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Building the evidence base for climate solutions in Africa

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Africa contributes approximately 2% – 3% of global greenhouse gas (GHG) emissions, yet experiences some of the most severe and immediate consequences of climate variability and change (Okesanya et al. 2024). This asymmetry is well established in the literature and is compounded by structural vulnerabilities of poverty, infrastructure gaps and governance constraints, which are both a cause, and a consequence of climate vulnerability. Rural communities, particularly women and youth whose livelihoods depend heavily on rain-fed agriculture, face heightened exposure to climate shocks and long-term climatic shifts (Abdela et al. 2024; Etta-Nyoh & Eyakwe 2025; Huyer et al. 2021). As climate risks intensify, development interventions across sectors: agriculture, water, energy, health, disaster risk response and social protection, are increasingly framed as climate-responsive or climate-smart. However, the extent to which climate has been meaningfully integrated into the logic of development remains uneven, with a dearth of models that meaningfully integrate the intersectionality of human development and climate protection.

The challenge facing evaluators is multidimensional. Although climate science relevant to Africa continues to expand, data on localised impacts, adaptive capacity and long-term development trajectories remain uneven and in many settings, emergent (Ssekamatte 2018). Many programmes are aiming to use language around climate with a general understanding that it is good development practice, but without the technical knowledge or experience to actually integrate climate considerations into programme design. Evaluations are frequently conducted in contexts characterised by incomplete baselines, limited longitudinal datasets and rapidly evolving risk profiles. Moreover, climate interventions operate within complex socio-ecological systems marked by non-linearity, feedback loops and uncertainty. Traditional evaluation designs, often premised on a higher level of predictability of change, are often insufficient for capturing resilience, transformation or systems change. While complexity-responsive evaluation models abound, choosing the most appropriate one is not the biggest challenge for evaluators; it is making a complexity-responsive evaluation model useful to organisations that have often just implemented programming that may have had different underlying logic.

Building the evidence base for climate solutions, therefore requires deliberate attention to how climate interventions are both designed and evaluated, not simply whether or how they are implemented. Firstly, evaluators must grapple with contribution and attribution in complex systems. Climate adaptation and mitigation programmes frequently interact with broader development initiatives and are influenced by exogenous climatic and economic factors. Establishing plausible contribution, rather than narrow attribution, often demands theory-based and mixed-method approaches capable of tracing pathways of change under conditions of uncertainty. It also involves a nuanced understanding of both the ecological and sociopolitical developmental context of Africa, which can often be left out of methodological debates in the climate space (Appeaning Addo 2010). While many evaluation practitioners are quite comfortable with this kind of complex and critical enquiry, they also need to demonstrate to organisations that may have much less patience for ambiguity that this kind of approach can be concretely useful for decision making and future planning.

Secondly, evaluators must address temporal misalignment. Climate impacts and adaptation outcomes frequently unfold over long time horizons, while project cycles and funding arrangements remain short-term. Similarly, well-designed, participatory processes of engagement with complex data often demand time for engagement, while decisions often need to be made quickly. Building meaningful trust and engagement in communities takes decades, and specific

Note: The manuscript is a contribution to the themed collection titled 'Building the evidence base for climate solutions in Africa', under the expert guidance of guest editors Dr Caitlin Blaser Mapitsa, Ms. Heather Michelle Conyers Dixon and Ms. Tabitha Atieno Olang.

development projects often have timelines of 5 years or even less (Akondeng et al. 2022). These tensions raise important methodological questions about the application and design of tools, the operationalisation of resilience and the measurement of transformational versus incremental change. Without robust conceptualisation and measurement strategies that are appropriate to a specific organisational and programmatic context, evaluation risks privileging easily quantifiable outputs over substantive adaptive capacity gains or meaningful transformation in complex systems.

Thirdly, equity considerations must be embedded within evaluation frameworks, acknowledging the intersectionality of climate with interconnected approaches to justice. The disproportionate vulnerability of women, youth and rural populations (Abdela et al. 2024; Etta-Nyoh & Eyakwe 2025) underscores the need for disaggregated data, participatory methodologies and attention to power dynamics in both programme design and evaluative inquiry. Evaluations that fail to interrogate distributional effects risk obscuring maladaptation or reinforcing existing inequalities. Climate-responsive evaluation is fundamentally inseparable from questions of justice and inclusion. As much as there may be consensus about this among evaluators, real landscape shifts in the framing and centrality of inclusion put intersectional climate discourse at risk.

Fourthly, evaluators must contend with complex data systems, such as frequent gaps in baseline data and climate risk information, or engagement with data types and forms that are relatively new to evaluation practice. In many African contexts, administrative datasets, longitudinal environmental records, and geo-spatial data are incomplete or inaccessible (Ssekamatte 2018). Methodological innovation, combining community-generated data, remote sensing, qualitative inquiry and adaptive learning mechanisms, is therefore central to strengthening evaluative rigour. The task is not merely technical; it involves fostering institutional capacities for ongoing learning and adaptation within implementing agencies and governments across a variety of contexts. Balancing these streams of work demands sufficient resourcing and political commitment. Until there are enough 'proof of concept' examples of evaluations demonstrating that engaging with complex data sets is worth the resource demands, there will be hesitation to invest. Furthermore, given a move away from climate concerns in America and many European countries, profiling the importance of climate vulnerability in Africa has now become an important space for global leadership.

This special edition of the *African Evaluation Journal*, titled 'Building the Evidence Base for Climate Solutions in Africa', is situated within this evolving methodological landscape. It proceeds from the premise that evaluation must play a central role in advancing credible, contextually grounded evidence on what works, for whom, under what conditions, and over what timeframes in relation to climate interventions. For African evaluators, the challenge is not only to assess performance, but to refine evaluative frameworks so that they are fit for purpose in a climate-constrained and climate-uncertain world.

African people have developed a wide range of adaptive mechanisms to climate change that are ecologically appropriate and culturally embedded. Sacred forests as a mechanism of conservation or prohibition of use are widespread throughout the continent (Franta et al. 2025). Customary laws apply indigenous knowledge to resource governance, such as water or land use patterns (Ibrahim, Golo & Sanni 2025). Many development interventions are developed with external logic about conservation and cultural embeddedness and have not integrated local practice into planning and implementation. This puts the onus on the evaluator to recognise both kinds of work and acknowledge both ways of understanding how climate resilience is built.

Strengthening the evidence base entails more than aggregating findings across projects. It requires conceptual clarity around resilience and adaptation, methodological pluralism suited to complex systems, deliberate integration of climate risk into theories of change and results frameworks, and a strong embeddedness in localised contexts of governance. It also demands reflexivity about the positionality of evaluators and the epistemologies that shape what counts as valid evidence in climate and development discourse.

By centring evaluation practice within the broader climate justice and development debate, this special edition affirms that evaluators are not peripheral actors in the climate response. Rather, they are essential to ensuring that interventions are accountable, adaptive and transformative. In contexts where Africa contributes minimally to global emissions yet faces disproportionate impacts (Okesanya et al. 2024), building a rigorous and contextually relevant evidence base is both a professional responsibility and a moral imperative.

This special edition of the *African Evaluation Journal,* titled 'Building the Evidence Base for Climate Solutions in Africa', brings together five papers reflecting on how evaluators have focused on climate solutions to allow evaluation to play a transformative role in Africa. It includes examples and models for practitioners and scholars aiming to better integrate a lens of climate responsiveness into programme planning and design, practice, and reflective learning.

Contributions to the edition

This special collection of the *African Evaluation Journal* emerges from a dedicated strand, supported by The Rockefeller Foundation, 'Climate Change, Agriculture and Sustainable environment management' at the 11th Annual African Evaluation Association (AfrEA), in Kigali, Rwanda, 2024. This was a 3-day dedicated strand which featured 13 presentations, with strong participant engagement and diverse climate-focussed discussions. We acknowledge the presenters in the

strand who were unable to participate in this process of developing presentations into articles. However, we hope that this edition is the beginning of the conversation, with more dedicated research and sharing of experiential knowledge feeding into the wider evidence ecosystem, combining practical application with academic rigour.

Featured manuscripts are from practitioners working at the nexus of climate change and evaluation, and inclusive of contributions in agriculture, Water, Sanitation, and Hygiene (WASH), the just energy transition, and artificial intelligence. This edition presents concrete examples of climate-responsive programming and evaluations implemented in African settings, reflecting empirical experiences and lessons from practitioners' experience. In this edition, Mabaso and Tsekiso, Goldman et al. all highlight new criteria and tools for climate evaluation. Mabaso's work presents and reflects on the application of a scorecard to assess and build climate change resilience for smallholder farmers, and Tsekiso, Goldman et al. share lessons on implementing the transformative equity and climate criteria developed in partnership with the Department of Planning, Monitoring and Evaluation.

Berhanu then provides methodological lessons for the use of adaptive frameworks and the integration of gender into climate-vulnerable WASH systems to capture gender-transformative and climate resilience outcomes, and Hartley, Goldman et al. reflect on the different models and approaches for monitoring, evaluation and learning for the just transition in South Africa. Finally, Anowai presents how the use of machine learning and artificial intelligence can assist in the adaptive needs of climate change evaluation.

A key theme reflected in all articles is that African climate evaluation needs to be adaptive, and as always, rooted in socio-ecological and cultural context. A second is that developing appropriate tools and approaches for climate-responsive evaluation comes with unique technical challenges, from geo-spatial data sets to translating complex concepts, distilling key concepts, and bringing creativity and rigour in equal measure to address data gaps. However, these tools are most useful when applied through reflective, iterative adaptation, which must be demand-led by everyone in the evaluation ecosystem. Finally, the articles reflected on the ways in which evaluation and the development of a strong evidence base can contribute to meaningful change. While progress has been uneven, certain case studies presented offer strong examples of impact, when evaluation and advocacy come together.

We hope this special edition contributes to ongoing dialogue by bringing together research with experiential knowledge and amplifying African evaluation expertise in global climate discourse. We thank all presenters at the strand for their valuable contributions, including those whose presentations are not represented as articles in this special edition. The discussions which took place enriched the debates and contributed to richer manuscripts. We also extend our sincere thanks to the peer reviewers who generously reviewed papers.

The challenge of evaluating climate solutions in Africa is a journey that evaluators are increasingly prioritising as a critical response to transformative development. It is a journey that requires us to produce evidence that is robust enough to inform global policy while remaining rooted in local contexts. This collection hopes to present tools and reflections necessary to demonstrate both the potential and shortcomings of climate-responsive programming, at a time when the political controversy of the necessity of these interventions requires comprehensive, credible evidence. It is our hope that this evidence will not only inform better programming locally but also provide thought leadership and solidarity to regions of the world which are both more responsible for the climate crisis, with less political will and investment to take action.

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Competing interests

Genesis Analytics (Heather Dixon's employer at the time of AfREA and journal editing) and the Global Energy Alliance for People and Planet (Tabitha A. Olang's current employer) are both grantees of The Rockefeller Foundation. However, the authors declare that they were not inappropriately influenced in writing this article, and that this article is complementary to their practice. Dr Blaser Mapitsa has no competing interests. This editorial was drafted by Heather M.C. Dixon, and following this draft was finalised with input from all authors.

Ethical considerations

This article followed all ethical standards for research without direct contact with human or animal subjects.

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