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Assessing the Integration of the Sendai Framework, Sustainable Development Goals, and the Paris Agreement in Advancing Disaster Risk Reduction and Sustainable Development: Insights from an African Perspective

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Abstract

Disaster risk, climate change, and unsustainable development are growing and interconnected challenges across Africa, where socio-economic vulnerabilities, environmental degradation, and institutional fragility converge to amplify risks. While the Sendai Framework for Disaster Risk Reduction (SFDRR), the Sustainable Development Goals (SDGs), and the Paris Agreement on Climate Change provide complementary global frameworks for tackling these complex issues, the true extent of their integrated implementation in the African context has remained largely unexplored. Existing research has tended to examine these frameworks in isolation, failing to capture their potential synergies and combined impact. This study fills this gap by assessing the integration of these global frameworks into national and sub-national planning and implementation processes in Africa. The study conducted a systematic review, complemented by a review of grey literature, covering the period from 2000 to 2024. The analysis combined qualitative thematic synthesis with quantitative assessment using MATLAB to identify trends, patterns, and integration gaps. Key funding reveals that while these frameworks are formally endorsed in Africa, their integration remains limited and inconsistent. Analysis shows that only 6.5% of Africa's measurable SDG targets are on track, with 67.7% requiring acceleration and 25.8% off track for achieving the 2030 goals. Furthermore, fewer than 30% of African countries have adopted comprehensive strategies aligning DRR, climate adaptation, and SDGs. The study also confirms that

fragmented financing, weak decentralization, and incompatible data systems persist as major barriers, limiting operational coherence and impact.

Keywords

Policy Integration, Disaster Risk Reduction (DRR), Climate Change (CC), Sustainable Development Goals (SDGs), Africa

1. Introduction

The increasing frequency, severity, and complexity of disasters, worsened by climate change, rapid urbanization, and environmental degradation, pose significant threats to global sustainable development (Collins, 2018; Frieler et al., 2017). These risks are particularly acute in Africa, where high exposure to natural hazards intersects with widespread socioeconomic vulnerabilities, institutional limitations, and underdeveloped infrastructure (AfDB, 2021; Codjoe & Atiglo, 2020; IPCC, 2007). In response to these challenges, the international community has adopted a series of global frameworks designed to guide countries toward resilience, sustainability, and climate security (Huang et al., 2024; Tiepolo & Braccio, 2020). Chief among these is the Sendai Framework for Disaster Risk Reduction (2015-2030), the 2030 Agenda for Sustainable Development, and the Paris Agreement on Climate Change (2015). Together, these frameworks offer a shared global vision for reducing disaster risks (van Niekerk et al., 2020), advancing sustainable development (Flood et al., 2022), and limiting global warming while enhancing adaptive abilities (Khalid, 2023).

While these international agreements were developed through distinct policy processes, they are inherently interconnected in their aims and implementation strategies (Wen et al., 2023). The Sendai Framework emphasizes the need to reduce existing disaster risk and prevent the creation of new risk by strengthening governance, understanding existing hazards, investing in resilience, and improving preparedness and response mechanisms (Nicodemus & Dennis, 2021). Sustainable Development, on the other hand, promotes an integrated approach to development that includes targets on climate action (SDG 13), resilient infrastructure (SDG 9), sustainable cities and communities (SDG 11), and reducing inequalities (SDG 10), among others (Khan et al., 2024). And, the Paris Agreement, meanwhile, addresses climate change through mitigation and adaptation strategies, emphasizing nationally determined contributions (NDCs), financial flows, and capacity-building for low-carbon (Bodansky, 2016). Together, these frameworks present an unprecedented opportunity for integrated, synergistic action on risk reduction and sustainability (Wen et al., 2023).

Despite the conceptual alignment and policy relevance of these frameworks, their integration in practice, particularly within national and regional governance systems in Africa, remains uneven and poorly understood (Tiepolo & Braccio,

2020; van Niekerk et al., 2020; Zia & Wagner, 2015). Current research tends to address these frameworks in silos, focusing either on climate governance, development planning, or disaster risk management, thereby failing to capture the complexity of their interrelationships. Empirical studies assessing the extent and effectiveness of multi-framework integration in Africa are limited, and those that do exist rarely provide detailed analyses of institutional coordination, policy coherence, and implementation mechanisms. This presents a critical knowledge gap, particularly given the urgency of addressing compounding and cascading risks in vulnerable regions across the continent.

Bridging this gap is vital for enhancing the effectiveness and efficiency of resilience-building efforts. Understanding how African countries are translating global frameworks into coordinated national policies and action plans can reveal both enabling factors and persistent barriers to integration (Tiepolo & Braccio, 2020). Such insights are essential for informing policy development, strengthening institutional arrangements, and guiding international support in ways that align with local contexts and abilities. Furthermore, the integrated implementation of the Sendai Framework, the Sustainable Development Goals, and the Paris Agreement holds significant potential for maximizing synergies (Khalid, 2023), avoiding duplication of efforts, and ensuring that investments in disaster risk reduction and sustainable development yield transformative and long-term outcomes (Wen et al., 2023).

This study aims to critically assess the extent and nature of policy integration among the Sendai Framework for Disaster Risk Reduction, the Sustainable Development Goals, and the Paris Agreement within the African context. Specifically, it examines the mechanisms facilitating such integration, identifies existing gaps and constraints, and highlights best practices and opportunities for advancing more coherent and effective implementation.

1.1. Disaster Risk Reduction and Sustainable Development

Disaster risk reduction (DRR) and sustainable development are fundamentally interdependent (Wen et al., 2023). Systematic evidence from Africa and other developing regions shows that disasters, whether natural or human-induced, can significantly derail development efforts (Codjoe & Atiglo, 2020; Khalid, 2023). While poor development practices can worsen disaster risk by increasing exposure and vulnerability, particularly in hazard-prone areas (Nicodemus & Dennis, 2021; van Niekerk et al., 2020). Recognizing and operationalizing the interlinkages between DRR and SDGs is essential for achieving resilient and sustainable growth across the African continent.

The Sendai Framework (2015-2030) clearly articulates that disaster risk reduction is a critical requirement for sustainable development, and it cannot be achieved without disaster risk management (Flood et al., 2022). Disasters erode progress across multiple development sectors, from primary, secondary, tertiary, to quaternary sectors (Echendu, 2022). Adisa et al. (2020) have demonstrated that re-

curring droughts undermine agricultural productivity, worsening hunger (SDG 2) and poverty (SDG 1), while floods and cyclones can disrupt education (SDG 4), health services (SDG 3), and infrastructure (SDG 9). Conversely, investments in risk reduction, such as resilient infrastructure, early warning systems, and ecosystem restoration, contribute to sustaining development gains and promoting long-term resilience (Collins, 2018). On the other hand, development processes themselves can either reduce or increase disaster risks depending on how they are designed and implemented (Nicodemus & Dennis, 2021; van Niekerk et al., 2020). Unplanned urbanization, environmental degradation, and socio-economic inequalities are often associated with rapid but poorly managed development and are key drivers of disaster risk in Africa (van Niekerk et al., 2020). This underscores that sustainable development must be risk-informed (Flood et al., 2022). Development initiatives that do not integrate disaster risk considerations often result in maladaptation or create new vulnerabilities, undermining both immediate and future development (Wen et al., 2023).

Despite this conceptual convergence, implementation often reveals a lack of coherence between DRR and development agendas. DRR is still commonly treated as a technical or humanitarian concern, detached from core socio-economic policy, while development planning may overlook risk-sensitive design and preparedness. Flood et al. (2022) and Wen et al. (2023) reveal that divergence is often rooted in institutional silos, fragmented financing, and differing planning horizons where DRR emphasizes immediate risk reduction and preparedness, and sustainable development focuses on long-term transformation. Bridging this divide requires integrated governance structures, shared policy instruments, and joint monitoring frameworks that embed DRR principles across all stages of development planning.

1.2. Climate Change Risks and Sustainable Development

Climate change constitutes one of the most pervasive and escalating threats to sustainable development in the 21st century. It is not only an environmental challenge but a systemic development risk, capable of undermining progress across virtually all dimensions of the 2030 Agenda (Khalid, 2023). Rising global temperatures, shifting precipitation patterns, sea-level rise, and the increasing frequency and intensity of extreme weather events are destabilizing ecosystems, economies, and societies (IPCC, 2014). These impacts are not confined to physical damage; they interact with social and economic vulnerabilities (Frieler et al., 2017), disproportionately affecting the poorest and most marginalized groups, thereby deepening existing inequalities and development gaps.

At the heart of the climate development nexus lies the recognition that climate risks are development risks (Khalid, 2023). Climate variability directly compromises food systems (SDG 2), depletes water resources (SDG 6), worsens public health burdens (SDG 3), and strains critical infrastructure (SDG 9) (IPCC, 2023). Moreover, climate-induced hazards such as floods, droughts, and storms amplify

poverty (SDG 1), increase forced displacement, and disrupt education and livelihoods, undermining several SDGs simultaneously (Frieler et al., 2017; Ofori et al., 2023). These cascading impacts illustrate that no development pathway can be sustainable if it is not climate resilient.

The Paris Agreement, adopted in 2015, provides a pivotal global framework for addressing climate risk and steering the world toward resilient, low-carbon development (Bodansky, 2016). Through its dual focus on mitigation and adaptation, the Agreement reinforces the need to align national policies and investments with long-term climate resilience goals (Wewerinke-Singh & Doebbler, 2016). For many countries, particularly those in climate-vulnerable regions, adaptation has become a central policy priority (Droogers & Aerts, 2005). Actions such as climate-smart agriculture, integrated water resource management, and disaster risk reduction exemplify the potential for synergistic interventions that serve both climate and sustainable development objectives (Flood et al., 2022).

As development priorities evolve in response to climate realities, there is a growing consensus that sustainable development must be inherently climate-smart, risk-informed, and equity-driven. Given the scale and complexity of climate and disaster risks, no single framework can address these challenges in isolation.

Yet, despite this conceptual alignment and increasing political commitment, a significant implementation gap remains. Flood et al. (2022) and Wen et al. (2023) have again shown that efforts to mainstream climate adaptation into development planning are often limited by institutional capacity, inadequate funding, fragmented data systems, and weak coordination across sectors and levels of governance. In many cases, national development strategies do not sufficiently consider future climate scenarios, leading to maladaptive investments that reinforce rather than reduce long-term vulnerabilities (Jaiyesimi, 2016). The ongoing underinvestment in adaptation, compared to mitigation, worsens this imbalance.

1.3. Nexus of Disaster Risk, Climate Change, and Sustainable Development

The global understanding of sustainable development and risk governance has evolved significantly over the past four decades, shaped by a growing awareness of the interconnectedness of environmental degradation, poverty, and vulnerability to disasters (Abdulai et al., 2020). A foundational moment came in 1987 with the publication of the World Commission on Environment and Development's report, Our Common Future, which introduced sustainable development as a framework to balance ecological integrity with human well-being (UN, 2015). This vision was institutionalized at the 1992 Earth Summit in Rio de Janeiro, where governments adopted the Rio Declaration, Agenda 21, the United Nations Framework Convention on Climate Change (UNFCCC), and the Convention on Biological Diversity, laying a comprehensive roadmap for harmonizing development with environmental stewardship (Cicin-Sain, 1996). Subsequent treaties, such as the 1994 United Nations Convention to Combat Desertification, further

cemented the understanding that human and ecological systems are inextricably linked.

This trajectory culminated in the Millennium Development Goals (MDGs), adopted in 2000, which emphasized poverty reduction and human development. Building on this, the 2030 Agenda for Sustainable Development, adopted in 2015, established 17 Sustainable Development Goals (SDGs) and 169 targets that explicitly integrate climate action (Goal 13), disaster risk reduction (Goal 11), and the resilience of vulnerable populations (Goal 1) (UN, 2015). Many of these targets, such as enhancing infrastructure resilience and reducing exposure to environmental shocks, overlap directly with the objectives of the Sendai Framework for Disaster Risk Reduction (SFDRR) and the Paris Agreement on Climate Change (Wen et al., 2023). The SFDRR (2015–2030) outlines priorities for reducing disaster risk and loss through improved risk governance, early warning systems, and the mainstreaming of DRR into all sectors (van Niekerk et al., 2020). Simultaneously, the Paris Agreement prioritizes climate adaptation, resilience-building, and low-emission development as integral to long-term sustainability (Bodansky, 2016).

Although these frameworks differ in scope and operational mechanisms, they share a unifying principle: the need for risk-informed, inclusive, and integrated development (Flood et al., 2022; Wen et al., 2023). Climate change adaptation (CCA) and disaster risk reduction (DRR) represent two critical pillars of integrated risk management. Both aim to reduce the risk posed by climate-related hazards, whether sudden-onset events such as floods or slow-onset processes like droughts and sea-level rise (Flood et al., 2022). Yet, their domains also diverge: DRR addresses risks from all natural hazards, including geophysical ones such as earthquakes and volcanic eruptions, while CCA focuses more on ecosystems, biodiversity, communities, and public health implications of climate variability. According to the UNEP Adaptation Gap Report (2024), current adaptation efforts are primarily concentrated in agriculture, water, and ecosystem-based sectors, underscoring the need for more comprehensive and multi-sectoral integration with DRR.

Integrated risk management thus emerges as a core strategy under the broader umbrella of resilient development (IPCC, 2014). It calls for aligning CCA and DRR with emergency management systems and climate mitigation efforts to address the full spectrum of climate and disaster-related threats (Flood et al., 2022). The synergistic implementation of these elements supports not only safer growth but also fosters structural resilience to future shocks and stresses. As shown in **Figure 1**, the conceptual nexus between the SDGs, the Sendai Framework, and the Paris Agreement highlights their shared objectives and underscores the central role of integrated risk management in promoting resilient and sustainable development. Although, despite increasing policy convergence at the global level, some challenges remain in translating these interconnected goals into coherent national strategies and localized action (Wen et al., 2023). Fragmented governance, parallel reporting mechanisms, and misaligned financial flows continue to hinder opera-

tional integration, especially in low- and middle-income countries (Jaiyesimi, 2016). As the literature demonstrates, global policy architecture has matured significantly, offering a solid foundation for integrated resilience-building. Yet, understanding how countries, especially in risk-prone regions, interpret and implement this nexus remains a critical research imperative.

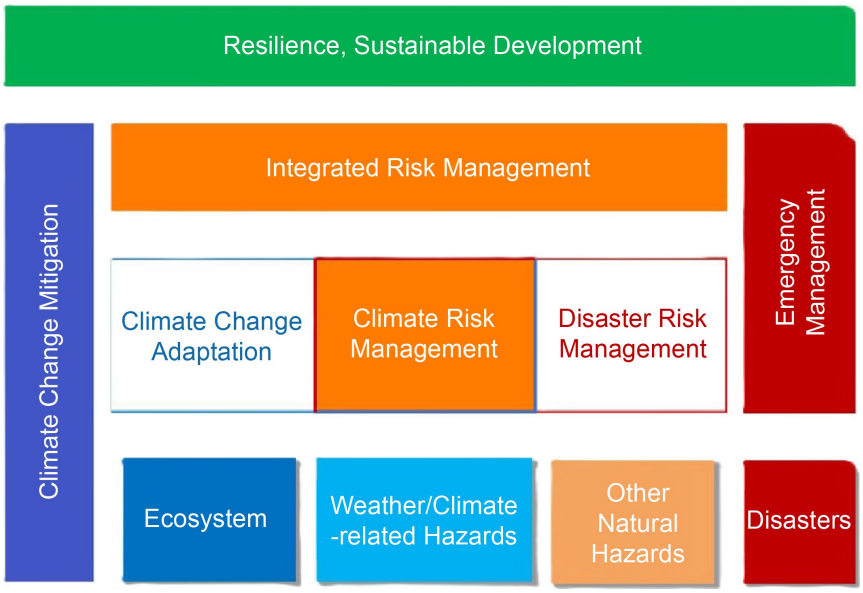

Figure 1. Interconnected nexus of disaster Risk, climate policy & sustainable development from Wen et al. (2023).

2. Methodology

This study conducted a systematic review to assess the alignment, relevance, and integration of the Sendai Framework for Disaster Risk Reduction (SFDRR), the Sustainable Development Goals (SDGs), and the Paris Agreement in advancing disaster risk reduction and sustainable development in Africa. The review aimed to synthesize and produce evidence on policy integration, implementation practices, and thematic interlinkages across disaster risk, climate change, and development agendas.

The literature search was conducted across multiple databases, including Our World in Data, PolicyFile, JSTOR, EconLit, AJOL, Scopus, Web of Science, and ScienceDirect, covering the period from 2000 to 2024 to capture both foundational and contemporary studies. The search was complemented by a grey review to include government reports and data from official websites. No language restrictions were applied during the search; however, studies available in English and French were prioritized to reflect the dominant languages of publication in Africa.

Search strategies combined keywords related to sustainability ("SDGs", "circular economy", "green economy"), climate change ("CCA", "CCM", "Paris Agreement"), disaster risk reduction ("Sendai Framework", "DRM", "hazard", "risk",

"vulnerability"), African perspectives ("Agenda 2063", "AfCFTA", "education", "governance", "democracy"), and sectoral impacts ("economy", "energy", "water security", "health", "agriculture"). The search specifically targeted studies addressing African regional, national, or sub-national contexts.

Studies were included if they: (1) focused explicitly on African contexts; (2) had a clearly defined objective and timeframe; and (3) directly engaged with themes of disaster risk reduction, sustainable development, or climate change. Conversely, studies were excluded if they lacked meaningful engagement with African realities or focused narrowly on technical aspects without addressing broader policy implications.

Data were analyzed thematically, with emphasis on identifying patterns in the relevance of each framework, progress and challenges in implementation, and evidence of policy integration or fragmentation. To enhance analytical rigor, MATLAB software was used to conduct statistical analyses of disaster, climate, and development indicators; perform trend and correlation analyses; and generate visual representations of cross-framework linkages. This combination of qualitative and quantitative methods provided a robust foundation for answering the overarching research question: How do the SFDRR, Paris Agreement, and SDGs collectively influence disaster risk reduction and sustainable development efforts across Africa?

3. Results

This study shows how the extent and nature of the integration of the Sendai Framework, the Sustainable Development Goals, and the Paris Agreement contribute to shaping disaster risk reduction and sustainable development efforts across Africa. It reveals that the frameworks are highly relevant, contribute to socioeconomic development, and share common perspectives with regional African agendas and initiatives. Each of the frameworks brings distinct strengths in the African development process: the Sendai Framework provides a comprehensive blueprint for reducing disaster risks through proactive governance, early warning systems, and resilience building; the SDGs offer an integrated development agenda that situates risk reduction within broader goals of poverty eradication, social equity, and environmental sustainability; and the Paris Agreement advances climate action by embedding adaptation and resilience within global climate governance and finance mechanisms.

Collectively, they promote core principles of risk-informed development, cross-sectoral integration, and long-term resilience. Although the study also reveals that while these frameworks share core principles, their translation into national and local contexts remains uneven in Africa. The findings show a complex reality in which global agendas are formally embraced in policy frameworks but inconsistently operationalized in practice, with patterns of relevance, implementation, and integration challenges shaping outcomes across the continent.

3.1. Relevance of Global Frameworks and Junction Points to Africa

The study reveals that the SFDRR, the SDGs, and the Paris Agreement are highly relevant frameworks for African countries, but they should be adopted differently depending on the context (CAHOSCC, 2023; Tiepolo & Braccio, 2020; van Niekerk et al., 2020). As shown in **Table 1**, national development strategies, climate policies, and resilience programs across the continent often reference at least two of these global instruments (CAHOSCC, 2023), highlighting emerging understanding of the importance of disaster risk reduction, climate change adaptation, and sustainable development as mutually reinforcing priorities (Abdulai et al., 2020; Tiepolo & Braccio, 2020; van Niekerk et al., 2020). Continental agendas such as the African Union's Agenda 2063 and the Nairobi Declaration on climate change further reinforce this growing convergence, which explicitly promotes integrated approaches to risk, resilience, and sustainable growth (CAHOSCC, 2023).

Table 1. Alignment between African regional frameworks and global frameworks.

Instrument/Statute	Purpose/Focus	Alignment with SDGs/Paris Agreement/DRR
Agenda 2063: The Africa We Want (2015)	Provides a long-term vision for inclusive growth and sustainable development in Africa.	Strong alignment with SDGs, Paris Agreement, and resilience goals.
African Climate Change Strategy (2022)	Coordinates climate policy and guides countries in Paris Agreement implementation.	Directly supports NDCs and regional climate action.
African Strategy for DRR (2022-2030)	Sets the framework for reducing disaster risks across Africa.	Strong alignment with the Sendai Framework and SDGs.
Nairobi Declaration (2023)	Calls for increased climate finance and fair global climate action.	Advocates Paris' implementation, climate justice, and SDG 13.
African Adaptation Initiative (2015)	Enhances adaptation capacity and supports African-led climate resilience efforts	Advances adaptation strategies, address loss and damage, and SDG 13.
African Development Bank (1964)	Mobilizes funding for climate-resilient infrastructure and green growth	Supports SDGs, Paris Agreement, DRM and Agenda 2063 implementation

Yet, despite this institutional alignment, from regional to national level, the findings also reveal that substantive operationalization remains uneven and fragmented (Jaiyesimi, 2016; UNDRR, 2016). While 85% of African Union Member States mention disaster risk reduction and climate change in their national development plans, fewer than 30% have adopted fully integrated strategies that align these objectives across sectors such as health, agriculture, water, and urban development (Jaiyesimi, 2016; van Niekerk et al., 2020). Cross-referencing frameworks are often limited to high-level policy documents, with little evidence of downstream translation into coordinated, multi-level governance systems or budgetary commitments (Atela et al., 2024; Tiepolo & Braccio, 2020). In many cases, national action plans on disaster risk or climate adaptation (NAPs) operate in isolation and are generally managed by separate ministries with overlapping mandates and limited cross-sectoral collaboration. (Abdulai et al., 2020; Jaiyesimi, 2016; UNDRR,

2016).

These persistent gaps between policy recognition and effective implementation reflect structural constraints (Jaiyesimi, 2016), including weak institutional capacities, limited technical expertise, fragmented financing streams, and competing short-term development pressures (Abdulai et al., 2020; Nicodemus & Dennis, 2021; Adisa et al., 2024). Moreover, geopolitical tensions and governance challenges in several regions, such as in Central, East, and West Africa, further impede the ability to translate global commitments into concrete and sustained actions (CAHOSCC, 2023). Bridging this gap requires moving beyond rhetorical commitments toward integrated national planning frameworks, robust accountability mechanisms, and empowering sub-national actors to effectively localize and operationalize global goals.

3.2. Progress in Implementation across African Countries

Implementing the SFDRR, the SDGs, and the Paris Agreement across Africa has shown considerable disparities, with significant variations in national and sub-national approaches (UNDRR, 2016). While highly relevant, these global frameworks are often not operationalized uniformly, resulting in uneven progress across sectors, countries, and governance levels.

3.2.1. Progress in Implementing SFDRR

Over the period 2015-2018, Africa has made significant progress in aligning with the Sendai Framework for Disaster Risk Reduction (SFDRR) objectives. This progress is primarily characterized by growing regional cooperation, strengthened governance, and heightened institutional awareness (van Niekerk et al., 2020). Despite a modest 13% rise in disaster mortalities during this time, driven mainly by exceptional events such as the Ebola outbreak, mudslides in Sierra Leone in 2017, and floods linked to a strong El Niño, there has been substantial advancement in documenting and responding to these events (UNDRR, 2016). As shown in **Figure 2**, the rising number of reported disasters and their consequences highlights the improvement in Africa's disaster monitoring and evaluation systems.

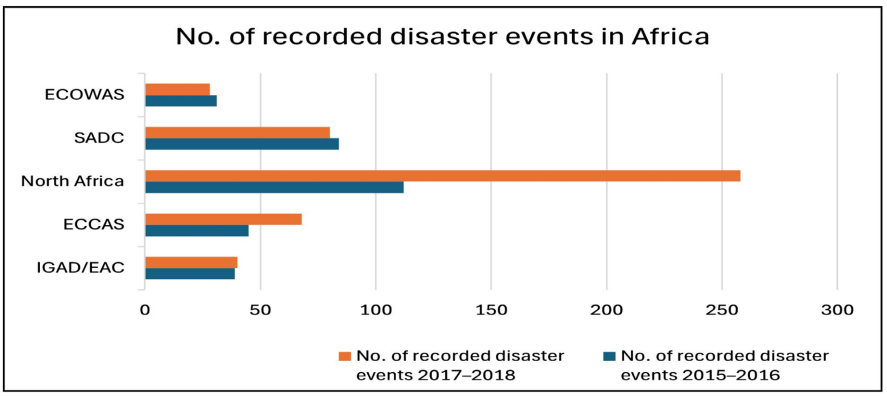

Figure 2. Number of recorded disasters from 2015 to 2018 in Africa.

In parallel, there has been measurable progress in key outcome areas of the Sendai Framework for Disaster Risk Reduction (SFDRR). **Figure 3** highlights trends in targets with the most quantifiable indicators, particularly targets A, B, and C, showing notable improvements in saving lives, reducing human impact, and managing economic losses across regions (van Niekerk et al., 2020). Several Regional Economic Communities (RECs) have successfully lowered disaster-related mortality and reduced the number of people affected. Most significantly, between 2015 and 2018, the number of people affected by disasters declined by 39%, particularly in the IGAD/EAC and SADC regions, largely due to more effective responses to droughts and floods. As shown in **Figure 3**, although reported direct economic losses increased by 34% between 2015-2016 and 2017-2018, deaths per 100,000 population generally declined, and the number of people affected per 100,000 fell in several regions. International cooperation has also strengthened, with growing trust and support from external partners (UNDRR, 2016). Nonetheless, full implementation of SFDRR strategies remains limited, with only 4% of countries reporting complete execution (van Niekerk et al., 2020).

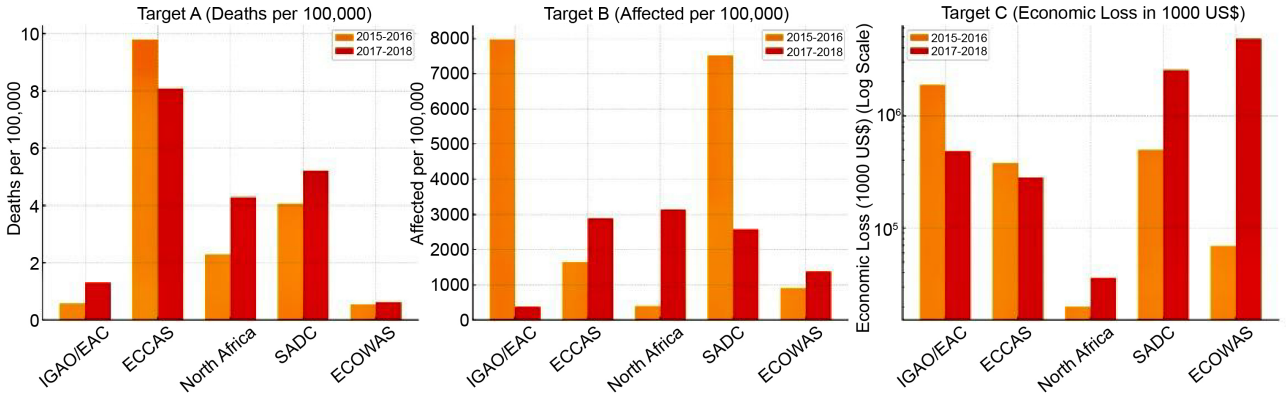

Figure 3. Trends in disaster-related deaths, affected population, and direct economic losses across African regions (2015-2016 vs. 2017-2018).

3.2.2. Progress in Implementing the Paris Agreement

The Paris Agreement has garnered significant traction in Africa and stands out as the international environmental accord with the most substantial progress recorded on the continent (AU, 2022; CAHOSCC, 2023). As shown in **Table 2**, this progress is mainly due to the widespread ratification and the increasing alignment of national climate strategies with global climate objectives. Over 90% of African countries have submitted their Nationally Determined Contributions (NDCs), many of which set ambitious targets for both mitigation and adaptation. Across the continent, governments are translating these commitments into concrete action through local initiatives, which mainly include scaling up renewable energy deployment, promoting climate-resilient agricultural practices, and integrating nature-based approaches into adaptation strategies. These efforts are further strengthened by enhanced regional cooperation and political leadership, particularly through bodies such as the Committee of African Heads of State on Climate

Table 2. Africa's progress in implementing the Paris agreement.

Aspect	Progress/Status	Challenges
Ratification	99% of African countries	Only Libya has not ratified to date
NDC Implementation	53 countries submitted NDC1.0 and 45 countries submitted NDC2.0	By Feb 2025, only Zimbabwe submitted NDC3.0; inconsistent NDC targets, and uneven progress
Finance	Funding of at least US$25 billion by 2025 from local sources.	Limited access and mobilization barriers
Institutional Capacity	Adoption of the Nairobi Declaration, CAHOSCC, and AAI	Lack of sufficient institutional and technical ability across countries
Public Awareness	60% of the population across the continent	Data and information accessibility issue
International Support	Increase of international cooperation, support from UN agencies, and global climate funds	Uneven and Insufficient support

Change (CAHOSCC) and initiatives like the African Adaptation Initiative (AAI), both of which have elevated climate action to the highest levels of policy and decision-making.

Africa's coordinated climate diplomacy, as reflected in landmark commitments such as the Nairobi Declaration, demonstrates the continent's growing influence in shaping global climate discourse and advocating for fair and effective climate solutions. Despite persistent challenges, including a significant climate finance gap, dependency on external funds, limited technical expertise, and low levels of public awareness of NDCs at both national and local levels, Africa's trajectory signals a shift from commitment to concrete implementation.

3.2.3. Progress in Implementing SDGs

The study reveals that Africa is lagging in achieving the Sustainable Development Goals (SDGs), with less than 6.5% of the 32 measurable targets on track, 67.7% on track and 25.8% behind schedule for achievement by 2030 (Figure 4). Despite modest progress on 12 of the 17 SDGs, the overall pace of implementation remains alarming. This is particularly evident in Central, East, and West Africa, which continues to lag behind South Africa and North Africa.

Despite these challenges, there are nevertheless signs of hope. Figure 5 highlights six SDG targets for which African countries have made substantial progress. SDG 13 (Climate Action) stands out, with 34 countries having already achieved it. Similarly, SDG 12 (Responsible Consumption and Production) has been achieved by 30 countries. At the national level, a few numbers of countries have achieved notable successes: Algeria, Mauritius, and Tunisia have achieved SDG 1 (No Poverty); Seychelles has achieved SDG 4 (Quality Education); Namibia has achieved SDG 5 (Gender Equality); and Algeria has also achieved SDG 10 (Reduced Inequalities). These achievements are supported by technological and infrastructural improvements (Abdulai et al., 2020; Singh et al., 2018). The expansion of digital connectivity, improved access to clean water, and increased electrification are playing a key role in accelerating sustainable development.

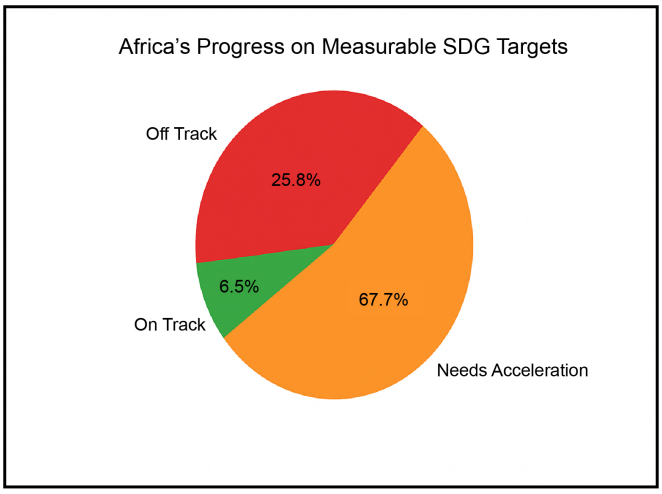

Figure 4. Progress on measurable SDG targets.

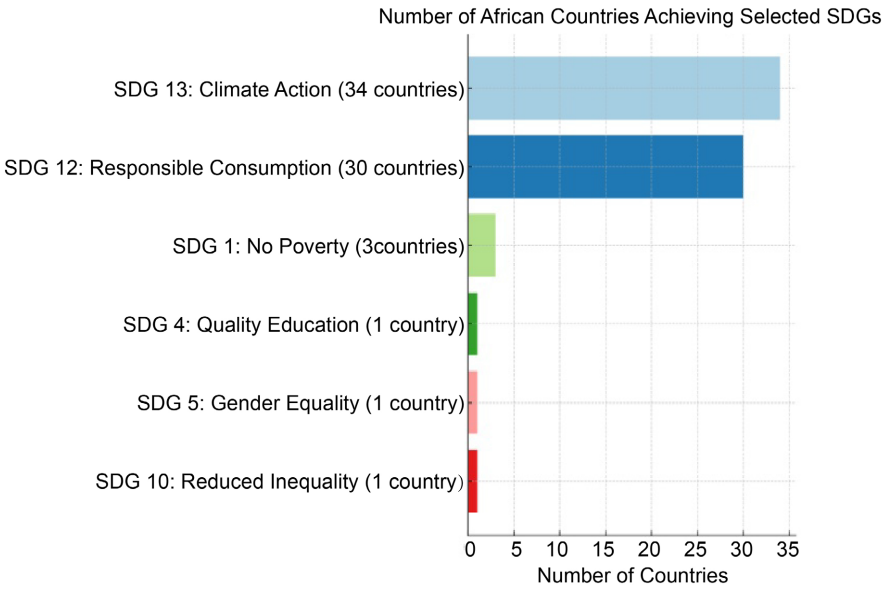

Figure 5. Most advanced SDGs in Africa.

However, the study also reveals that significant obstacles continue to hinder large-scale progress (Jaiyesimi, 2016). Poverty and hunger are worsening, with approximately 600 million people projected to remain in extreme poverty beyond 2030 and more than 281 million people facing hunger in 2022 (Jaiyesimi, 2016). Furthermore, financial constraints, as for the Sendai framework and Paris Agreement, represent one of the most significant challenges for the SDGs in Africa (Adisa et al., 2024). In addition, governance challenges and development priorities further complicate the landscape (Abdulai et al., 2020). Illicit financial flows, estimated at $88.6 billion per year, continue to divert critical resources from development efforts (Jaiyesimi, 2016).

Finally, weak data systems and underdeveloped social protection structures limit governments' ability to design and implement effective, evidence-based in-

terventions (Abdulai et al., 2020; Nicodemus & Dennis, 2021).

3.3. Cross-Sectoral Policy Gaps

Despite increasing alignment in the objectives of the SFDRR, the Paris Agreement, and the SDGs, African countries face persistent policy gaps that hinder integrated implementation (Abdulai et al., 2020; Tiepolo & Braccio, 2020). These gaps represent the disconnect between thematically linked agendas and their practical integration across sectors.

Climate change, disaster risk, and development strategies are still developed and executed by separate ministries and agencies with divergent mandates, uncoordinated planning processes, and limited mechanisms for horizontal collaboration (Abdulai et al., 2020; Jaiyesimi, 2016; Nicodemus & Dennis, 2021). As a result, sectoral strategies like agriculture, health, infrastructure, and energy frequently lack a shared risk lens and fail to embed climate and disaster considerations into routine planning and investment decisions (UNDRR, 2016). Another critical gap is the misalignment between national frameworks and sub-national implementation capacity (Abdulai et al., 2020; Nicodemus & Dennis, 2021). Local governments are often expected to implement global commitments without adequate institutional capacity or resources (Atela et al., 2024). Gaps also persist in monitoring and evaluation, as each framework operates with distinct indicators, timelines, and institutional responsibilities, making it difficult to track collective progress or identify synergies and trade-offs (Davis-Reddy & Hilgart, 2021; Tiepolo & Braccio, 2020). Financing structures further expose integration gaps: climate, development, and disaster risk funding channels remain largely siloed, lacking mechanisms to incentivize joint programming or multi-sectoral investment (AfDB, 2021; Adisa et al., 2024).

Finally, the absence of innovative ecosystems and feedback loops contributes to a gap between policy ambition and adaptive learning, limiting the ability to scale successful integrated models. These cross-sectoral policy gaps highlight not blockages, but missing or misaligned connections between interdependent policy domains that must be bridged to enable cohesive, resilient development planning.

3.4. Systemic Barriers to Policy Integration

Beyond cross-sectoral disconnections, the integration of the SFDRR, the Paris Agreement, and the SDGs in Africa is also hindered by systemic barriers, deeply rooted structural and institutional obstacles that prevent coherent and coordinated action (Jaiyesimi, 2016; Tiepolo & Braccio, 2020; van Niekerk et al., 2020).

This study identifies ten (10) core obstacles that hinder and slow down the effective integration of the SFDRR, Paris Agreement, and SDGs in Africa. First, weak decentralization frameworks constrain the ability of subnational governments to implement integrated approaches, as they are often deprived of clear mandates, technical capacities, and resources (Nicodemus & Dennis, 2021). Second, bureaucratic rigidity limits institutional flexibility and hinders the adaptive

processes necessary for cross-sectoral collaboration (Drechsler, 2020). Third, limited institutional memory and weak policy continuity due to frequent political reshuffles, leadership turnover, and lack of strategic documentation undermine sustained efforts to implement long-term integration (Tiepolo & Braccio, 2020; van Niekerk et al., 2020). Fourth, incompatible and non-interoperable data systems across climate, disaster risk, and development institutions prevent harmonized monitoring and evidence-based policy formulation (Sanga, 2011). Fifth, the disconnect between planning and budgeting systems is reflected in the fact that many integration strategies are either unfunded or insufficiently aligned with budgetary frameworks, leading to weak implementation. Sixth, weak civic engagement mechanisms and low levels of citizen participation, particularly of women, youth, and marginalized groups, reduce accountability and limit the relevance of national plans to local contexts (Brown, 2011; Atela et al., 2024). Seventh, the dominance of donor-driven, externally designed programs leads to fragmented project cycles that fail to promote sustained and systemic integration of resilience and development agendas (Adisa et al., 2024). Eighth, limited technical capacity in policy analysis and systems integration restricts the ability of institutions to design and operationalize coherent cross-sectoral strategies. Ninth, fragmented and unpredictable financing architectures characterized by siloed development and climate funds reduce the scope for coordinated investment in resilience-building (AfDB, 2021). Tenth, geopolitical tensions, electoral cycles, and shifting political incentives discourage long-term institutional reforms, as political leaders tend to prioritize visible, short-term outputs over complex integration processes (Tiepolo & Braccio, 2020).

Table 3 shows key progress indicators, quantitative metrics, persistent challenges, and potential opportunities for accelerating integrated action.

3.5. Critical Reflections and Future Directions

This study highlights that although African countries have made important strides in aligning with the Sendai Framework for Disaster Risk Reduction (SFDRR), the Sustainable Development Goals (SDGs), and the Paris Agreement, progress remains uneven and largely fragmented. These frameworks are still frequently implemented in parallel rather than through an integrated approach, limiting their collective impact and synergies. The persistent disjunction across policy domains, governance tiers, and financing mechanisms represent a major barrier to realizing the transformative potential of these global agendas.

While incremental reforms, such as the expansion of social protection, increased adoption of early warning systems, and initial efforts to mainstream climate adaptation, have laid the foundation for progress, they are insufficient to address the systemic nature of risk in Africa. A shift is urgently needed toward structural and systemic reforms that promote deeper institutional integration and long-term resilience. Key strategic entry points include the deployment of nature-based solutions, climate-smart agriculture, and resilient public service systems,

Table 3. Africa's progress in implementing the Paris agreement.

Frameworks	Progress Highlights	Quantitative Metrics	Major Challenges	Key Opportunities
SDGs	<6% of Africa's 32 measurable SDG targets are on track for 2030	Hunger increased from 270.6M (2021) to 281.6M (2022)	Weak data systems, debt distress, governance and corruption issues, weak decentralization, development priorities, and misaligned budgets	Scale up finance, strengthen M&E system, enhance resource mobilization, and improve governance and transparency
	10 of the 144 measurable SDG targets are currently on track to be achieved by 2030	~6.5% of SDGs are on track		
	Significant improvements in SDG12 and SDG13	SDGs 12 and 13 have been achieved by at least 30 countries		
SFDRR	Medium-low implementation	+30 countries have developed DRR strategies	Insufficient and unstable financing, inadequate technology/data, institutional weakness, limited vertical coordination, and public awareness gap	Invest in early warning systems, risk mapping, strengthen cross-sector coordination, mobilise funding, and build capacity
	Increased adoption of early warning systems in +15 countries	~40% of countries have early warning systems		
	Integration of DRR into NDP	Strong preparedness and resilience in the face of disasters		
Paris Agreement	All 54 African countries signed	99% of ratification	Climate finance gap, technology and capacity deficits, limited policy continuity, and weak monitoring system	Scale climate finance, mobilizing private investment, fostering regional cooperation, and long-term resilience planning
	53 countries have submitted NDC 1.0; Growing alignment of NDCs-NDP-SDGs	+90% of NDCs submitted		
	Emerging climate finance initiatives	15% increase in renewable energy in 2018		

which offer multiple co-benefits across the climate, disaster, and development nexus. To support this transition, institutional innovations such as inter-ministerial resilience councils, integrated budget planning mechanisms, and harmonized monitoring and evaluation systems are essential to overcome current silos and improve cross-sector coordination.

Moreover, resilience-building must be inclusive and future-oriented. This entails deliberate investments in youth-led innovation, gender-responsive planning, and the incorporation of local and indigenous knowledge systems into formal policy processes. Finally, strengthening data systems and aligning metrics across SFDRR, NDCs, and SDG targets can reduce duplication, improve decision-making, and foster adaptive governance.

4. Conclusion

This paper assessed the integration of the Sendai Framework, the Sustainable Development Goals (SDGs), and the Paris Agreement in advancing disaster risk reduction (DRR) and sustainable development in Africa. The analysis underscores the significant synergies across these global frameworks, particularly in their shared emphasis on resilience, climate adaptation, and inclusive development.

However, translating these aligned global agendas into coherent national policies and local action remains a major challenge. Despite notable progress in developing national strategies and submitting NDCs, African countries continue to face cross-sectoral policy gaps and systemic barriers. These constraints not only hinder effective implementation but also limit the ability to respond to local vulnerabilities with context-specific solutions. Addressing these challenges requires coordinated, inclusive, and innovative approaches that build on incremental progress while enabling transformative change. Strengthening policy integration across DRR, climate, and development frameworks is not only a strategic priority but a necessary pathway for realizing Africa's sustainable and resilient future in the face of escalating climate and disaster risks.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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