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Community perceptions of climate change and its impact on natural resources in Umlazi and surrounding areas: A cross-sectional case study.

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Abstract

Background
Climate change is increasingly affecting vulnerable communities in South Africa, particularly those reliant on natural resources. Umlazi and the surrounding areas face challenges such as flooding, water scarcity, and biodiversity loss. Understanding community perceptions is essential for developing effective adaptation strategies and resource management plans.

Methods
A cross-sectional mixed-methods case study design was used. Quantitative data were collected via structured questionnaires administered to 120 residents of Umlazi and neighbouring communities. Qualitative data were gathered through focus group discussions with community leaders, youth, and environmental activists. Quantitative data were analysed using descriptive statistics; qualitative data were thematically analysed.

Results
Of the 120 participants, 65 (54%) were female and 55 (46%) male, aged 18 to 65 years (mean age = 34.8 years). The majority (72%) had resided in Umlazi for more than 10 years.
Quantitative findings showed that 82% of respondents observed significant climate changes over the past decade, with erratic rainfall (79%) and rising temperatures (68%) most frequently reported. Over 70% linked these changes to declining water quality, reduced agricultural yields, and biodiversity loss. Qualitative findings revealed three major themes: (1) Limited access to climate information: *"We do not receive proper education on climate risks or what to do when disasters happen"* (community leader); (2) Concerns over weak institutional response: *"Local government promises support but we don't see it on the ground"* (youth representative); and (3) Desire for greater community involvement: *"We want to form local committees to protect our resources"* (environmental activist).

Conclusion
Communities in Umlazi are aware of climate change impacts but face constraints in adaptive capacity due to limited information, infrastructure gaps, and weak institutional support.

Recommendation
Localized climate education, sustainable resource management, and community-led adaptation initiatives should be prioritized through partnerships between universities, local government, and civil society.

Keywords: *Climate change, Community perception, Natural resource degradation, Local adaptation*
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Introduction

Climate change has emerged as one of the most pressing challenges of the 21st century, particularly for communities whose livelihoods are intricately tied to natural resources. In South Africa, the effects of climate change are becoming increasingly evident in the form of erratic rainfall, droughts, and loss of biodiversity, disproportionately affecting marginalized communities with limited adaptive capacity. Understanding how these

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communities perceive and respond to climate change is essential for designing effective and inclusive adaptation strategies. This study focuses on Umlazi and its surrounding areas' urban and peri-urban settlements in KwaZulu-Natal, South Africa, that are vulnerable to both environmental and socio-economic stressors. Given the local dependence on water, biodiversity, and agricultural land, climate-induced degradation poses severe risks to community well-being. Although climate models and policy interventions are often top-down, community perceptions can reveal real-time experiential knowledge that may inform locally grounded solutions. This paper investigates the perceptions held by Umlazi residents regarding climate change and its impact on natural resources. It further explores how these perceptions shape local adaptation needs and what institutional support is required to enhance resilience.

Background to the Study

In South Africa, climate change intersects with existing developmental challenges such as poverty, unemployment, and inadequate service delivery, particularly in townships like Umlazi. As urbanization expands and ecosystems degrade, communities find themselves grappling with increased flooding, loss of arable land, and deteriorating water quality. These changes not only threaten biodiversity but also undermine livelihoods that depend on environmental services. Despite the significance of these issues, much of the research and policy work has remained centred on large-scale adaptation plans with limited integration of community voices. Previous studies have highlighted the importance of community-based adaptation in sub-Saharan Africa (Ziervogel et al., 2014; IPCC, 2022), yet localized investigations into the perceptions of climate impacts on natural resources remain scarce. This study fills that gap by focusing on a community-level assessment in Umlazi, combining quantitative and qualitative methods to understand local perspectives. It builds on a socio-ecological understanding of climate vulnerability that places emphasis on both environmental change and social response.

Objectives of the study

- To assess community awareness and understanding of climate change in Umlazi and surrounding areas.
- To identify perceived impacts of climate change on key natural resources such as water, biodiversity, and agriculture

Problem statement

Despite mounting evidence of climate change in South Africa, there remains a limited understanding of how communities interpret and respond to its impacts, particularly about natural resource degradation. In Umlazi and surrounding areas, where communities are intimately linked with the environment, climate stressors threaten water access, food security, and biodiversity conservation. However, the lack of localized data on community perceptions hampers the development of inclusive, bottom-up adaptation strategies. This study seeks to address that gap by exploring how communities perceive climate change and how such perceptions can inform locally relevant interventions.

Research question

What are the perceptions of Umlazi and surrounding communities regarding climate change and its impact on natural resources, and how can these insights inform localized adaptation strategies?

Methodology

Study design

This study adopted a cross-sectional mixed-methods case study design, integrating both quantitative (survey) and qualitative (focus groups) approaches. This design was chosen to provide a comprehensive understanding of community perceptions regarding climate change and its impacts on natural resources, allowing for triangulation of numerical trends and narrative insights to enhance validity.

Study setting

The research was conducted in Umlazi Township and selected surrounding communities within the eThekwini Municipality, KwaZulu-Natal, South Africa. Umlazi is one of the largest townships in the country, marked by rapid urbanization, socio-economic challenges, and reliance on natural resources for household subsistence. Data collection occurred over six weeks (10 January to 25 February 2025), coinciding with the summer rainy season, a period typically associated with climate-related impacts such as flooding, erosion, and water contamination.

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Participants

Participants included adult residents (aged 18 years and older) who had resided in Umlazi or adjacent communities for a minimum of three years.

Inclusion criteria

- Residents aged 18 years and above
- Residency in the area for ≥ 3 years
- Voluntary consent to participate

Exclusion criteria

- Residents younger than 18 years of age
- Individuals with cognitive or communication impairments that prevent meaningful participation
- Individuals who had lived in the area for less than 3 years

A stratified random sampling method was used for the quantitative survey (n = 120), ensuring representation across wards, age groups, and gender. Purposive sampling guided the selection of focus group participants (n = 18), which included community leaders, youth representatives, and environmental activists.

Study variables

Dependent variable

- Community perceptions of climate change impacts on natural resources

Independent variables

- Socio-demographic characteristics (age, gender, education level, residency duration)
- Reported observations of climate change indicators (rainfall, temperature changes, biodiversity loss)
- Access to climate information
- Perceived institutional support

Bias

To minimize selection bias, stratified randomization was used for the survey sample. Interviewer bias was addressed through standardized field researcher training and piloting of the questionnaire. Social desirability bias was mitigated by ensuring anonymity and conducting data collection in neutral, private settings.

Study size

The quantitative sample of 120 participants was determined using Cochran's formula for unknown population size (95% confidence level, 5% margin of error). The qualitative sample of 18 focus group participants was determined based on thematic saturation, where no new insights were emerging from additional discussions.

Statistical analysis

Quantitative data were analysed using SPSS version 27. Descriptive statistics (frequencies, percentages) summarized demographic data and climate perceptions. Cross-tabulations explored relationships between variables. Missing data were addressed via listwise deletion for cases with >20% missing responses and mean/mode imputation for minor gaps. Qualitative data were transcribed and coded using NVivo 12, with thematic analysis used to identify recurring patterns aligned with study objectives.

Ethical consideration

Ethical clearance was granted by the Mangosuthu University of Technology Research Ethics Committee on 06 December 2024. Written informed consent was obtained from all participants. Confidentiality and the right to withdraw were ensured. For any focus groups involving minors, both guardian consent and participant assent were secured per institutional policy.

Results

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Table 1: Participant flow

Stage of Study	Number of Participants	Reasons for Non-Participation
Community members approached	160	—
Examined for eligibility	150	10 declined participations
Confirmed eligible	135	15 excluded (lived < 3 years or cognitive/communication impairments)
Consented and enrolled	120	—
Completed quantitative survey	120	—
Completed qualitative focus group (subset)	18	Non-selected, saturation reached

Table 2: Descriptive statistics: socio-demographic characteristics of participants (N = 120)

Characteristic	n (%)
Gender	
Female	65 (54%)
Male	55 (46%)
Age (years)	
18–24	28 (23%)
25–34	36 (30%)
35–44	32 (27%)
45–54	15 (12%)
55 and above	9 (8%)
Residency Duration	
3–5 years	15 (12%)
6–10 years	19 (16%)
> 10 years	86 (72%)
Education Level	
No formal schooling	8 (7%)
Primary school	22 (18%)
Secondary school	54 (45%)
Tertiary education	36 (30%)
Occupation	
Unemployed	42 (35%)
Informal employment	36 (30%)
Formal employment	28 (23%)
Students	14 (12%

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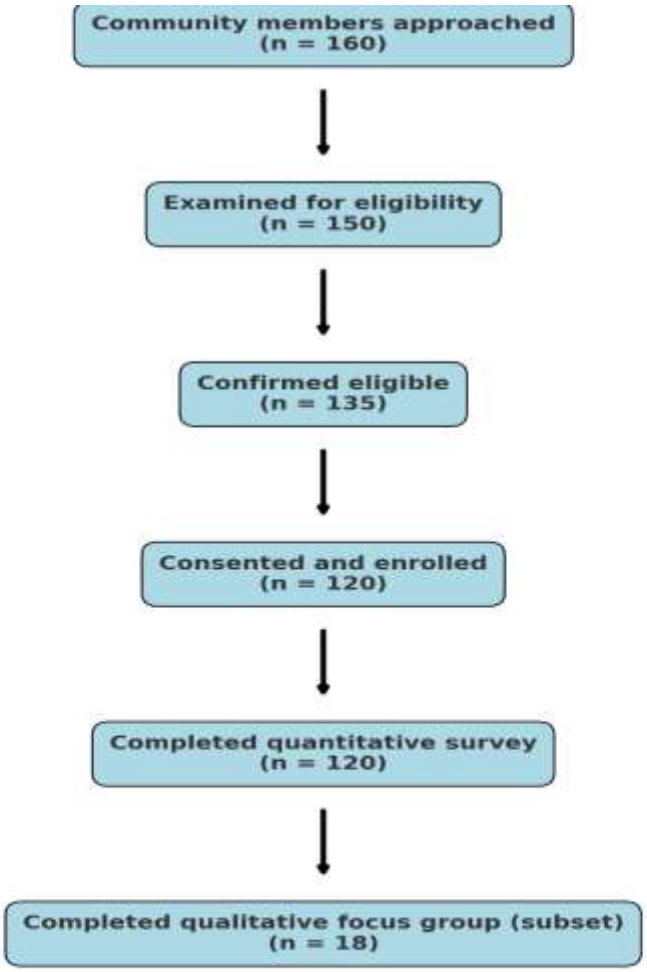
Diagram 1: The participant flow diagram for the study, clearly showing the number of individuals at each stage.



Reasons for Non-Participation

10 residents declined to participate due to a lack of time or interest.

15 were excluded based on eligibility criteria: either less than 3 years of residency or inability to engage meaningfully in the study (due to communication or cognitive limitations).

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The graphical representations underscore the community's heightened awareness and concern regarding climate change and its tangible effects on natural resources. As illustrated in Figure 1, a substantial 82% of respondents reported being aware of changes in climate patterns over the past decade. This widespread recognition highlights the growing visibility of climate-related phenomena in Umlazi and its surrounding areas. The relatively small proportion (18%) of respondents who indicated no awareness suggests a foundational level of climate consciousness within the community, likely influenced by observable environmental shifts and anecdotal experiences.

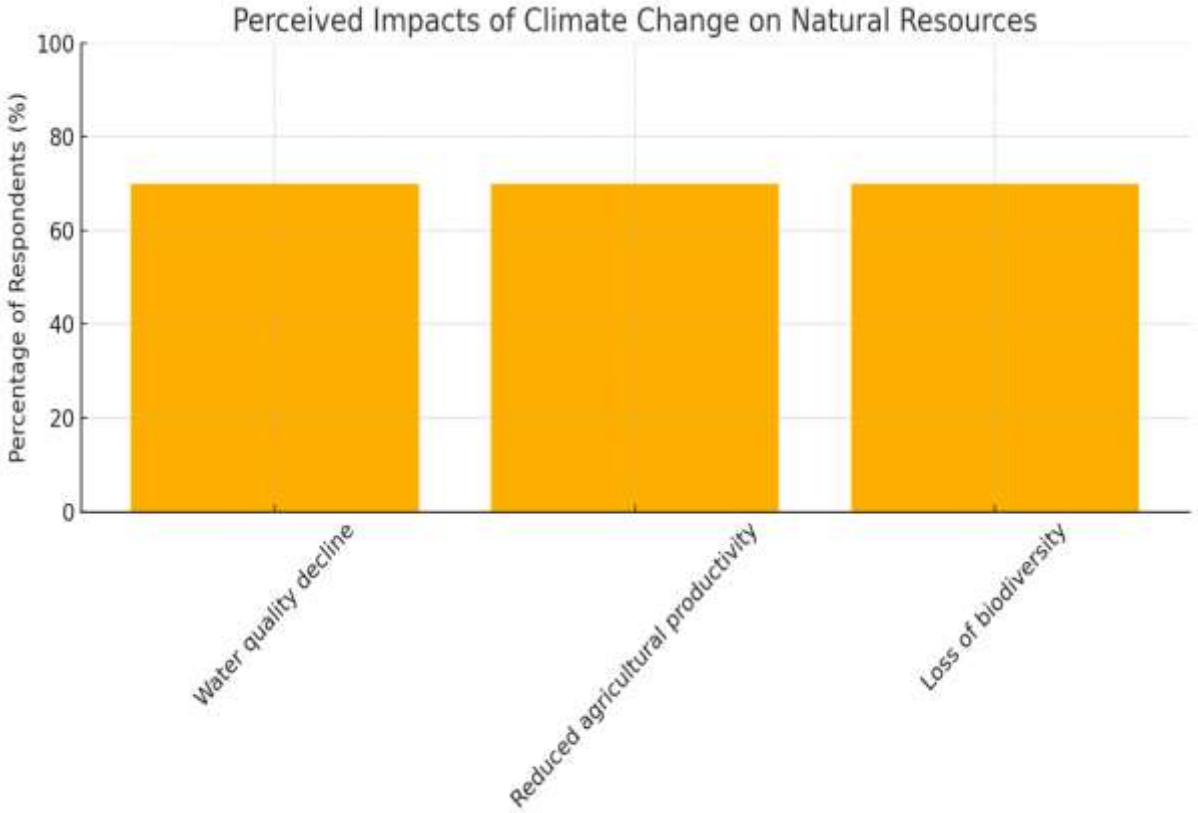

Figure 1: The bar graph highlights the impacts reported impacts such as declining water quality, reduced agricultural productivity, and biodiversity loss due to climate change.

Figure 2 captures community perceptions of climate change impacts on key natural resources. A uniform 70% of respondents attributed climate change to the decline in water quality, reduced agricultural productivity, and the loss of biodiversity. The consistent percentage across these impact categories suggests a shared understanding of the environmental degradation being experienced locally. These results may reflect both direct exposure to resource scarcity and the community's dependence on ecosystem services for water provision, food production, and ecological stability. The findings indicate not only a strong awareness of climate change among residents but also a clear recognition of its detrimental effects on essential natural resources. This alignment between perception and environmental reality affirms the urgency of implementing community-centred adaptation strategies and resource management interventions. It also signals the need for further participatory research and educational outreach to sustain and deepen climate resilience at the grassroots level.

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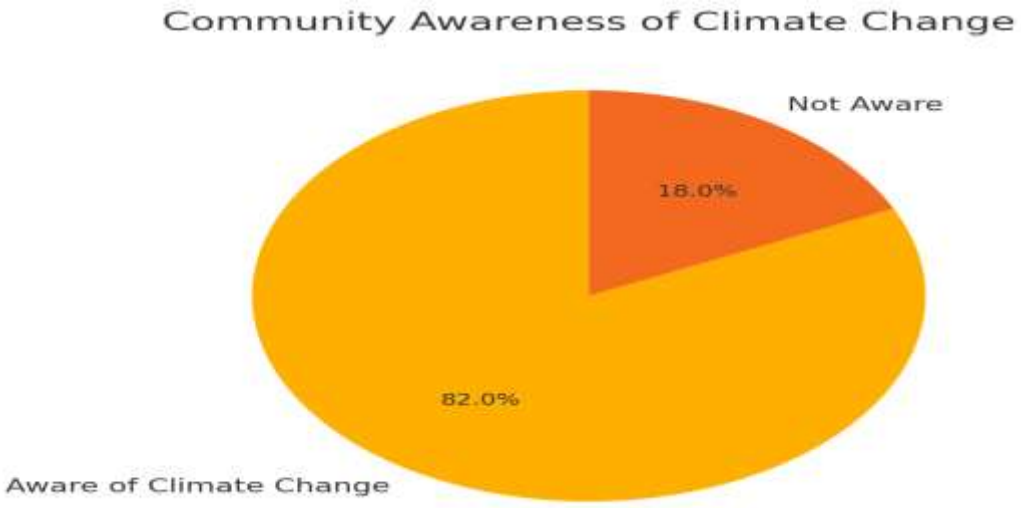

Figure 2: The Pie chart shows that 82% of respondents are aware of climate change, while 18% are not

Figure 3 illustrates the frequency of key themes identified from qualitative analysis of participant responses. The most prevalent theme was Limited Access to Climate Information, mentioned by approximately 83% of participants. This highlights a widespread perception that local residents lack sufficient education and communication regarding climate risks and adaptation measures. The second most frequently cited theme was Concerns Over Weak Institutional Response (78%), indicating participant frustration with perceived gaps between local government promises and the actual delivery of climate-related services and interventions. Finally, the desire for Greater Community Involvement was reported by 67% of participants, reflecting strong grassroots motivation for collective action and local ownership of environmental initiatives.

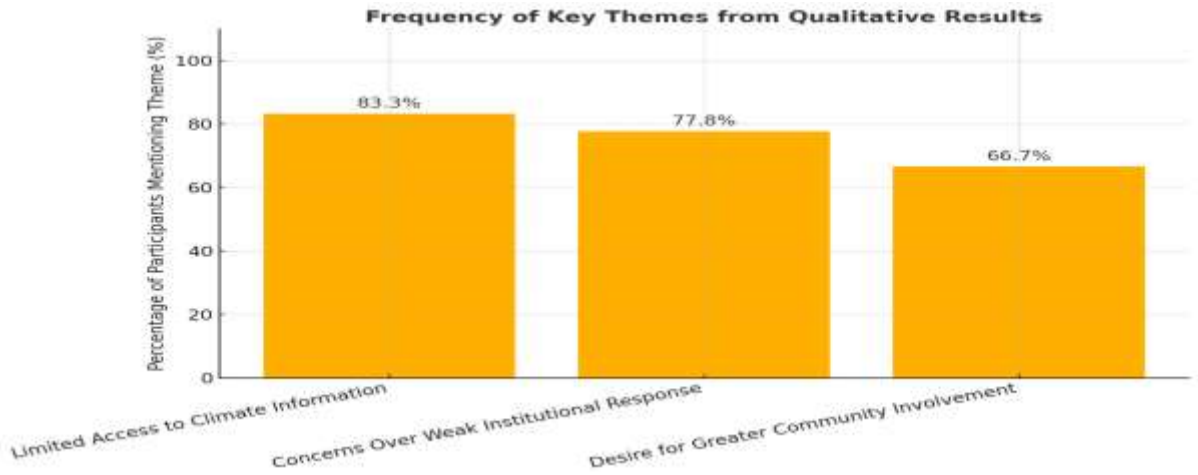

Figure 3: The bar chart shows the frequency of key themes from your qualitative results

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Discussion

The study reveals a high level of climate change awareness among community members in Umlazi and the surrounding areas, with 82% of survey respondents acknowledging noticeable shifts in climate patterns. This high level of awareness reflects the direct experiences of these communities with changing rainfall patterns, rising temperatures, and increasing climate-related hazards. These findings align with previous research showing that communities in resource-dependent, developing regions are often acutely aware of climate change due to their daily reliance on natural resources (IPCC, 2022; Ziervogel et al., 2014). The most commonly reported impacts, declining water quality, reduced agricultural productivity, and loss of biodiversity, mirror trends observed across sub-Saharan Africa, where environmental degradation and climate stressors are intensifying in rural and peri-urban settings (Niang et al., 2014; Kalaba et al., 2017). The consistency in responses across different age groups and wards suggests a shared ecological consciousness among residents. This provides a valuable foundation for participatory climate adaptation strategies that build on local knowledge and community experience. However, qualitative data from focus group discussions (n = 18 participants) indicate that awareness alone does not translate into preparedness or adaptive capacity. Many participants voiced frustration at the lack of practical information and institutional support. As one community leader stated, *"We do not receive proper education on climate risks or what to do when disasters happen."* Another youth representative highlighted the absence of effective institutional action: *"Local government promises support, but we don't see it on the ground."* These statements underscore the structural barriers that limit effective community responses to climate risks, echoing broader concerns about inequalities in climate response capacity in marginalized South African communities (Moser & Ekstrom, 2010; Leichenko & O'Brien, 2008).

The desire for more active community involvement was another strong theme. As one participant expressed: *"We want to form local committees to protect our resources and work together."* This demonstrates both a readiness for grassroots engagement and an opportunity for institutions to support bottom-up adaptation efforts. The findings suggest that while Umlazi communities possess a strong awareness of climate change and its impacts, systemic vulnerabilities, particularly the lack of access to climate information, early warning systems, and institutional support, hinder their adaptive capacity. This underscores the need for locally grounded adaptation frameworks that leverage community knowledge while addressing these systemic gaps. In this context, universities and local governance structures have an important role to play in facilitating knowledge co-production and the co-design of interventions that are relevant to the community's lived realities (Pelling & Manuel-Navarrete, 2011). Building partnerships among academic institutions, civil society organizations, and municipal authorities can foster inclusive, collaborative approaches that enhance community resilience and support long-term climate adaptation in vulnerable urban communities.

Generalizability

As a case study focused on Umlazi and adjacent areas, the findings may not be immediately generalizable to all urban or peri-urban communities in South Africa. However, the results may hold analytical generalizability, offering transferable insights to other communities facing similar climate vulnerabilities and resource dependencies. The patterns observed, particularly the strong awareness but low adaptive capacity, are common in under-resourced settlements, thereby offering a basis for comparative studies or policy applications in other high-risk regions.

Conclusion

This study contributes to the growing literature on localized climate change perception by documenting the experiences and concerns of residents in Umlazi and its neighbouring areas. The findings demonstrate high awareness levels and consistent reporting of natural resource degradation attributed to climate change. However, adaptive actions remain constrained by a lack of institutional support, climate literacy, and coordinated community responses. The research highlights the necessity of multi-stakeholder collaboration to bridge the gap between climate awareness and resilience. University-led outreach programs, combined with municipal investments in environmental infrastructure and climate education, can enhance grassroots climate adaptation efforts. Moving forward, policy and programmatic responses must prioritize community inclusion, recognizing that local insights are essential for the co-creation of sustainable and equitable adaptation pathways.

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Limitations

While this study provides valuable insights into community perceptions of climate change in Umlazi and surrounding areas, several limitations must be acknowledged. Firstly, the research relied primarily on self-reported data, which may introduce response bias due to participants' interpretations or social desirability effects. Secondly, the study was cross-sectional and did not account for seasonal or long-term environmental changes, limiting the ability to track evolving perceptions over time. Lastly, due to resource constraints, the study did not include perspectives from municipal officials or policy implementers, which could have provided a fuller picture of the institutional landscape influencing community adaptation.

Recommendation

Based on the study findings, it is recommended that locally tailored climate change education programmes be developed and implemented within Umlazi and surrounding communities. These programmes should aim to enhance community understanding of climate risks, adaptive strategies, and resource management practices. In addition, it is crucial to establish accessible early warning systems and to strengthen institutional support for community-led adaptation initiatives. Greater investment is needed in sustainable natural resource management, particularly in improving water quality and biodiversity conservation. The study further recommends fostering collaborative partnerships between universities, local government, and civil society organisations to support knowledge co-production and the co-design of locally relevant interventions. These partnerships can empower communities to take a more active role in climate adaptation planning. Finally, the formation of community-led adaptation committees should be encouraged, providing a platform for local voices to shape policy and practice and enhancing grassroots resilience to climate change.

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Biography

Dr. Sibonelo Thanda Mbanjwa is a dedicated lecturer in the Department of Nature Conservation at Mangosuthu University of Technology (MUT), South Africa. He holds a Ph.D. in Environmental Science and specializes in biodiversity conservation, sustainable development, and environmental education. Dr. Mbanjwa is deeply committed to community engagement, student mentorship, and the integration of indigenous knowledge systems into conservation practices. His work bridges academia and practical application, empowering students and communities through innovative teaching, research, and outreach initiatives.

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Competing interests

The authors have no relevant financial or non-financial interests to disclose.

Author contributions

I, the author, contributed to the study conception and design. Material preparation, data collection, and research were performed by Mbanjwa S.T. The first draft was written by Mbanjwa S.T.

Data availability

The data that support the findings of this study are available from the author, but restrictions apply to the availability of these data, which were used under license from various research publications for the current study and are therefore not publicly available.

References

1. Intergovernmental Panel on Climate Change (IPCC). (2022). Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report. Cambridge University Press. https://doi.org/10.1017/9781009325844
2. Kalaba, F. K., Quinn, C. H., & Dougill, A. J. (2017). The role of forest provisioning ecosystem services in

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Original Article

coping with household stresses and shocks in rural Africa. Ecosystem Services, 28, 66-72.
3. Leichenko, R., & O'Brien, K. (2008). Environmental Change and Globalization: Double Exposures. Oxford University Press.
4. Moser, S. C., & Ekstrom, J. A. (2010). A framework to diagnose barriers to climate change adaptation. Proceedings of the National Academy of Sciences, 107(51), 22026-22031. https://doi.org/10.1073/pnas.1007887107 PMid:21135232 PMCid:PMC3009757
5. Niang, I., Ruppel, O. C., Abdrabo, M. A., Essel, A., Lennard, C., Padgham, J., & Urquhart, P. (2014). Africa. In Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Cambridge University Press.
6. Pelling, M., & Manuel-Navarrete, D. (2011). From resilience to transformation: the adaptive cycle in two Mexican urban centers. Ecology and Society, 16(2).7 https://doi.org/10.5751/ES-04038-160211
7. Ziervogel, G., New, M., van Garderen, E. A., Midgley, G., Taylor, A., Hamann, R., ... & Visser, M. (2014). Climate change impacts and adaptation in South Africa. WIREs Climate Change, 5(5), 605-620. https://doi.org/10.1002/wcc.295

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