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Item Type	Article (Version of Record)
UoW Affiliated Authors	Nkiko, Cedric
Full Citation	Nkiko, Cedric (2026) Systematic review of business strategies for climate-induced migration adaptation through ESG in Sub-Saharan Africa. <i>Discover Sustainability</i> , 7 (271). pp. 1-30. ISSN 2662-9984
DOI/ISBN/ISSN	https://doi.org/10.1007/s43621-025-02382-4
Journal/Publisher	Discover Sustainability Springer
Rights/Publisher Set Statement	© The Author(s) 2026. Open Access This article is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License, http://creativecommons.org/licenses/by-nc-nd/4.0/
License	CC BY-NC-ND 4.0
Link	https://link.springer.com/article/10.1007/s43621-025-02382-4

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REVIEW

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Systematic review of business strategies for climate-induced migration adaptation through ESG in Sub-Saharan Africa

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Abstract

Climate change has displaced millions across Sub-Saharan Africa (SSA), deepening livelihood precarity and limiting prospects for return or resettlement. Yet the intersection of climate-induced migration and business sustainability strategies remains underexamined in both scholarship and practice. This systematic review investigates how Environmental, Social, and Governance (ESG) strategies, typically applied for compliance and value creation, can be leveraged to enhance resilience and indirectly mitigate migration pressures. Drawing on evidence from the agriculture, energy, and service sectors, the review finds that while ESG interventions often support risk management and community stability, they seldom engage explicitly with migration dynamics. The paper highlights both the promise and limitations of current ESG practices and calls for more intentional integration of migration-sensitive approaches into business sustainability planning. It concludes by proposing the Sustainable ESG–Migration Integration Framework (SEMIF), a five-stage model to guide ESG–migration alignment and strengthen private sector contributions to adaptation and resilience.

Keywords ESG strategies, Climate change, Mitigation, Resilience, Migration, Sub-Saharan Africa

1 Introduction

Climate change is emerging as a major driver of human mobility, with projections suggesting that between 200 million and 2 billion people could be displaced by 2100 due to environmental stressors such as rising temperatures, sea-level rise, and extreme weather events [96]. The World Bank estimates that by 2050, up to 216 million people may be internally displaced across developing regions, including Sub-Saharan Africa (SSA), as gradual-onset events like water scarcity, crop failure, and ecosystem collapse intensify [21]. These are not distant threats: in 2022 alone, 98% of the 32.6 million new displacements were triggered by weather- and climate-related disasters [85].

SSA remains highly vulnerable to climate change due to its dependence on rain-fed agriculture, widespread poverty, and weak adaptive infrastructure [53]. Climate



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variability is already undermining agricultural productivity, disrupting livelihoods, and accelerating rural–urban migration [77, 100]. These demographic shifts strain urban services, labour markets, and business operations across sectors. Case studies including the desert locust crisis in East Africa [49], the shrinking of Lake Chad [42], Cyclones Idai and Kenneth, and recurrent disasters such as landslides in Uganda and prolonged droughts in Tanzania (Dombio and Namara, 2014, [60], highlight how environmental degradation increasingly interacts with socio-political instability to drive displacement [54].

The private sector is increasingly exposed to these risks. Climate-induced migration affects supply chains, labour availability, and consumer markets [102]. While adaptive practices such as climate-smart agriculture and sustainable sourcing exist, uptake remains uneven, particularly among smallholder farmers and local enterprises with limited access to finance and information [15]. In response, Environmental, Social, and Governance (ESG) strategies have gained traction as a framework for aligning profit-making with climate adaptation and social resilience. ESG-aligned investments in areas such as renewable energy, agroforestry, and inclusive employment have shown promise in reducing vulnerability and curbing the economic drivers of migration (Bogale and Bekele, 2021, Eluwa et al., 2023).

Despite growing interest in ESG across SSA, few businesses incorporate climate migration explicitly into their sustainability planning. Where such considerations exist, they often lack coherence or long-term integration (Graham, 2024). This represents a missed opportunity to design ESG strategies that address both climate risks and migration pressures in a unified manner.

This study contributes to this gap by examining how businesses in SSA are using ESG strategies to respond (directly or indirectly) to climate-induced mobility. Conceptually, it reframes migration as not only a consequence of climate stress but also a potential form of adaptation. This dual framing highlights a role for businesses in pre-emptively addressing displacement through resilience-building investments [113]. Specifically, the study: (1) explores how ESG strategies intersect with climate migration risks in SSA, and (2) offers practical guidance on designing ESG interventions that enhance local adaptive capacity and may contribute to conditions that reduce migration pressures as a last-resort strategy.

1.1 Conceptual framework of the climate migration and ESG strategies nexus

This study builds on the Intergovernmental Panel on Climate Change's (IPCC) climate risk framework, specifically the “propeller” model that conceptualises risk as a function of hazard, exposure, and vulnerability [70]. Drawing from this model, A conceptual framework (Fig. 1) is developed in this study to examine how Environmental, Social, and Governance (ESG) strategies adopted by businesses in Sub-Saharan Africa (SSA) can support resilience that may reduce displacement risks.

Figure 1 illustrates how ESG strategies may reduce exposure and vulnerability by supporting adaptive livelihoods, enhancing local infrastructure, and strengthening institutional governance. These interventions may decrease the likelihood of involuntary displacement and promote resilience in high-risk contexts. This framework positions businesses as active agents in reducing climate migration pressures.

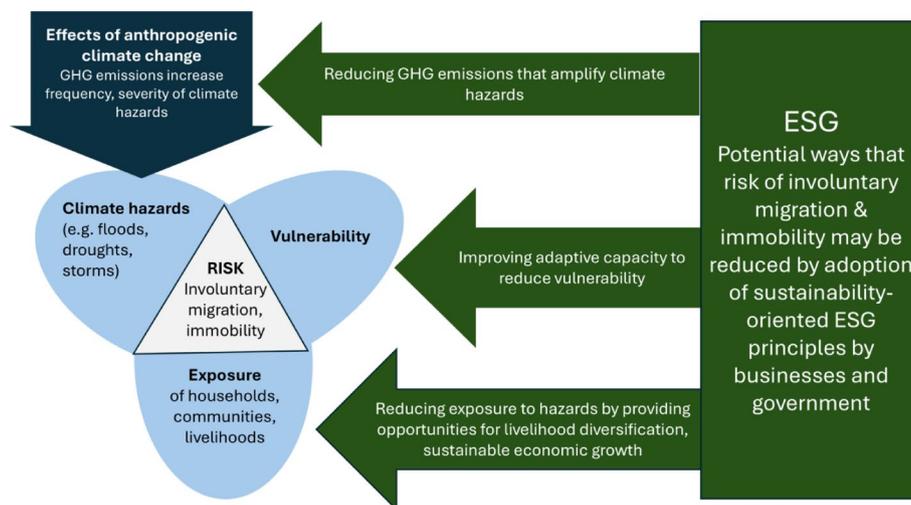


Fig. 1 A conceptual framework: the impact of ESG strategies on moderating risks of involuntary migration and immobility (adapted from McLeman, [70])

Exposure refers to the location of people and assets in areas prone to climate hazards such as floodplains or drought-prone zones, while vulnerability denotes the socio-economic and infrastructural conditions that shape a community’s sensitivity to these hazards. ESG-aligned investments, including climate-smart agriculture, decentralised energy systems, and disaster-resilient infrastructure, reduce risk by improving coping capacity and diversifying income streams [6].

Recent cases in SSA such as flooding in Nigeria’s Benue State (Bannor et al., 2023), coastal erosion in Ghana (Addo et al., 2018), and prolonged droughts in Tanzania [60] demonstrate how environmental hazards intersect with weak governance and socio-economic fragility to drive displacement. The differentiated effects of such hazards, shaped by gender, age, and economic status, reinforce the need for context-specific business responses (Osei-Amponsah et al., [81] [83]).

ESG strategies can play a preventive and adaptive role when tailored to local conditions. For instance, Ethiopia’s Climate-Resilient Green Economy (CRGE) strategy demonstrates how public–private partnerships can scale up low-carbon development and climate adaptation, while creating employment and reducing exposure [27], Corfee-Morlot et al., 2017). Similarly, initiatives that link eco-tourism and sustainable farming in Rwanda and Kenya illustrate the role of business in livelihood resilience [6].

Migration itself operates along a continuum from voluntary relocation to forced displacement and immobility. Vulnerable populations without adequate resources or access to information may remain trapped in deteriorating environments McLeman, [70]. Businesses have a role to play in mitigating these conditions by supporting locally rooted adaptation strategies through ESG frameworks.

The model aligns with the “hazards-of-place” tradition, recognising that structural inequality and place-based risk combine to shape migration outcomes. By embedding ESG strategies into business operations, companies can contribute to more inclusive, anticipatory governance systems that address the environmental and social drivers of displacement [76, 106].

Finally, stakeholder collaboration with government, civil society, and local communities, enhances the effectiveness of ESG interventions. Corporate social responsibility

(CSR) initiatives that prioritise co-designed adaptation projects, vocational training, or infrastructure investment contribute to the social dimension of ESG and strengthen local capacity to respond to climate risks [8].

This framework offers a practical and theoretically grounded pathway for businesses to integrate ESG strategy with climate adaptation and migration mitigation. It serves both as an analytical lens and an implementation guide for firms seeking to align profitability with long-term resilience in SSA.

This conceptual framework offers a practical and theoretically grounded pathway for businesses to integrate ESG strategy with climate adaptation and migration mitigation. It serves both as an analytical lens and an implementation guide for firms seeking to align profitability with long-term resilience in SSA. Building on the conceptual foundations outlined above, this review introduces the Sustainable ESG–Migration Integration Framework (SEMIF) (presented in the discussion section), a conceptual model designed to address the analytical gaps across ESG domains particularly the absence of migration-sensitive planning.

2 Methodology

2.1 Search strategy

This systematic review follows the PRISMA 2020 guidelines, providing a structured and transparent process for identifying, screening, and including studies on the climate vulnerability–migration–ESG nexus in Sub-Saharan Africa (SSA) [84]. In addition to database searches, a snowballing approach was used to identify supplementary peer-reviewed literature from key bibliographies.

While PRISMA ensures methodological rigour, it is often limited in capturing fast-emerging literature, particularly in dynamic fields such as ESG and climate-induced mobility [61, 98]. To address this, the study adopted a living review model, integrating Elicit AI to automate ongoing literature screening and data extraction [26]. Figure 2 presents the screening results generated by Elicit AI, summarising the identification, inclusion, and thematic categorisation of studies relevant to the study. Such screening approach aligns with Page’s (2020) recommendations for maintaining review currency over time.

AI tools like Elicit have become increasingly prominent in sustainability research due to their capacity to expedite literature classification, abstract analysis, and metadata extraction [58], Santhanam, [94]. Dhiman et al. [28] further distinguish between “AI for

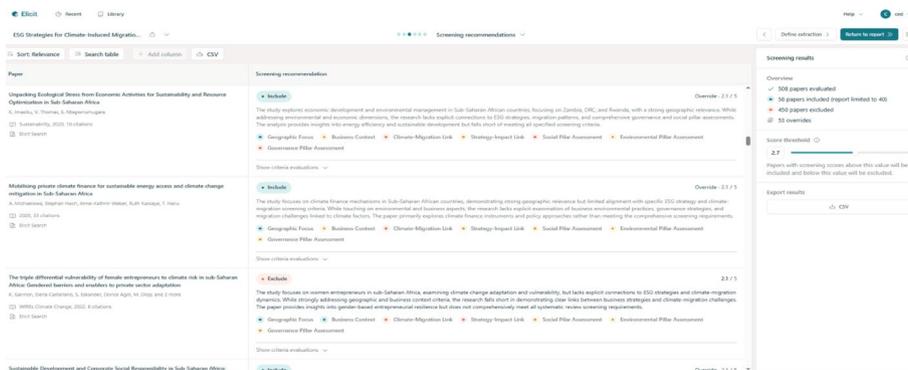


Fig. 2 Elicit Screening results extract

Sustainability” and “Sustainability of AI,” framing AI itself as both a tool and object of sustainability inquiry.

Despite its efficiencies, Elicit carries limitations. Biases inherent in algorithmic training data can lead to skewed inclusion patterns, especially underrepresenting qualitative or regional studies [38]. AI may also misinterpret complex theoretical arguments, affecting review depth and nuance [14]. To mitigate these risks, a hybrid approach was adopted, combining AI-driven processing with human oversight and interpretive judgement [30]. This ensured fidelity to PRISMA standards and strengthened the validity of review findings [72].

2.2 Quality assessment

Each study was evaluated using Yadav’s [112] seven criteria- relevance, clarity, contribution to objectives, consistency, accuracy, completeness, and credibility, to ensure methodological rigor. Reflexivity was applied throughout to identify potential biases in data selection and interpretation.

2.3 Inclusion and exclusion criteria

The review focused on addressing the research question: “*What specific ESG sustainability strategies do businesses in SSA implement to mitigate climate-related migration risks?*” Studies were included if they: (1) examined ESG-related strategies in SSA, (2) addressed business-led interventions, and (3) considered implications for migration or immobility. Studies were excluded if they, (1) focused solely on government or NGO interventions; (2) lacked ESG relevance; (3) were published before 2010; (4) were not in English and (5) were review articles, grey literature, or outside the SSA context.

A total of 508 studies were initially retrieved through Elicit AI from the Semantic Scholar database. After full-text screening, 221 publications met the inclusion criteria, as outlined in Fig. 3, which summarises the inclusion and exclusion criteria applied during the review process.

2.4 Data extraction and synthesis

Elicit AI supported the identification and extraction of key variables, including authorship, publication year, ESG definitions, methods, findings, and policy relevance. Each study was coded based on 1) type of ESG strategy (environmental, social, governance),

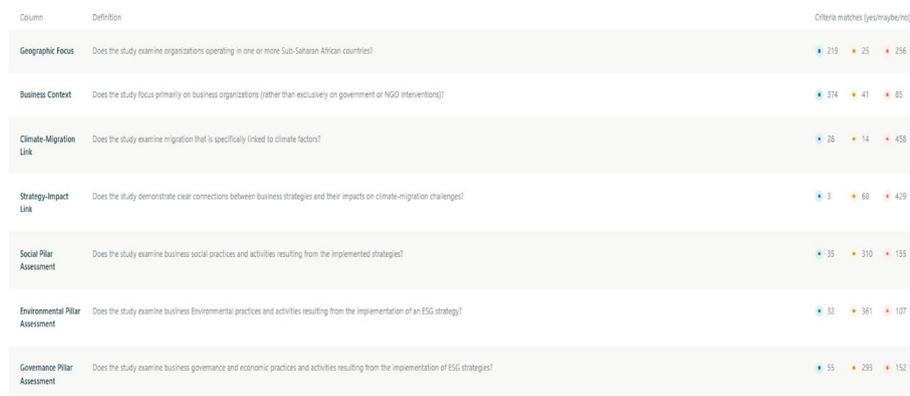


Fig. 3 Inclusion/exclusion criteria of studies reviewed

2) relevance to migration or immobility, 3) direct or indirect business engagement and 4) specific hazards addressed (e.g. floods, droughts, sea-level rise).

Content analysis was used to identify core linkages between ESG strategies and climate-induced mobility. Studies were further grouped by region and sector to understand how businesses engage with adaptive capacity and resilience-building. Where ambiguity arose, full-text verification ensured validity of interpretations and policy implications.

To enhance transparency and replicability, an illustrative coding example is provided. For instance, studies addressing renewable energy access (e.g., [73, 80]) were coded with inductive labels such as “infrastructure resilience,” “energy access,” and “livelihood stability.” These were subsequently grouped under the broader theme of “indirect displacement mitigation.” Similarly, stakeholder engagement studies (e.g., [45]) were initially coded using terms such as “community participation” and “co-designed adaptation,” which informed the theme “adaptive capacity through social strategies.”

Methodological heterogeneity across the included studies was managed through a structured interpretive approach. Empirical studies were prioritised for outcome-based coding, while conceptual and case-based contributions informed thematic framing and theory development. This process enabled triangulation of evidence without conflating methodological purpose. For example, conceptual papers were primarily used to support framework design (e.g., SEMIF), while case-based examples informed the context-specific interpretation of findings. The synthesis aimed to identify convergent insights rather than aggregate effect sizes, consistent with established best practices in narrative systematic review [86].

As this review was qualitative in scope, no statistical meta-analysis or effect size estimation was conducted. Instead, a thematic synthesis approach was applied to identify cross-cutting ESG–migration patterns. While statistical modelling was not feasible due to methodological heterogeneity among the included studies, robustness was enhanced by comparing findings across ESG domains and triangulating multiple data sources. Confidence in the findings was strengthened through repeated coding cycles and thematic convergence [86].

3 Results

A total of 449 records were retrieved through database searches, with 9 additional records identified manually. After screening for relevance and quality, 58 studies were included in the final analysis. The PRISMA flow diagram (Fig. 4) outlines the selection process.

These 58 studies reflect a wide geographic scope. Sixteen address Sub-Saharan Africa (SSA) broadly, offering insights into regional trends. Fifteen focus on specific countries most frequently South Africa, Ghana, Nigeria, Somalia, Sudan, Kenya and South Sudan, where climate hazards such as drought and flooding have disrupted livelihoods and contributed to migration. Nine studies examine cross-border cases, highlighting shared challenges and transferable ESG practices. This distribution balances regional synthesis with country-level and comparative perspectives (Table 1).

The geographic and sectoral distribution of the reviewed studies in Table 1 reveals notable trends in ESG–migration research across Sub-Saharan Africa (SSA). Thirteen studies had a regional or multi-country SSA scope, with Kenya, Nigeria, and South Africa receiving the most individual country attention. Other frequently studied

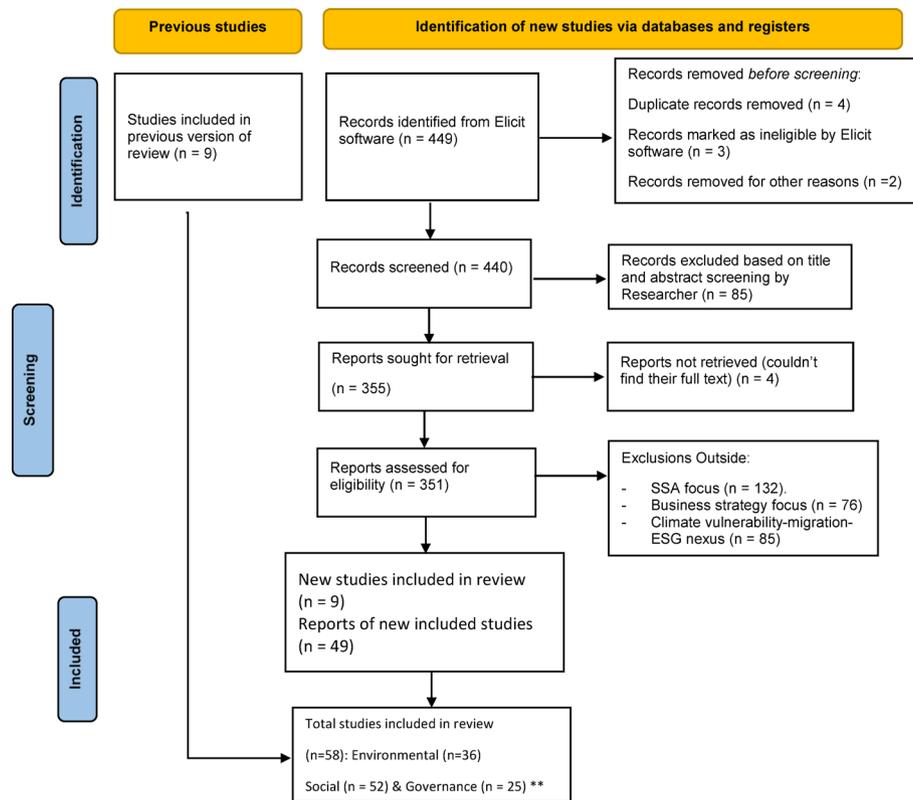


Fig. 4 The PRISMA 2020 flow diagram. **Studies included cover more than one ESG focus

countries included Ghana, Ethiopia, Tanzania, and Mozambique, reflecting their heightened exposure to climate risks and active private sector engagement. Agriculture and agri-business dominated sectoral coverage, represented in 17 studies, followed by SMEs, water management, and financial services. While some diversity in sectors and geographies is evident, the concentration of research in specific regions and industries suggests the need for broader inclusion of underrepresented countries and business sectors to develop a more comprehensive understanding of ESG strategies and climate migration dynamics across SSA.

Regarding ESG focus (Table 2), 23 studies addressed environmental strategies alone; 36 engaged with social strategies; and 12 examined governance in isolation. Twenty-one studies incorporated all three ESG pillars, and eight addressed both environmental and social dimensions. Only one study lacked clear ESG classification.

3.1 Indirect environmental strategies for climate migration

Businesses across Sub-Saharan Africa (SSA) were found to increasingly adopting environmental strategies that, while not directly framed around migration, contribute to reducing displacement risks by strengthening resilience. These strategies fall into four broad themes: regulatory motivation, emissions reduction, sustainable land use, and supply chain adaptation.

3.2 Environmental motivation factors

Climate mitigation efforts by firms are often influenced by regulatory incentives, market expectations, and global climate governance frameworks [12]. Carbon pricing, energy

Table 1 Characteristics of included studies

Study	Study Focus	Geographic Scope	Business Sector	Methodology Type
Abera et al., 2025	Agroforestry Practices reduce migration	Ethiopia	SMEs	Empirical (qualitative, case study)
Ahmad et al., (2024)	Religion-based businesses' influence on socio-environmental performance	Global (with SSA focus)	General business	Systematic review
Alemaw and Simatele, 2020	Policy integration for adaptation/mitigation	Botswana, Malawi, Tanzania, Zambia, DRC, Ethiopia, Ghana, Nigeria, South Africa	Water, agriculture, forestry, energy	Case study, policy analysis
Ansah and Sorooshian, 2019	Private sector and green economy	No mention found	Private sector	Theoretical/conceptual
Atela et al., 2018	Adaptation among female-led MSMEs in semiarid Kenya	Kenya (semiarid lands)	MSMEs (agriculture)	Case study, qualitative empirical
Börzel & Hamann, 2013	Business and climate change Governance	South Africa	No mention found	Case study, qualitative
Chanza & de Wit, 2016	IK can be deployed in the practice of climate governance.	Global	No mention found	Theoretical/conceptual
Chirambo, 2021	Social innovation for climate resilience and migration	Sub-Saharan Africa	Agribusiness, entrepreneurship	Theoretical/conceptual
Crick et al., 2018	Enabling private sector adaptation	Sub-Saharan Africa (Kenya, Zimbabwe)	SMEs (agriculture, livestock, trade)	Systematic review, conceptual
Dibal et al., 2022	IoT solutions in CSA in the context of food security	SSA	Agribusiness	Theoretical/conceptual
Erondu, 2025	Socio-economic impacts of climate displacement	Nigeria	Agriculture, fisheries	Empirical (qualitative, case study)
Gannon et al., 2022	Gendered vulnerability and adaptation of female entrepreneurs to climate risk	SSA	SMEs (agriculture, livestock, fishing, trading, processing)	Systematic review
Gerhard et al., 2023	Gender mainstreaming in climate finance	Southern Africa (SADC)	Financial institutions	Empirical (qualitative), conceptual
Gomes, 2020	Land deals, climate vulnerability, adaptation	Mozambique	Land concessions (agriculture)	Empirical (qualitative, case study)
Graham, 2020 [45]	Multi-stakeholder partnerships for climate resilience	Sub-Saharan Africa (Great Green Wall countries)	Agriculture, water management	Theoretical/conceptual
Herslund et al., 2015	Stakeholders' climate change adaptation into urban development and planning.	Tanzania & Ethiopia	General business	Systematic review
Kehinde, 2023	ESG information disclosures in healthcare sectors	SSA	Health Sector	Qualitative
Kranz, 2013	Business management strategies to adapt to climate-induced environmental changes	South Africa	General business	Empirical (qualitative), conceptual
Liedong et al., 2022	Corporate Social Responsibility (CSR) and climate change in Africa	West, Central, Southern Africa, Sahel	Agriculture	Theoretical/conceptual
Marangwanda, 2025	ESG in African insurance markets	Africa	Insurance	Theoretical/conceptual
Mash and Von Pressentin, 2024	Contribution of family physicians to African health systems	Sub-Saharan African countries	SMEs (health)	Systematic review

Table 1 (continued)

Study	Study Focus	Geographic Scope	Business Sector	Methodology Type
Moon, 2025	B-Corp and tourism business development	South Africa	Tourism	Case study, secondary data
Mukhtar et al., 2023	poverty and renewable energy potential	Sub-Saharan Africa	Energy Sector	Mixed research
Mungai et al., 2020	Climate finance for adaptation	14 Sub-Saharan African countries	Agriculture (Climate-Smart Agriculture)	Empirical (mixed methods)
Noah et al., 2024 [75]	Local community influence on corporate environmental and social accountability responses.	Nigeria	General business	Theoretical/ conceptual
Ojango et al., 2016	Characteristics of farms in CSV in relation to small ruminant (SR) production	Kenya	Small Agribusiness CVS	Empirical (quantitative)
Olajide, 2020 [79]	Migration and green SMEs in farm-family business	Nigeria	Agriculture, green SMEs	Empirical (quantitative)
Omari, 2021	Solar energy sector can offer solution for migration	Tanzania	Energy sector	Case study/
Otieno et al., 2022	Community adaptation and planetary health	Horn of Africa, East Africa, Zambia, Kenya	Agriculture	Theoretical/ conceptual
Quarshie et al., 2023	Why "formal" climate adaptation strategies fail	Ghana	Agriculture	Systematic review
Rahut et al., 2021	Coping strategies among farm households	Eastern and South-ern Africa	Agriculture	Empirical (quantitative)
Recha et al., 2017	Impact of farming practices and partnership on households' security.	Kenya	Agribusiness	Theoretical/ conceptual
Reyers & McGeoch, 2011	Finance investment in voluntary climate change mitigation.	South Africa	Finance	Qualitative
Rigaud et al., 2018	Africa Climate Business Plan progress	Sub-Saharan Africa	General business	Theoretical/ conceptual
Samy et al., 2015	public policy perspective of CSR implementation	SSA	Policy	Qualitative re-search approach
Shilomboleni et al., 2022	SMEs and climate-resilient seed systems	Eastern and South-ern Africa	Agri-business SMEs	Theoretical/ conceptual
Uduji and Okolo-obasi, 2020	CSR and youth migration in oil communities	Nigeria (Niger Delta)	Oil and gas	Empirical
Valente, 2015	Business sustainability in Higher Education Institutions (HEIs)	Kenya, Tanzania, South Africa, Egypt	Higher education	Case study/
Vinke et al., 2021	Host communities and migrants' perceptions of migration	Burkina Faso	General business	Qualitative
Vitoh and Serbeh-Boateng, 2025	ESG in Ghana's sustainable development	Ghana	Banking, SMEs	Theoretical/ conceptual
Zekarias & Zecharias, 2023	Inclusive employment for resilience	Ethiopia	Small Agribusiness	Case study

Table 2 Strategic response frameworks

Strategy type	Implementation approach	Target disruption	Reported effectiveness
Environmental Management	Integration of ESG frameworks into corporate strategies	Environmental	Limited evidence provided
Social Responsibility	CSR initiatives focusing on community development	Social	Positive impact on business value reported
Governance Enhancement	Adoption of corporate governance principles	Economic, Social	Mixed results reported
Sustainable Banking	Implementation of sustainable banking initiatives	Environmental	Positive association with financial performance
Stakeholder Engagement	Collaboration with local communities	Social	Improved social capital reported
Green Innovation	Incorporation of green technological innovation	Environmental	Reduction in environmental impacts reported
Risk Management	Development of comprehensive risk management strategies	Economic, Environmental	Limited evidence provided
Inclusive Employment	Hiring and training of disadvantaged staff	Social	Positive impact on social inclusion reported
Technology Transfer	Transfer of environmentally sound technologies	Environmental	Successful transfer reported, but limited evidence on effectiveness
Climate Finance	Mobilisation of private finance for sustainable energy	Environmental, Economic	Limited evidence on effectiveness
Sustainability Reporting	Enhanced disclosure of ESG practices	Environmental, Social, Governance	Improved transparency reported, but limited evidence on direct impacts
Community Investment	CSR initiatives targeting local development	Social, Economic	Positive impact on deterring migration reported

efficiency standards, and reputational pressures encourage firms to adopt reforms that also benefit surrounding communities. Carbon offset schemes, including those involving reforestation and sustainable aviation fuel (SAF), such as Kenya Airways’ SAF programme, illustrate how emissions reduction may also support job creation and resilience in affected areas.

Sector-specific dynamics shape firm engagement. In South Africa, many businesses pursue mitigation beyond compliance to align with international sustainability benchmarks (Reyers and McGeoch, [91]; [57]). Smaller firms, however, often require tailored support to participate effectively in such initiatives [99].

3.3 Greenhouse gas emissions reduction

Energy transition strategies are a key part of business-led climate responses. Projects like the Oya Energy Hybrid Facility in South Africa and off-grid solar–wind systems in Tanzania’s Izazi village have improved energy access while supporting small-scale enterprise development [73, 80]. These outcomes reduce economic vulnerability and strengthen the viability of voluntary immobility in high-risk areas.

3.4 Promotion of sustainable practices

Land-based strategies such as agroforestry and regenerative agriculture help diversify rural livelihoods, stabilise food production, and restore degraded ecosystems. Firms like Danone and General Mills are scaling such practices to enhance supply chain security and local resilience. Locally tailored interventions, including diverse Agroforestry Practices (Farmers adopt home gardens, alley cropping, and hedgerows, enhancing

biodiversity and soil health) in Ethiopia may reduce migration pressures by supporting agricultural stability [1].

3.5 Supply chain adaptation

Businesses are adapting supply chains in response to climate-driven shocks. In Kenya and Senegal, agribusinesses offer climate-resilient seeds and financial services to vulnerable farmers, while SMEs across Botswana, Malawi, and Zambia invest in irrigation and organic fertilisers [23, 33]. Larger firms, including Olam and Unilever, are incorporating local communities into resilience strategies, using tools like IoT and blockchain to enhance supply chain monitoring and responsiveness [29, 101]. These efforts reduce the operational risks of climate disruption while helping stabilise communities at risk of displacement.

However, these outcomes are largely inferential, as most reviewed studies did not use migration-specific indicators. Future research should test these linkages more rigorously to establish causal pathways.

3.6 Indirect social strategies for climate migration

Findings from this review show that businesses across SSA have adopted a range of indirect social strategies that enhance resilience to climate shocks, thereby helping reduce the likelihood of involuntary migration. These strategies focus on social protection programmes, health and wellbeing initiatives, and stakeholder collaboration.

3.7 Social protection programmes

Businesses are increasingly contributing to adaptive safety nets through partnerships with national programmes such as Ethiopia's Productive Safety Net Programme (PSNP), Kenya's Hunger Safety Net Programme (HSNP), and Ghana's Livelihood Empowerment Against Poverty (LEAP) programme. While originally government-led, these schemes have been enhanced by private sector involvement, improving reach and sustainability [113]. Companies also support the Climate-Smart Villages (CSVs) model in regions like Nyando and Kaffrine, integrating sustainable agriculture, water management, and local innovation [78, 89]. These initiatives stabilise rural livelihoods, making migration a less necessary adaptation strategy.

3.8 Health and wellbeing initiatives

Corporate investments in health systems also support climate resilience. Firms like Anglo American embed health delivery and public health outreach into their sustainability strategies, especially in remote or vulnerable. Anglo American's Sustainable Mining strategy includes health service delivery, workplace safety, and wellness promotion. Similarly, Safaricom's M-TIBA platform enables users to save and spend funds for healthcare, improving access in rural, climate-affected areas. Safaricom's M-Pesa service also supports pastoralist communities by facilitating access to emergency healthcare funds while on the move.

Family Physicians (FPs) have emerged as key actors in building climate-resilient, migration-inclusive health systems. They strengthen primary care and district health services, improve clinical governance, and contribute to overall community resilience (Mash, 2022).

Other businesses are prioritising employee wellbeing through health insurance, mental health support, and wellness programmes. Companies like YuLife South Africa and Business for Health Solution offer integrated wellbeing services that enhance workforce resilience and productivity. These examples reflect a growing recognition that health and wellness are vital to building adaptive capacity within both businesses and communities.

3.9 Stakeholder engagement

Review findings also highlight the importance of multi-stakeholder collaboration. Firms co-develop local adaptation strategies with NGOs, community groups, and government bodies, enhancing the legitimacy and effectiveness of interventions [45]. Examples include agroecological projects like the Chagga Homegardens and the CARE/Kenya Agroforestry Extension, which not only boost food security but also reduce environmental risks that drive migration. Emerging digital tools, such as IoT-enabled irrigation systems deployed by Twiga Foods, improve agricultural stability and represent a growing area of tech-enabled resilience [29].

While these social strategies appear to strengthen resilience, their migration impacts remain inferred rather than directly measured, highlighting a critical area for future empirical research.

3.9.1 Indirect governance strategies for climate migration

This review finds that governance-related strategies although not always labelled as climate migration responses, play a significant role in shaping business engagement with climate risk. These strategies focus on accountability, transparency, ESG performance, labour rights, and trade resilience.

3.9.2 Climate accountability

Many firms now institutionalise climate risk at board level. Moreover, by assigning oversight of climate-related risks such as environmental degradation and associated displacement, to dedicated executive governance structures, firms like MTN Group can respond more systematically to environmental pressures and protect against displacement-linked disruptions. In countries with weak regulatory frameworks, voluntary adoption of international standards like the UN Global Compact has helped embed accountability [93]. This form of governance enables firms to respond more systematically to displacement pressures tied to environmental change [75].

3.9.3 Transparency and reporting

ESG disclosure is expanding in SSA, with firms increasingly aligning with frameworks such as GRI and TCFD to report on climate action and migration-relevant risks [2]. Public tools like the World Bank's Sovereign ESG Data Portal further facilitate stakeholder access to climate migration data, strengthening accountability [45]. In some cases, businesses are also incorporating Indigenous knowledge into planning, reflecting a growing recognition that governance must account for locally grounded insights [17].

3.9.4 ESG ratings and strategic alignment

High ESG ratings correlate with stronger adaptation strategies. Companies like Safaricom, MTN Group, and Dangote Cement demonstrate how environmental and social

investments enhance both business continuity and community resilience [25, 56]. These actions ranging from emissions reduction to digital inclusion, suggest that aligning ESG with core strategy helps firms contribute to broader migration mitigation efforts [35], Bambi et al., 2024).

3.9.5 Human rights and labour practices

Governance also extends to ethical labour standards in contexts vulnerable to migration. Firms operating in agriculture and extractives face pressure to uphold human rights as displacement, land loss, and labour precarity increase [40]. Businesses are adapting to changing markets by shifting supply chains and retraining workforces, essential steps for mitigating instability in both rural and urban areas [47, 69].

3.9.6 Trade and climate resilience

Regional trade is another governance lever. Firms such as ETG and Olam help stabilise food availability during climate shocks, like the El Niño-induced drought, by facilitating cross-border commodity flows [24]. However, trade dependence introduces risks that must be managed through climate-resilient infrastructure and regional coordination (Affoh et al., 2022 [46]). Collaborative platforms, including the NCCN Harmonised Guidelines, demonstrate the potential of coordinated state-business responses to displacement (Sen and te Velde, [97]).

4 Discussion

4.1 Direct versus indirect ESG–vulnerability–migration strategies

The review highlights a persistent gap between corporate sustainability efforts and the integration of climate-induced migration concerns. While ESG strategies are increasingly adopted across SSA, migration remains a largely unaddressed outcome rather than a strategic objective. Studies by Quarshie et al. [87] and Chirambo [20] point to fragmented ESG implementation, particularly in sectors like energy and agriculture. For example, firms such as ENGIE Africa and Photons Energy Ltd. have introduced hybrid renewable energy solutions that enhance local resilience [80], yet these efforts rarely include migration metrics or targets. As climate risks intensify, scholars such as Arouna et al. [9] stress the need to embed migration-sensitive design into ESG frameworks to prevent the deepening of social and economic vulnerabilities.

4.2 Indirect ESG–migration strategies

Findings from this review indicate that most ESG strategies adopted by businesses in SSA address climate-induced migration indirectly by strengthening community resilience. In key sectors such as agriculture, energy, and supply chains, firms are deploying climate-smart innovations such as agroecological practices, renewable energy, and digital infrastructure, that mitigate displacement drivers without explicitly targeting migration outcomes.

In the agricultural sector, regenerative practices promoted by companies like Danone Southern Africa and General Mills have improved soil health and diversified rural incomes, contributing to greater livelihood stability [66]. Likewise, agroforestry initiatives such as alley cropping and homegardens, supported by ThriveAgric and Haytuns Agro Enterprise, enhance food security—an important factor influencing mobility [89].

In the energy sector, off-grid renewable projects led by G7 Renewable Energies and ENGIE Africa have expanded electricity access in underserved areas, indirectly reducing migration pressures by supporting local service delivery and economic opportunity [73, 80].

Technology further reinforces these efforts. Twiga Foods' deployment of IoT-enabled irrigation in drought-prone zones stabilises food production, reducing migration linked to agricultural collapse [29]. These examples support Renaud et al.'s [90] argument that climate mobility must be addressed through the interplay of environmental disruption and social systems.

Nonetheless, ESG implementation varies widely across the region. Countries like Ghana and South Africa exhibit stronger ESG integration, supported by more robust institutional frameworks, while regulatory and capacity gaps in other contexts limit adoption [91]. While business-led strategies are helping to reduce vulnerability, they remain largely migration-blind. These findings point to the need for more deliberate integration of mobility considerations into ESG design, implementation, and monitoring frameworks.

4.3 Environmental strategies and climate migration outcomes

This review finds that environmental strategies adopted by businesses in SSA often contribute to climate risk mitigation and local resilience, though they rarely include climate-induced migration as an explicit objective. While outcomes such as reduced vulnerability and improved livelihoods may plausibly reduce displacement pressures, the evidence remains largely correlational rather than causal.

For example, carbon offset and low-emission transition programmes, such as Kenya Airways' Sustainable Aviation Fuel initiative, create green jobs and strengthen supply chains. While these outcomes can indirectly support household stability, studies do not empirically link them to reduced migration [87]. Similarly, hybrid renewable energy systems deployed in South Africa and Tanzania by firms like ENGIE Africa improve access to electricity in underserved areas [80], which can lower livelihood stress and reduce the need for migration. Yet, without migration-specific indicators, these outcomes remain inferential.

Nature-based approaches provide a closer, though still indirect, alignment. Regenerative agriculture and agroforestry projects by companies such as Danone Southern Africa and General Mills promote food security and income diversification, two key levers of immobility in rural contexts [66]. Traditional systems like the Chagga Homegardens and alley cropping with *Acacia albida* enhance ecological and economic resilience in climate-exposed regions [39] and are increasingly adopted in business–community partnerships. These strategies may show an emerging potential for migration-sensitive design, but few have been evaluated for actual displacement-related outcomes.

Despite growing adoption, many environmental ESG initiatives remain fragmented and poorly aligned with mobility indicators. Institutional, regulatory, and investor-driven ESG compliance often prioritises mitigation and reputational returns over social vulnerability reduction [57]. As a result, displacement-related co-benefits tend to be incidental rather than intentional.

To strengthen the evidence base and inform business-led migration-sensitive ESG design, there is a need for more systematic integration of mobility metrics into

environmental interventions. This includes embedding indicators such as household movement patterns, access to land and livelihoods, and service delivery improvements into monitoring frameworks. Without such intentional alignment, the potential for environmental ESG strategies to meaningfully address climate-induced migration risks will remain largely theoretical.

4.4 Social strategies and climate migration outcomes

This review finds that social strategies particularly those related to health, education, protection, and stakeholder engagement, offer some of the most proximate entry points for addressing the drivers of climate-induced migration. While few initiatives are explicitly framed as mobility interventions, their contributions to adaptive capacity, livelihood stability, and access to essential services may suggest potential for reducing migration pressures. However, it is important to emphasise that most of these links are inferential, with limited direct evidence demonstrating causality between social ESG actions and displacement outcomes.

Health investments by firms such as Anglo American and Safaricom including platforms like M-TIBA, improve healthcare access in climate-vulnerable areas (Asaka and Smucker, 2016; Jenkins and Yakovleva, 2006). These initiatives enhance well-being and service delivery, factors that may indirectly reduce migration incentives. Similarly, mobile financial services like M-PESA facilitate climate-responsive remittances and emergency coping strategies. While these tools expand adaptive options, the extent to which they actively shape migration decisions remains under-evaluated in the literature.

Multi-sector community programmes like Climate-Smart Villages (CSVs) in Kenya and Senegal, implemented with support from agribusinesses and CGIAR, integrate interventions across water, agriculture, and livelihoods to promote in situ adaptation [78, 89]. Businesses are also engaging in agricultural insurance and conservation practices in high-risk regions, contributing to resilience against environmental shocks [3]. Yet, few studies measure how these initiatives impact mobility metrics such as migration rates, displacement reduction, or voluntary return.

A further limitation is the disconnection between social impact and formal ESG governance. Many socially beneficial interventions including YuLife's wellness programmes or private-sector support for government safety nets like PSNP or LEAP, fall outside ESG reporting frameworks, limiting accountability and evaluation [95]. Without integration into ESG indicators, it becomes difficult to assess their effectiveness in managing systemic climate vulnerabilities that lead to migration.

Nonetheless, where social strategies are embedded within long-term stakeholder engagement and participatory planning, they appear to generate stronger outcomes. Co-produced projects like the CARE/Kenya Agroforestry Extension programme enhance local ownership and service access, conditions known to stabilise populations [45]. Similarly, businesses that integrate smallholders into value chains, such as ThriveAgric and Olam, promote income diversification and resilience in vulnerable rural contexts (Habani and Kamaruddin, 2021). These examples suggest that social ESG strategies, when properly structured and monitored, can serve as effective buffers against involuntary migration.

Overall, while the potential for social strategies to support migration-sensitive adaptation is evident, empirical validation remains limited. Future studies should incorporate

migration-relevant indicators into project design and ESG reporting to better assess causal pathways. Without this, the relationship between social investment and displacement reduction remains suggestive rather than conclusive.

4.5 Governance strategies and climate migration outcomes

This review finds that governance-related ESG strategies such as climate accountability, transparency, ethical labour practices, and trade-based resilience, are the least developed in relation to climate-induced migration in SSA. While many firms are gradually aligning with international ESG reporting standards, few explicitly incorporate migration risk into corporate governance systems. The connections between governance action and mobility outcomes therefore remain largely inferential and under-evaluated.

Some progress is visible at the board level. Companies such as MTN Group and Safaricom demonstrate growing commitment to sustainability through board-level climate oversight and disclosures aligned with frameworks like the Task Force on Climate-related Financial Disclosures (TCFD) and Global Reporting Initiative (GRI) [111]. However, these frameworks rarely include migration-sensitive indicators, and displacement risk is typically not treated as a material governance concern. The Development Bank of Rwanda's integration of climate migration into its risk disclosures remains an exception rather than standard practice [45].

Similarly, while high ESG ratings may signal corporate responsibility, they do not guarantee alignment with climate mobility goals. For instance, companies like Dangote Cement and Nedbank receive strong ratings based on energy transitions and community investment [2], yet their governance systems do not measure outcomes such as reduced displacement or improved service access for vulnerable populations. Without such indicators, the assumed benefits for climate-affected communities remain speculative.

Some firms are adopting inclusive governance practices through ethical trade and responsible sourcing. Unilever and Nestlé, for example, implement policies that promote human rights, fair labour, and supplier integration, measures that address some structural drivers of displacement (Armitage et al., 2017; [59]). Likewise, trade facilitation efforts by Export Trading Group and Olam International help maintain food system stability during climate shocks, reducing migration triggers in food-insecure regions (Affoh et al., 2022 [66]). These examples suggest potential, but the causal links between governance structures and mobility outcomes remain under-researched.

Crucially, weak institutional environments in many SSA countries constrain the scope and effectiveness of corporate governance contributions. As Forje and Tchamba [40] argue, the absence of coherent state-led regulation undermines consistent private sector engagement with climate risks, including migration. This fragmentation limits the institutional anchoring of governance strategies, often reducing them to voluntary, compliance-driven exercises rather than mechanisms of systemic adaptation.

In sum, while there is emerging evidence that governance-focused ESG interventions may contribute to climate migration resilience, the pathways remain under-theorised and empirically weak. This review acknowledges that most governance strategies are not designed with migration in mind, and where potential connections are identified, they are based on indirect linkages rather than direct causality. Future research and corporate practice would benefit from the integration of migration-sensitive governance indicators into ESG frameworks, enabling businesses to evaluate how governance reforms

affect displacement drivers and adaptive capacity. Without such integration, the potential role of ESG governance in mitigating migration remains underdeveloped and largely untapped.

4.6 Stakeholder engagement and governance

This review further highlights the critical role of stakeholder engagement in shaping effective ESG strategies that support resilience and address climate-induced migration. In the SSA context, where institutional capacity is often fragmented and public service delivery remains uneven, multi-stakeholder partnerships offer a viable pathway for embedding local knowledge and securing legitimacy for ESG actions.

Collaborations between businesses, communities, and policymakers are particularly effective in bridging the disconnect between strategic ESG planning and lived climate vulnerability. For example, Graham [45] demonstrates how co-designed interventions, when implemented through partnerships with affected communities, foster shared ownership and enhance implementation capacity. Evidence from Kenya similarly shows that participatory approaches to corporate social responsibility (CSR) and inclusive employment practices increase the social acceptability and sustainability of ESG initiatives in rural areas (Uduji and Okolo-Obasi, 2020).

Gender mainstreaming also emerged as a recurrent theme in governance-related interventions. As Gerhard et al. [43] argue, private-sector strategies that incorporate gender-sensitive approaches into climate finance and adaptation planning produce more equitable outcomes. This is particularly relevant in climate-affected sectors like agriculture and informal labour markets, where women are both disproportionately impacted and strategically positioned to lead local resilience efforts.

Nonetheless, persistent governance challenges constrain the broader uptake and effectiveness of these practices. Fragmented institutional mandates, regulatory overlaps, and limited technical capacity undermine the coherence of ESG frameworks and inhibit the integration of migration-sensitive indicators into corporate governance. This is consistent with broader findings in the review that ESG strategies, while evolving, remain largely migration-blind in both design and evaluation [37, 48].

Importantly, these challenges are not merely operational but structural. Many SSA countries lack comprehensive policy frameworks that explicitly guide businesses on climate migration, leaving firms to rely on voluntary reporting schemes such as GRI and TCFD, which do not yet mandate mobility-related disclosures. In this context, stakeholder engagement becomes a compensatory mechanism, filling governance gaps and helping businesses identify locally relevant adaptation priorities.

This review suggests that more integrative and accountable governance mechanisms are needed to move beyond reputational ESG compliance. Embedding stakeholder engagement into formal ESG governance, through inclusive planning, participatory monitoring, and gender-responsive evaluation, can enhance the operational relevance of ESG strategies and support more deliberate pathways for addressing the root causes and consequences of climate-induced displacement.

4.7 Regional implementation patterns

The analysis reveals distinct regional patterns in how ESG strategies are adopted and operationalised across SSA. In East and Southern Africa, ESG interventions are most

linked to agricultural adaptation and seed systems. Studies from Kenya, Tanzania, and Mozambique report widespread use of climate-smart agriculture and agroecological practices that help stabilise food systems and reduce displacement pressures [88, 99]. These regions also show stronger institutional frameworks for coordinating public–private action on resilience.

In contrast, West Africa's ESG engagement is more visible in CSR and migration-related interventions. For example, Uduji and Okolo-Obasi (2020) and Liedong et al. [62] document business-led livelihood and employment programmes designed to address youth vulnerability and migration pressures. Urban adaptation strategies are increasingly studied in Ethiopia and Tanzania, where infrastructure stress and population growth intersect with climate vulnerability [48]. Southern Africa, particularly South Africa and Namibia, shows more advanced integration of ESG principles within the insurance and financial sectors, including sustainability-linked lending and green product innovation [43, 63].

These regional variations reflect differences in institutional capacity, sectoral exposure to climate risks, and market maturity. They also highlight the importance of tailoring ESG–migration strategies to context-specific governance and development priorities. However, despite these promising efforts, implementation remains uneven across the continent. Persistent structural, financial, and institutional barriers continue to hinder the integration of migration-sensitive approaches into ESG frameworks.

4.8 Barriers to ESG–migration alignment and pathways for integration

While ESG strategies are gaining traction in SSA, this review highlights persistent barriers to their alignment with climate migration goals. These include ambiguous ESG standards, weak regulatory enforcement, and limited institutional capacity especially among SMEs, which often lack the resources to interpret or apply ESG frameworks [5, 32].

Fragmented environmental regulation and the dominance of informal economies [110] further undermine implementation. Informal labour and supply chains are typically excluded from ESG reporting, complicating accountability and compliance. Larger firms also struggle to bridge formal ESG requirements with informal business realities. The absence of reliable data on mobility compounds these difficulties, restricting firms' ability to assess and respond to displacement risks [104].

Cultural perceptions present another barrier. ESG is often seen as externally imposed and misaligned with local priorities, reducing buy-in (Chanza and de Wit, 2026). However, when ESG frameworks are adapted to reflect local values, as in some South African firms, implementation improves [104].

Addressing these challenges requires simplified and contextualised ESG standards, capacity-building for SMEs, and improved data on climate mobility. Greater transparency, integration of local knowledge, and alignment with national adaptation goals can help businesses move beyond compliance and toward meaningful climate–migration action.

4.9 Financing ESG strategies for climate migration

A central barrier to ESG–migration integration in SSA remains the lack of financial capacity, particularly among SMEs. Many businesses are unable to fund large-scale adaptation or resilience initiatives due to limited access to affordable capital. Blended finance

models such as green bonds and sustainability-linked loans offer one potential solution by leveraging public and private funds to support scalable, low-carbon infrastructure [18]. Debt-for-climate swaps, already gaining traction in highly indebted, climate-vulnerable countries, can further unlock resources by linking debt relief to environmental action, provided ESG criteria are embedded in financing terms to ensure accountability.

Public–private partnerships (PPPs) can also play a catalytic role in supporting ESG investment aligned with climate migration goals. When paired with robust disclosure standards and transparent reporting, PPPs help de-risk investments, attract sustainability-focused capital, and expand cross-sector implementation capacity [18, 55]. However, the success of these financial innovations hinges on their alignment with inclusive governance and participatory planning. ESG strategies must be embedded in broader adaptation frameworks that enable businesses to contribute not only to risk reduction but also to equitable and resilient development pathways.

4.9.1 Interpreting the evidence: correlation, not causation

This review synthesises diverse sources that highlight the relationship between ESG strategies and climate-induced migration in SSA. However, it is important to clarify that the evidence reviewed is primarily qualitative and inferential in nature. The connections identified between ESG practices and migration-related outcomes should be understood as correlational rather than causal. While the analysis reveals consistent patterns in which ESG interventions particularly in agriculture, energy, and technology, to livelihood stability and reduce displacement pressures, these outcomes are not directly measured or evaluated as causal effects in the original studies. The conclusions presented here are therefore based on a synthesis of reported associations and policy-relevant insights, rather than on statistically validated causation. This evidentiary framing is important for interpreting the utility of the SEMIF framework and for guiding future empirical research that may test these linkages more rigorously.

4.9.2 Incorporating climate migration principles into ESG strategies in SSA

This review highlights an urgent need for businesses in Sub-Saharan Africa (SSA) to formally integrate climate migration considerations into their Environmental, Social, and Governance (ESG) strategies. Although ESG frameworks are increasingly used to guide sustainability practices across sectors, few currently account for the displacement risks posed by climate-related disruptions. The evidence gathered in this review reveals a persistent gap between business-led resilience efforts and the region's escalating mobility pressures.

Nowhere is this misalignment more evident than in the agriculture sector. Climate change is driving rising temperatures, erratic rainfall, and land degradation, factors that have already begun to undermine food production and accelerate rural–urban migration [100]. Projections suggest that by 2080, SSA will be home to a substantial share of the world's food-insecure population [68]. Integrating migration-sensitive principles into ESG strategies allows agribusinesses to move beyond generic resilience-building and directly address the drivers of displacement. By supporting climate-resilient production systems, businesses can contribute to stabilising rural livelihoods and may reduce the need for migratory coping strategies.

The energy sector presents a related challenge. Limited access to reliable and affordable energy exacerbates socio-economic vulnerability and heightens the impact of environmental stress. Fluctuating fuel markets and poor infrastructure further compromise energy security, especially in rural and peri-urban regions. ESG strategies that invest in inclusive, durable, and low-carbon energy solutions may help bridge this gap. By enhancing energy access in climate-affected areas, these interventions may simultaneously improve local adaptive capacity and support community-level resilience, particularly reduce the pressures that drive displacement [73].

Building on these sectoral insights, digital and telecommunications technologies offer important complementary tools. Digital platforms can enable early warning systems, remote healthcare (telemedicine), and mobile-based financial services, all of which enhance local adaptive capacity under climate stress. When deployed strategically, these tools may support communities in situ by improving access to critical services, facilitating preparedness, and reducing the push factors that lead to forced migration [103].

To operationalise these insights, this study proposes the Sustainable ESG–Migration Integration Framework (SEMIF), a five-stage model to help businesses in SSA systematically embed climate migration considerations into their ESG strategies. SEMIF (Fig. 5) emphasises sustainability not only in environmental terms, but also in how businesses approach risk, resilience, and long-term value creation. Unlike conventional, static and linear strategy planning tools [13, 71], SEMIF is designed as an iterative and adaptive process, where each stage reinforces the others and responds to evolving climate and migration dynamics.

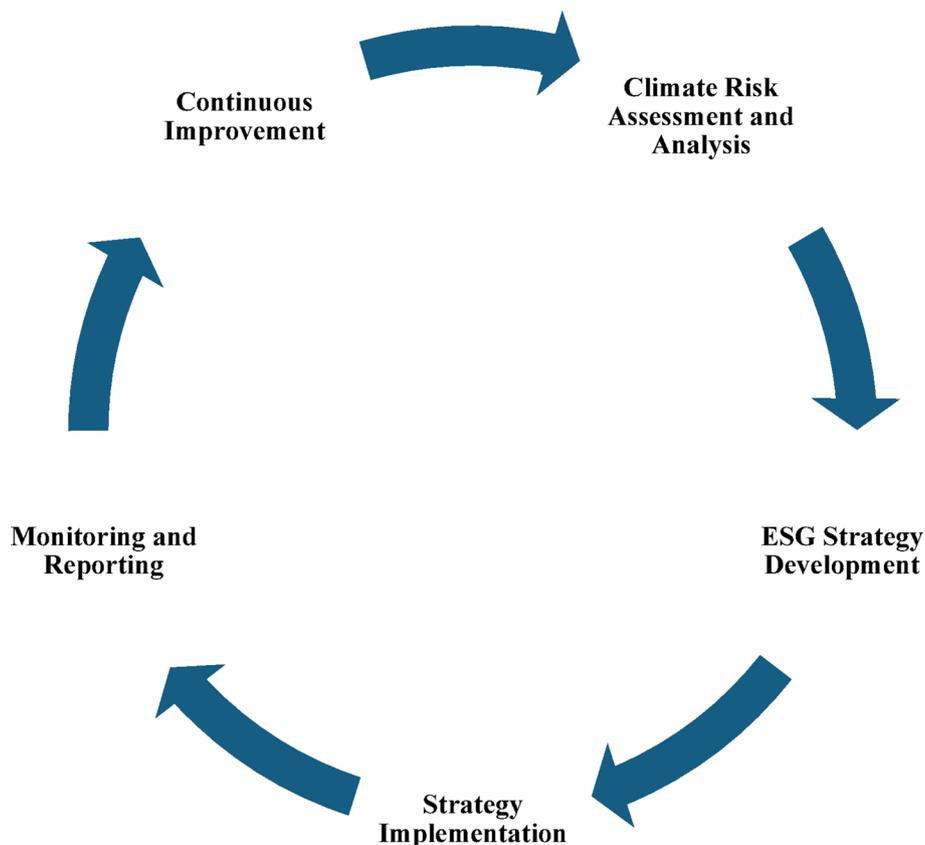


Fig. 5 Sustainable ESG–migration integration framework (SEMIF)

Box 1: Illustrative application of SEMIF in the agriculture sector (Ghana)

A mid-sized agribusiness operating in northern Ghana is expanding its regenerative agriculture programme as part of its ESG strategy. Applying SEMIF, the company conducts a baseline assessment (Stage 1) of climate risk exposure, revealing rising heat stress and declining rainfall as drivers of yield loss and rural out-migration. In Stage 2, the firm identifies stakeholders including local farmers, municipal leaders, and a regional NGO focused on migration

During Stage 3, the firm co-designs interventions such as drought-tolerant crops, soil regeneration training, and mobile irrigation technology. It also integrates migration-sensitive indicators such as seasonal mobility rates, farmers' stated migration intentions, and access to local services (water, extension services)

Stage 4 involves piloting these initiatives in three districts, with ESG reporting updated to include migration metrics. After one year, monitoring shows a 15% increase in yield, improved water access, and a reduction in household migration intentions

Finally, in Stage 5, the company conducts an impact review and shares results with local stakeholders, feeding lessons into regional planning processes

For SMEs, SEMIF's flexibility is particularly important. For example, a small agribusiness in a drought-prone region could focus on sourcing water-efficient inputs and training local workers on soil resilience practices, without needing full-scale ESG reporting infrastructure. The strategy development stage allows SMEs to set incremental goals and gradually build capacity around displacement-sensitive ESG action, aligned with community needs and resource availability

1. Stage 1 (Climate risk assessment and analysis): focuses on evaluating how climate risks and displacement trends intersect with business operations, supply chains, and workforce dynamics. Firms are encouraged to map exposure and vulnerability across operational sites, particularly among informal workers and at-risk communities. Engaging stakeholders during this stage especially those directly affected by mobility pressures, ensures that emerging strategies are grounded in actual needs and context [51].

To overcome data limitations and the invisibility of actors in informal economies, SEMIF promotes the use of non-traditional data sources, such as participatory mapping, community feedback tools, mobile phone data, and NGO-collected records. These sources enable businesses to identify climate–mobility hotspots, assess displacement risks, and establish a baseline for migration-sensitive ESG planning. In contexts where formal statistics are weak or absent, this stage empowers firms to generate contextually valid evidence and connect with local knowledge systems that inform mobility-aware sustainability efforts.

2. Stage 2 (ESG strategy development): focuses on translating climate–mobility risk assessments into actionable ESG strategies. Drawing from sectoral insights, businesses are guided to develop goals that reduce climate vulnerability and support at-risk or displaced populations, for example, through emissions targets, livelihood programmes, or ecosystem restoration [7]. Crucially, SEMIF positions climate migration not as a peripheral concern but as a core ESG risk dimension.

For small and medium enterprises (SMEs), which often operate in informal economies and lack ESG expertise or regulatory clarity, SEMIF offers a simplified, stepwise entry point. Instead of relying on complex global standards, the framework supports the development of context-appropriate, migration-sensitive goals such as improving water access, supporting climate-resilient local jobs, or reducing exposure in supply chains. These goals are co-developed with local stakeholders and aligned with national priorities. Scenario planning is encouraged to anticipate both direct and indirect mobility impacts. By embedding flexibility and practicality, SEMIF helps SMEs prioritise material

risks and implement feasible interventions, making meaningful ESG–migration alignment possible even in low-capacity governance environments.

3. Stage 3 (Strategy implementation): focuses on translating ESG–migration strategies into action through clear timelines, resource allocation, and internal accountability. As shown in the review, firms such as Safaricom and MTN have operationalised ESG through employee wellbeing programmes, energy transitions, and inclusive outreach initiatives, reinforcing both business value and community resilience (Holuša et al., 2022).

SEMIF enables businesses to mainstream migration-sensitive goals across core functions including HR, procurement, and operations, while aligning these efforts with sustainability teams and risk management units. This harmonisation supports practical execution in contexts marked by regulatory ambiguity. The framework encourages firms to embed resilience and displacement indicators directly into operational targets, facilitating integration with voluntary reporting standards such as the Global Reporting Initiative (GRI) or the Task Force on Climate-related Financial Disclosures (TCFD), even where formal governance is limited. By embedding mobility considerations into implementation structures, SEMIF ensures that migration is not treated as a peripheral concern but as a central driver of ESG performance.

4. Stage 4 (Monitoring and reporting): institutionalises accountability by mandating the use of migration-sensitive governance indicators, such as rates of involuntary displacement, access to basic services for mobile populations, and resilience outcomes linked to ESG interventions. These metrics move beyond conventional ESG reporting by requiring firms to collect, disaggregate, and disclose data on climate–mobility risks. To support implementation in low-capacity contexts, SEMIF promotes simplified, locally adaptable indicators that reflect regional vulnerabilities and sectoral realities, such as access to climate-related services, livelihood stability, and stakeholder feedback. In doing so, the framework shifts ESG reporting from reputational or voluntary disclosure toward structured, outcome-oriented governance aligned with climate migration priorities. Firms are guided to benchmark progress against international frameworks (e.g. GRI, TCFD) while embedding culturally sensitive feedback loops that reinforce local legitimacy and trust. This stage also strengthens institutional capacity by filling the metric vacuum left by weak enforcement and fragmented environmental governance, particularly in Sub-Saharan African contexts.
5. Stage 5 (Continuous improvement): consolidates the SEMIF logic by embedding adaptive governance practices that respond to evolving climate and migration dynamics. It calls for institutionalised feedback mechanisms, such as stakeholder engagement, iterative evaluation, and integration of emerging science, to ensure firms remain aligned with national adaptation planning and real-time risks [55]. Critically, this stage incorporates stakeholder engagement as a core pillar, recognising that weak public institutions, fragmented mandates, and limited regulatory coherence inhibit effective ESG–migration integration. SEMIF guides businesses to initiate structured dialogue with policy actors, civil society, and vulnerable communities, enabling them to validate indicators, co-create governance knowledge, and advocate for stronger policy environments. Through these mechanisms, SEMIF transforms firms from passive ESG adopters into co-architects of adaptive futures, capable of influencing

governance systems and reinforcing the regulatory ecosystem rather than working around it. This creates an internal–external feedback loop, linking corporate learning with systemic change.

Through continuous improvement, businesses are encouraged not only to refine internal ESG practices but also to engage proactively with governments, civil society, local communities, and development partners to shape enabling environments for mobility-sensitive sustainability. This includes:

- Participating in policy co-creation forums to align ESG practices with national climate adaptation and migration frameworks;
- Co-producing evidence and sharing data on displacement risks, service access, and ESG impact with public institutions and researchers;
- Advocating for regulatory reforms that embed migration-relevant indicators within ESG disclosure requirements;
- Supporting SME and community capacity-building through training, technical assistance, and inclusive partnerships.

By embedding stakeholder engagement into the Continuous Improvement stage, SEMIF positions businesses not only as implementers of ESG but also as institutional actors with a legitimate role in influencing systemic change. This enhances the framework's capacity to close the governance gaps outlined in the review and reinforces its long-term orientation. It also supports iterative learning and collaborative accountability, both of which are essential in navigating the complexity of climate-induced migration in SSA.

The SEMIF is proposed as a strategic guide to support businesses in SSA in embedding climate mobility concerns into ESG planning. Rather than a linear tool, SEMIF offers a cyclical and adaptive structure that enables firms to iteratively respond to dynamic environmental conditions and displacement risks. It builds on current ESG and climate mobility literature while addressing the persistent absence of migration-sensitive logic in business-led adaptation strategies.

SEMIF is not presented as a validated or prescriptive model, but as a flexible roadmap that can evolve alongside emerging risks, data, and policy frameworks. By foregrounding migration-related risks such as displacement, mobility as adaptation, and service access, it guides firms to align ESG interventions with measurable resilience outcomes. Its five stages encourage businesses to assess exposure, design relevant interventions, integrate migration indicators into ESG plans, evaluate impacts using context-specific metrics, and refine strategies through feedback loops. In doing so, SEMIF repositions ESG as a deliberate vehicle for climate mobility-responsive adaptation.

The framework is intentionally designed to be adaptive across diverse regulatory, institutional, and environmental contexts within SSA. Recognising the regional implementation patterns discussed earlier such as stronger ESG adoption in Southern Africa due to more robust governance, or innovation-led approaches in East Africa, the SEMIF allows for contextual tailoring at each stage. For example, in regions with limited regulatory enforcement or data availability, the Assessment stage may rely more heavily on stakeholder coproduction and community-led diagnostics. In contrast, regions with more advanced ESG ecosystems can leverage formal disclosures and climate mobility modelling. Similarly, the Integration and Evaluation stages can be aligned with country-specific ESG reporting regimes or sectoral policy instruments, such as agriculture resilience

frameworks or energy access plans. This regional flexibility ensures that SEMIF does not promote a one-size-fits-all solution but instead offers a scalable roadmap that responds to institutional capacity, sectoral exposure, and governance maturity across the continent.

The following illustrative case offers a practical example of how SEMIF could be applied in a specific sector and regional context.

4.9.3 Recommendations for future research and practice

In response to the growing urgency of climate-induced migration and the expanding role of the private sector in sustainability, this review recommends a shift toward migration-sensitive ESG frameworks in SSA.

First, ESG strategies should move beyond a narrow focus on environmental mitigation and explicitly address the interconnectedness of environmental risks, social vulnerability, and governance limitations. As demonstrated in this review, ESG interventions particularly in sectors such as agriculture, energy, and trade, may contribute to stabilising livelihoods and creating conditions that reduce the likelihood of climate-induced migration. However, these contributions are often indirect and remain under-recognised and insufficiently measured in current ESG reporting and evaluation frameworks.

Improved data systems are critical. Localised evidence using tools such as geospatial modelling, participatory vulnerability mapping, and behavioural analysis of mobility decisions can inform more precise ESG risk assessments and interventions [16]. These methods are especially relevant in contexts of involuntary immobility, where populations remain trapped under increasing environmental stress.

There is also a need to transition from reactive ESG planning toward proactive, co-designed resilience strategies. Cross-sector partnerships including businesses, governments, NGOs, and development agencies, should support integrated adaptation planning across health, food systems, infrastructure, and education. These partnerships require governance mechanisms that ensure transparency, accountability, and alignment with global commitments such as the Cancun Adaptation Framework, Global Compact for Migration, Sendai Framework, and the Paris Agreement. As demonstrated throughout this review, businesses in SSA have a direct interest in mitigating migration-related risks to secure supply chains, labour markets, and regulatory legitimacy.

Finally, evidence suggests a positive correlation between ESG investment and business performance. Firms that incorporate sustainability and resilience into their core operations benefit from reduced long-term risk and improved stakeholder trust [67]. Embedding climate migration into ESG frameworks enhances these gains, positioning businesses not only as beneficiaries of resilience but as co-architects of adaptive futures.

5 Conclusion

This review expands the literature on climate-induced migration by examining how businesses in SSA are engaging with ESG strategies to address displacement risks. While previous research has largely focused on state-led responses [90], this study highlights the indirect but growing role of private sector actors in building climate resilience through ESG-aligned interventions. Notable examples include climate-smart agriculture, digital health platforms, and renewable energy initiatives, which collectively contribute to

community stability and reduce the pressures that drive migration (Aggarwal et al., 2018 [103]).

Despite these advances, ESG strategies in SSA seldom explicitly address migration. Structural challenges, including fragmented policy environments, limited SME capacity [5], and weak ESG disclosure frameworks [95], impede wider adoption and alignment with climate mobility governance. The dominance of informal economies and the perception of ESG as externally driven further complicate implementation [110]. Importantly, because most ESG interventions are not explicitly designed with migration indicators, their impacts on migration should be interpreted as indicative rather than causally established. Future research is needed to rigorously test these relationships and develop metrics that capture mobility outcomes.

To address these gaps, this study proposes the Sustainable ESG–Migration Integration Framework (SEMIF), a five-stage, adaptive model for integrating migration concerns into ESG planning. The SEMIF framework encourages businesses to treat climate migration not as an external risk but as a core component of sustainability, embedded within ongoing ESG assessment, implementation, and learning. This approach moves beyond traditional linear planning models by emphasising continuous improvement, participatory engagement, and locally informed risk analysis.

The review reinforces growing calls for private sector involvement in climate adaptation frameworks, including the Cancun Adaptation Framework, the Global Compact for Migration, and the Paris Agreement. It also demonstrates that aligning ESG strategies with mobility-sensitive development goals can enhance both corporate resilience and social outcomes.

To move SEMIF from a conceptual roadmap to a validated tool, future research should prioritise empirical testing across diverse business contexts in SSA. Longitudinal case studies and participatory action research can offer insights into how ESG actions shape mobility outcomes and expose barriers to adoption, especially among SMEs and informal actors. Developing and field-testing migration-sensitive ESG indicators such as displacement risk reduction, livelihood stability, and access to basic services, will be critical for operationalising the framework's five stages. Cross-sector partnerships that bridge public and private climate governance will also be essential. As businesses adapt to intensifying climate risks, embedding migration into ESG strategy offers a pathway to strengthen resilience, safeguard livelihoods, and promote more equitable climate transitions.

Acknowledgements

The author thanks Professor Robert McLeman from the Department of Geography and Environmental Studies at Wilfrid Laurier University – Canada, for his support in adopting the Intergovernmental Panel on Climate Change's (IPCC) propeller approach (McLeman et al., 2021) for this paper. Their comments greatly improved the paper and provided valuable insights into the author's future strategic sustainability migration focus.

Author contribution

The Author conceptualised and designed the study, conducted the data analysis, and wrote both the initial and final drafts of the manuscript. The author critically revised the manuscript for intellectual content and gave final approval of the version to be published. All authors agree to be accountable for all aspects of the work.

Funding

This research received funding from the International Science Partnerships Fund (ISPF).

Data availability

No datasets were generated or analysed during the current study.

Declarations

Ethics approval

Not applicable.

Consent to Participate

Not applicable.

Consent to Publish

Not applicable.

Clinical trial number

Not applicable.

Competing Interests

The authors declare no competing interests.

Received: 21 July 2025 / Accepted: 24 November 2025

Published online: 24 January 2026

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