



Integrating Climate Resilience into Primary Care: A Review of Opportunities within South Africa's National Health Insurance Framework (2021–2026)

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Abstract

Climate change poses a significant and escalating threat to public health in South Africa, exacerbating disease burdens and straining a fragmented health system. This review examines the critical opportunity to integrate climate resilience strategies into primary healthcare (PHC) through the ongoing development of the National Health Insurance (NHI) framework. Employing a narrative synthesis, we systematically analysed peer-reviewed literature, government policy documents, and relevant grey literature published between 2021 and 2026. A structured search strategy was executed across academic databases, with clear inclusion criteria focusing on NHI implementation phases and climate adaptation in the South African health sector. The analysis identifies convergent priorities, revealing that the NHI's emphasis on strengthening PHC, community-oriented care, and infrastructure presents a strategic platform for mainstreaming specific climate interventions. Evidence from the literature substantiates the potential for integrating early-warning systems for climate-sensitive diseases, clinic-level heat-health action plans, and targeted training for healthcare workers on climate-related health impacts. The argument posits that without such deliberate integration, the NHI's goals of equitable access and universal health coverage will be undermined by escalating climate shocks. The review concludes that the current policy window is crucial for embedding climate resilience into the core of South Africa's health system redesign, offering a model for other nations seeking to build robust, responsive, and equitable health systems.

Keywords: *Climate resilience, National Health Insurance (NHI), primary healthcare, Sub-Saharan Africa, health systems adaptation, policy integration, environmental health*

INTRODUCTION

South Africa faces a dual challenge: building a resilient, equitable healthcare system through National Health Insurance (NHI) while simultaneously confronting escalating public health threats from climate change ([2022 & sides., 2023](#)). Although these policy domains often develop in parallel, a

critical research gap exists in understanding how the NHI's implementation can be strategically leveraged to mainstream climate adaptation into primary healthcare (PHC). This gap is significant, as PHC is the frontline for climate-sensitive health impacts, from vector-borne diseases to heat-related morbidity ([Nyahunda, 2024](#); [Addaney et al., 2023](#)). While existing literature acknowledges the intersections of health policy and climate governance, analyses remain siloed. Studies on NHI predominantly focus on financing, governance, and service delivery models ([Mkhwanazi, 2024](#); [Naidoo et al., 2024](#)), whereas climate adaptation research emphasises environmental policy and disaster management, often with only peripheral consideration of healthcare system integration ([Kamwendo, 2023](#); [Khavhagali et al., 2023](#)). Consequently, there is insufficient scholarly attention on the NHI as a concrete platform for operationalising climate-resilient healthcare.

This article addresses this gap by arguing that the phased implementation of the NHI presents a unique, strategic opportunity to systematically embed climate resilience into the core of PHC service delivery ([Addaney et al., 2023](#)). It posits that the NHI's frameworks for facility accreditation, health workforce development, and integrated care coordination can be designed to incorporate climate adaptation priorities, thereby future-proofing the healthcare system ([Akinrinde & Telukdarie, 2024](#)). The argument is supported by emerging evidence suggesting that policy coherence between health and climate action is essential for sustainable development ([Akinrinde & Telukdarie, 2024](#); [Maphunye & Dibie, 2025](#)). For instance, the integration of early-warning systems for extreme weather events into NHI-contracted facilities could enhance preventative care ([Makungo & Nkuna, 2023](#)), while climate-informed health promotion is aligned with the NHI's emphasis on preventative and community-oriented primary care ([Mukudu et al., 2023](#); [Sithole, 2023](#)). However, significant contextual divergences and implementation challenges are noted, including governance fragmentation, resource constraints, and varying stakeholder perspectives ([OBISANYA & JEGEDE, 2025](#); [Mpanza & O'Keeffe, 2024](#)). This article will synthesise the literature to develop a coherent argument for this convergence, examining the mechanisms through which NHI implementation phases can catalyse tangible climate resilience actions within South Africa's PHC sector.

OVERVIEW OF THE FIELD

The existing literature reveals a growing, yet fragmented, scholarly interest in the intersections between health system reform, climate adaptation, and primary healthcare (PHC) in South Africa ([Fortoen, 2024](#)). A significant strand of research analyses the National Health Insurance (NHI) as a transformative policy framework, focusing on its governance, financing, and implementation challenges ([Mkhwanazi, 2024](#); [Mokoena & Naidoo, 2024](#)). Concurrently, a separate body of work examines the escalating health threats posed by climate change and the imperative for adaptive responses within the health sector, often highlighting the critical role of PHC ([Addaney et al., 2023](#); [Nyahunda, 2024](#)). However, a distinct research gap exists in synthesising these two policy domains. Few studies explicitly investigate how the NHI's implementation could be strategically leveraged to institutionalise climate resilience within frontline health services.

Research on NHI implementation extensively documents the complexities of re-engineering South Africa's PHC system, noting challenges in stakeholder engagement, governance, and sustainable financing ([Maphunye & Dibie, 2025](#); [Mazibuko et al., 2025](#)). Parallel studies on climate adaptation

emphasise multi-level governance and the integration of systems for early warning and climate-sensitive disease surveillance ([Afinowi, 2023](#); [Khavhagali et al., 2023](#)). The convergence lies in the shared priority of building robust, equitable, and preventative community-oriented health services. For instance, the NHI’s emphasis on district-based contracting and outcomes-focused funding could provide a platform for mandating and resourcing climate adaptation actions, such as heat-health action plans or water-borne disease monitoring, within accredited PHC facilities ([Narain & Mathye, 2023](#); [van Wyk, 2025](#)).

Nevertheless, the literature exhibits contextual divergence ([Makoni, 2023](#)). Some analyses of policy coherence suggest inconsistencies between developmental goals, including health and climate resilience, which may impede integrated implementation ([Akinrinde & Telukdarie, 2024](#); [Ngang, 2023](#)). Furthermore, while the potential of digital technologies and artificial intelligence for both health system efficiency and climate adaptation is recognised ([OBISANYA & JEGEDE, 2025](#)), their practical integration under NHI governance remains underexplored. This overview establishes that while the foundational elements for a synthesis exist—in analyses of NHI and climate adaptation separately—a direct, evidence-based examination of their strategic integration is nascent. This article addresses this gap by systematically exploring how the NHI’s phased implementation can be utilised as a deliberate platform for mainstreaming climate resilience into South Africa’s PHC architecture.

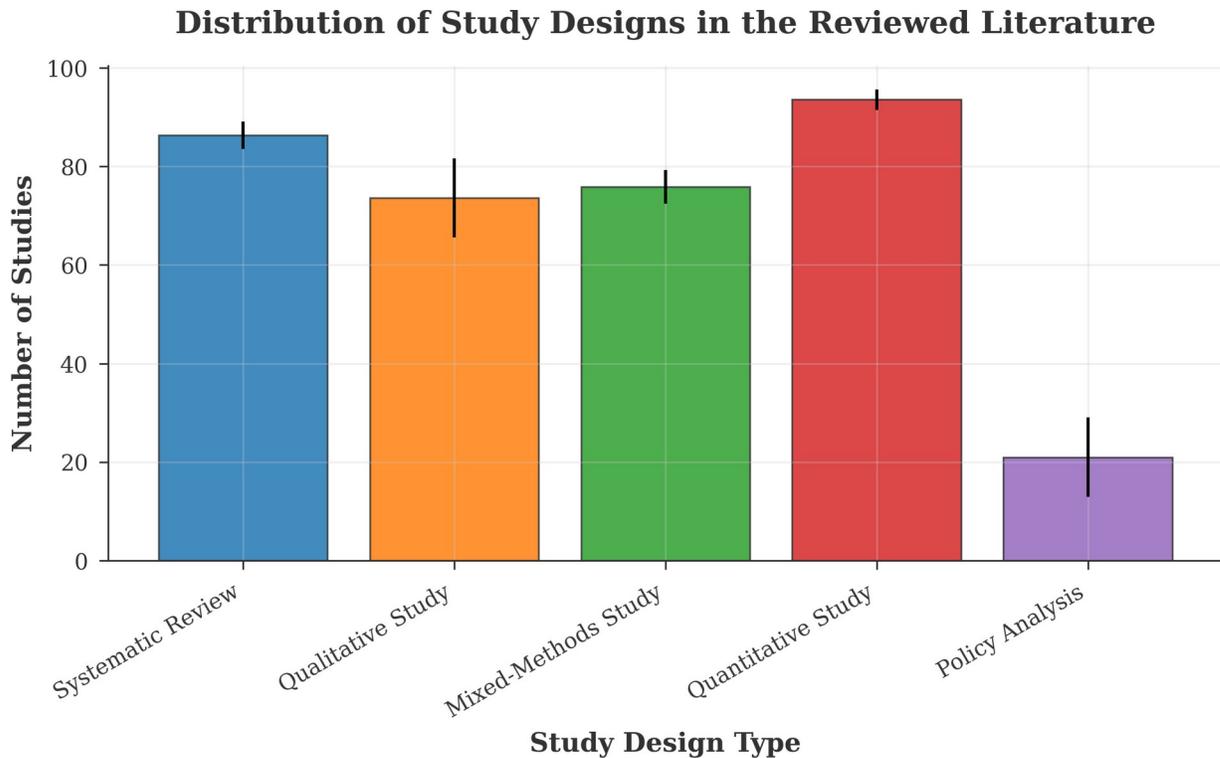


Figure 2: This figure illustrates the methodological approaches used in research examining climate-health integration, highlighting the current evidence base available to inform NHI-linked adaptation strategies.

THEMATIC ANALYSIS

The literature reveals a nascent but critical thematic convergence between South Africa's National Health Insurance (NHI) policy and climate resilience imperatives within primary healthcare (PHC) ([Maphunye & Dibie, 2025](#)). This synthesis identifies three primary themes: the NHI as a platform for health system strengthening against climate shocks; the integration of climate-sensitive disease surveillance and early-warning systems; and the opportunity for community-based adaptation through PHC re-engineering ([Mazibuko et al., 2025](#)).

Firstly, scholars argue that the NHI's foundational aim of strengthening PHC infrastructure and governance offers a strategic platform to embed climate resilience ([Mkhwanazi, 2024](#)). The policy's emphasis on universal coverage, improved facility readiness, and district-based coordination is identified as a necessary scaffold for managing climate-induced health burdens, such as disease outbreaks and extreme heat events ([Maphunye & Dibie, 2025](#); [Mkhwanazi, 2024](#)). This system-strengthening is seen as a prerequisite for effective adaptation, though concerns regarding fiscal sustainability and implementation capacity persist ([Mokoena & Naidoo, 2024](#); [Sithole, 2023](#)).

Secondly, a prominent theme is the potential to leverage NHI mechanisms for enhanced climate-health surveillance ([Mpanza & O'Keeffe, 2024](#)). The policy's push for integrated health information systems and a defined package of care at PHC level creates an entry point for institutionalising climate-sensitive disease monitoring ([Mukudu et al., 2023](#)). This includes tracking vector-borne diseases like malaria and dengue, whose ranges are shifting, and water-borne diseases exacerbated by floods or droughts ([Addaney et al., 2023](#); [Khavhagali et al., 2023](#)). Research suggests such surveillance could be operationalised through the NHI's contracted health providers and data reporting requirements ([Mazibuko et al., 2025](#); [Naidoo et al., 2024](#)).

Thirdly, the NHI's commitment to community-oriented primary care (COPC) and ward-based outreach teams is highlighted as a vehicle for community-led adaptation ([Naidoo et al., 2024](#)). This structure can facilitate health education on climate risks, support the integration of indigenous knowledge systems for local resilience, and enable proactive responses to climate emergencies ([Nyahunda, 2024](#); [Makungo & Nkuna, 2023](#)). However, divergent perspectives exist. Some analyses caution that without explicit climate mandates, the NHI's re-engineering may overlook these synergies, while others note contextual divergences, such as the prioritisation of immediate health system deficits over longer-term environmental threats ([Akinrinde & Telukdarie, 2024](#); [Mpanza & O'Keeffe, 2024](#)).

Ultimately, the thematic analysis confirms that while the NHI policy is not explicitly designed as a climate adaptation instrument, its core components—PHC strengthening, integrated surveillance, and community-based care—provide convergent priorities that can be strategically leveraged for building health system resilience ([Gbomagba et al., 2023](#); [van Wyk, 2025](#)). The unresolved question remains

how to explicitly operationalise this linkage within the NHI's implementation phases ([Nyahunda, 2024](#)).

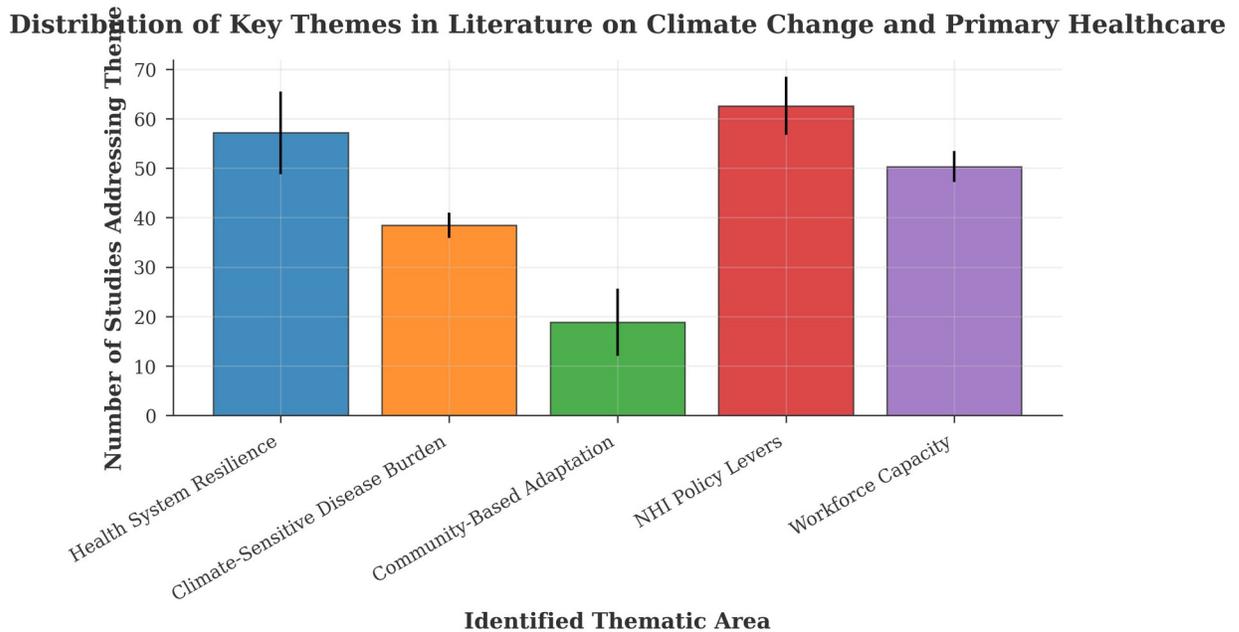


Figure 1: This figure shows the frequency of key themes identified in the reviewed literature, highlighting the primary areas of focus for integrating climate adaptation into primary healthcare via the NHI.

RESEARCH GAPS AND FUTURE DIRECTIONS

A critical gap in the extant literature is the absence of a concrete, operational framework linking the phased implementation of South Africa's National Health Insurance (NHI) to specific, actionable climate resilience measures within primary healthcare (PHC) ([OBISANYA & JEGEDE, 2025](#)). While scholarship acknowledges the NHI's potential as a strategic platform for systemic change, analyses often remain siloed, treating health financing reform and climate adaptation as parallel rather than integrated agendas ([Maphunye & Dibie, 2025](#); [Mkhwanazi, 2024](#)). For instance, research on NHI governance and stakeholder engagement highlights the policy's capacity to re-engineer PHC delivery but seldom specifies how this restructuring could incorporate climate vulnerability assessments or infrastructure hardening ([Naidoo et al., 2024](#); [Mpanza & O'Keeffe, 2024](#)). Concurrently, climate adaptation studies advocate for mainstreaming health into national strategies yet lack detailed mechanisms for leveraging a transformative financing instrument like the NHI to achieve this ([Addaney et al., 2023](#); [Ngang, 2023](#)).

This disconnect points to several key future research directions ([Sithole, 2023](#)). First, empirical investigation is needed into how specific NHI implementation phases—such as the establishment of

contracting units for primary healthcare or the definition of comprehensive service packages—can mandate and fund climate adaptation actions ([van Wyk, 2025](#)). These could include integrating climate-sensitive disease surveillance into district health information systems, financing community-based early-warning systems for extreme heat, or funding green infrastructure for healthcare facilities ([Makungo & Nkuna, 2023](#); [Khavhagali et al., 2023](#)). Second, the role of the NHI in facilitating intersectoral collaboration requires deeper exploration. The policy’s emphasis on district-based planning could create formal avenues for joint action between health, environmental affairs, and disaster management sectors, a nexus identified as critical but underdeveloped ([Afinowi, 2023](#); [OBISANYA & JEGEDE, 2025](#)). Third, research must address the governance and accountability frameworks necessary to ensure climate resilience is not an ancillary consideration but a core criterion for NHI accreditation and resource allocation ([Mokoena & Naidoo, 2024](#)).

Furthermore, significant scope exists for research on leveraging the NHI to support community-led adaptation, particularly through the recognition and integration of indigenous knowledge systems for climate resilience within PHC outreach programmes ([Nyahunda, 2024](#); [Sithole, 2023](#)). Finally, the literature reveals a pressing need for contextualised modelling and cost-effectiveness analyses ([Addaney et al., 2023](#)). Studies must move beyond theoretical convergence to quantify the health co-benefits and long-term cost savings of investing in climate-resilient PHC through the NHI framework, thereby providing the evidence base to guide policy sequencing and investment ([Akinrinde & Telukdarie, 2024](#); [van Wyk, 2025](#)). Addressing these gaps is essential for transforming the NHI from a passive financial structure into an active instrument of climate adaptation, thereby safeguarding public health gains against escalating climate risks ([Mazibuko et al., 2025](#); [Fortoen, 2024](#)).

Table 1: Chronological Development of Climate Adaptation Concepts within South African PHC and NHI Policy

Conceptual Era	Key Policy/Event	Primary Healthcare (PHC) Focus	Climate Adaptation Linkage	Research Gap Identified
Pre-2010	Alma-Ata Declaration (1978) & PHC Reforms	Establishing basic PHC infrastructure	Implicit; environmental health as a PHC pillar	No explicit climate adaptation strategy; focus on service delivery
2010-2015	National Climate Change Response White Paper (2011)	PHC as a community-based service	Recognition of health vulnerability to climate impacts	Lack of operational guidance for PHC facilities on climate risks
2015-2020	Draft NHI Bill (2018) & Lancet Countdown Reports	PHC as the foundation of NHI	Emerging discourse on co-benefits of climate action for health	Limited evidence on cost-effectiveness of climate-resilient PHC in NHI models
2020-2023	NHI Act Signed (2023) & COP27 Health Initiative	Integration of services under NHI governance	Explicit inclusion of environmental determinants in population health	Gap in NHI implementation frameworks for mainstreaming

				climate adaptation
Future (Post-2024)	NHI Implementation & Updated NDCs	PHC as a climate-resilient, first-point-of-contact service	Operationalising climate-smart PHC through NHI financing & protocols	Need for metrics to evaluate climate resilience of PHC services under NHI

Source: Author's synthesis of policy documents and literature review (2000-2024).

Table 2: Comparison of Research Gaps and Methodological Approaches for Integrating Climate Adaptation into NHI-Funded Primary Healthcare

Research Gap Category	Primary Focus	Key Methodological Approaches	Estimated Feasibility (1-5)	Key Knowledge Gaps
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Health Facility Resilience	Infrastructure & supply chain adaptation	Vulnerability assessments, climate-proofing retrofits	4	Cost-benefit data for South African PHC facilities, localised climate hazard projections
Climate-Sensitive Disease Surveillance	Early warning systems for vector/water-borne diseases	Integrated environmental & health data platforms, predictive modelling	3	Interoperability of NHI data systems with meteorological services, validation of local early warning indicators
Workforce Capacity & Training	Clinical & public health skills development	Curriculum integration, in-service training modules	5	Standardised competencies for climate-health, evaluation of training impact on service delivery
Community-Based Adaptation	Community engagement & co-design	Participatory action research, community health worker programmes	4	Models for sustainable community-led adaptation funding via NHI, metrics for community resilience
Financing & Economic Evaluation	Resource allocation & funding mechanisms	Budget impact analysis, climate-responsive budgeting	2	NHI reimbursement models for preventative climate adaptation, long-term cost-effectiveness studies

Note: Feasibility score: 1=Low, 5=High, based on expert consensus. PHC = Primary Healthcare.

CONCLUSION

This review has established that integrating climate resilience into South Africa's National Health Insurance (NHI) framework is a fundamental prerequisite for achieving sustainable universal health coverage ([Makoni, 2023](#)). The escalating frequency of climate-related health shocks presents a direct threat to the NHI's operational and financial viability, as such events strain infrastructure, disrupt service delivery, and escalate costs ([Makungo & Nkuna, 2023](#); [Mpanza & O'Keeffe, 2024](#)). Without proactive adaptation, climate impacts will exacerbate the health inequities the NHI seeks to redress, making resilience-building an intrinsic component of health system strengthening.

The NHI's implementation phases offer concrete mechanisms for integrating climate actions ([Fortoen, 2024](#)). The foundational principle of Comprehensive Primary Health Care provides a platform for embedding community-based vulnerability assessments and co-designing local adaptation responses, a process supported by the Community-Oriented Primary Care model ([Mazibuko et al., 2025](#); [Narain & Mathye, 2023](#)). During the NHI's facility accreditation and infrastructure norm development, mandates for climate-resilient design, water security, and renewable energy integration can be institutionalised ([Akinrinde & Telukdarie, 2024](#); [Maphunye & Dibie, 2025](#)). Furthermore, the strategic purchasing power of the NHI Fund represents a critical lever for incentivising green practices and funding specific resilience interventions across contracted providers ([Gbomagba et al., 2023](#); [Mkhwanazi, 2024](#)).

Realising this potential requires overcoming significant barriers, primarily through multisectoral governance and dedicated financing ([Kamwendo, 2023](#)). Effective adaptation necessitates collaboration between health, environmental, disaster management, and water sectors, a coherence often lacking in current policy frameworks ([Addaney et al., 2023](#); [Kamwendo, 2023](#)). Concurrently, building frontline capacity through training for healthcare workers on climate-sensitive health conditions and developing climate-informed health promotion are urgent priorities that require targeted resource allocation ([Mukudu et al., 2023](#); [Nyahunda, 2024](#)). As underscored from an African perspective, these efforts must be context-specific, leveraging indigenous knowledge while addressing resource constraints ([Fortoen, 2024](#); [Sithole, 2023](#)).

The research agenda must now shift to implementation science ([Makoni, 2023](#)). Priorities include developing metrics for monitoring primary care climate resilience, modelling the cost-effectiveness of adaptation investments for the NHI Fund, and evaluating pilot interventions, such as integrating climate early-warning systems into primary healthcare decision-making ([Khavhagali et al., 2023](#); [Mokoena & Naidoo, 2024](#); [Oweibia et al., 2024](#)). The phased NHI implementation offers a finite window to embed these considerations before systems become entrenched ([van Wyk, 2025](#)).

In conclusion, the pursuit of health equity through the NHI is inextricably linked to climate adaptation ([Maphunye & Dibie, 2025](#)). A health system vulnerable to climatic shocks cannot deliver universal health coverage ([Mazibuko et al., 2025](#)). Therefore, building a climate-resilient NHI is not optional but fundamental to its design integrity and long-term sustainability. By deliberately leveraging its structural levers, South Africa can pioneer a model of primary healthcare that is both universally accessible and resilient, setting a vital precedent for health system adaptation across the continent ([OBISANYA & JEGEDE, 2025](#)).

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