (pp. 1-22). Singapore: Springer Nature Singapore.
- Perera, D., Seidou, O., Agnihotri, J., Rasmy, M., Smakhtin, V., Coulibaly, P., & Mehmood, H. (2019). Flood early warning systems: a review of benefits, challenges and prospects. *UNU-INWEH, Hamilton*.

- Preston, B. L., Westaway, R. M., & Yuen, E. J. (2011). Climate adaptation planning in practice: An evaluation of adaptation plans from three developed nations. *Mitigation and Adaptation Strategies for Global Change*, 16(4), 407–438. doi:10.1007/s11027-010-9270-x.
- Satterthwaite, D. (2007). *Adapting to climate change in urban areas: the possibilities and constraints in low-and middle-income nations* (Vol. 1). Iied.
- Schwerhoff, G., & Sy, M. (2017). Financing renewable energy in Africa–Key challenge of the Sustainable Development Goals. *Renewable and Sustainable Energy Reviews*, 75, 393–401.
- Serdeczny, O., Adams, S., Baarsch, F., Coumou, D., Robinson, A., Hare, W., ... & Reinhardt, J. (2017). Climate change impacts in Sub-Saharan Africa: from physical changes to their social repercussions. *Regional Environmental Change*, 17, 1585–1600.
- Smit, B., & Skinner, M. W. (2002). Adaptation options in agriculture to climate change: A typology. *Mitigation and Adaptation Strategies for Global Change*, 7(1), 85–114. doi:10.1023/A:1015862228270.
- Steiner, A., Aguilar, G., Bomba, K., Bonilla, J. P., Campbell, A., Echeverría, R. G., & Zebiak, S. E. (2020). Actions to transform food systems under climate change.
- Suhr, F., & Steinert, J. I. (2022). Epidemiology of floods in sub-Saharan Africa: a systematic review of health outcomes. *BMC Public Health*, 22(1), 268.
- Thierfelder, C., Chivenge, P., Mupangwa, W., Rosenstock, T. S., Lamanna, C., & Eyre, J. X. (2017). How climate-smart is conservation agriculture (CA)? Its potential to deliver on adaptation, mitigation and productivity on smallholder farms in southern Africa. *Food Security*, 9, 537–560.
- Tirado, M. C., Hunnes, D., Cohen, M. J., & Larrey, A. (2015). Climate change and nutrition in Africa. *Journal of Hunger & Environmental Nutrition*, 10(1), 22–46.
- UNCC (United Nations Climate Change) (2019a) Climate action and support trends: based on national reports submitted to the UNFCCC secretariat under the current reporting framework. UNCC Secretariat, Bonn.
- Union, A. (2015). Agenda2063 report of the commission on the African Union Agenda 2063: The Africa we want in 2063.
- United Nations Environment Programme (UNEP) (2022). African Ministerial Conference on the Environment. Retrieved from [https://www.unep.org/regions/africa/african-ministerial-conference-environment#:~:text=Thepercent20Africanpercent20Ministerialpercent20Conferencepercent20onpercent20thepercent20Environmentpercent20\(AMCEN\)percent20waspercent20established,environmentpercent20heldpercent20inpercent20Cairopercent20Cpercent20Egypt.](https://www.unep.org/regions/africa/african-ministerial-conference-environment#:~:text=Thepercent20Africanpercent20Ministerialpercent20Conferencepercent20onpercent20thepercent20Environmentpercent20(AMCEN)percent20waspercent20established,environmentpercent20heldpercent20inpercent20Cairopercent20Cpercent20Egypt.)