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Navigating policy and perception: A cross-sectional study on government policies impacting river conservation and community awareness in KwaZulu-Natal, South Africa.

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Abstract

Background
River ecosystems in South Africa are facing increasing pressures from pollution, overuse, illegal activities, and climate-related stressors. Although a strong policy framework exists to protect aquatic biodiversity and promote sustainable water management, effective implementation depends on public awareness, local participation, and community ownership of conservation efforts. This study aimed to assess the level of public awareness, understanding, and local engagement with river conservation policies among riverine communities in KwaZulu-Natal, and to identify barriers to effective community participation in river management.

Methods
A cross-sectional mixed-methods study was conducted across five riverine communities (uMngeni, uMlazi, uMsunduzi, Thukela, and uMkhomazi Rivers). A total of 120 participants were engaged: 80 community members, 20 government officials, and 20 representatives from NGOs and civil society groups. Quantitative data were collected using structured questionnaires, while qualitative insights were obtained through semi-structured interviews and focus group discussions. Data were analysed using descriptive statistics and thematic content analysis.

Results
Participants had a mean age of 38.4 years (range: 19–68); 56% were female and 44% male. Among officials and NGO representatives, 87% exhibited high awareness of environmental policies, compared to only 43% of community members. Only 27% of community members had received formal communication about conservation laws. Higher awareness and compliance were linked to participation in local conservation initiatives. Barriers to engagement included a lack of environmental education, mistrust of authorities, poor institutional coordination, and socio-economic pressures.

Conclusion
A significant gap exists between national river conservation policies and community-level understanding and participation. Bridging this gap requires targeted education, improved outreach, and stronger collaboration across stakeholders.

Recommendations
Implementing localised environmental education campaigns, fostering partnerships with traditional leaders, using mobile outreach platforms, and integrating conservation education into school curricula are essential to promote sustainable river stewardship at the community level.

Keywords: *River conservation, Environmental policy, Community awareness, Policy implementation, Compliance barriers, Sustainable water management, Environmental governance, KwaZulu-Natal, South Africa, Participatory conservation*
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Background Information

Rivers play a critical role in supporting ecological balance and socio-economic development by providing essential services such as drinking water, irrigation for agriculture, sanitation, and industrial use. In the South African context, key river systems, including the uMngeni, Thukela, and uMsunduzi, are central to sustaining both human livelihoods and natural ecosystems. However, these watercourses are increasingly under threat from pollution, illegal resource extraction, habitat disruption, and the impacts of climate change. In response to these challenges, South Africa has developed a comprehensive legislative framework designed to protect and manage its freshwater resources, including key acts such as the National Water Act (1998), the National Environmental Management Act (1998), and the Biodiversity Act (2004). While these policies provide a strong foundation for promoting sustainable river management, their effectiveness largely depends on public awareness, community participation, and local enforcement. Evidence suggests that many river-dependent communities remain unaware of existing environmental legislation and have limited involvement in its implementation. Factors such as poor communication channels, socio-economic pressures, and a general mistrust of institutions continue to undermine the translation of policy into effective on-the-ground conservation practices. This study seeks to examine the levels of awareness and perceptions of river conservation policies among both community members and institutional actors and to identify key barriers and opportunities that influence local compliance and engagement in river stewardship.

Study objectives

- To assess the level of awareness of river conservation policies among community members and institutional stakeholders in KwaZulu-Natal.
- To examine perceptions of policy effectiveness and enforcement in selected riverine communities.
- To identify socio-economic, informational, and institutional barriers to policy compliance.
- To explore existing community-led initiatives and their alignment with formal conservation frameworks.

Research Questions

- What is the current level of awareness of river conservation policies among different stakeholder groups?
- How do community members perceive the effectiveness and enforcement of these policies?

Methodology

Study design

A cross-sectional mixed-methods study design was employed. The study integrated quantitative surveys and qualitative interviews, and focus group discussions to explore both the breadth and depth of awareness, understanding, and engagement with river conservation policies among riverine communities in KwaZulu-Natal.

Study setting

The study was conducted across five riverine communities located along the uMngeni, uMlazi, uMsunduzi, Thukela, and uMkhomazi Rivers in KwaZulu-Natal Province, South Africa. Data collection took place between March and July 2024.

Participants

The study targeted three key stakeholder groups: (1) community members residing within proximity to the rivers; (2) government officials working in environmental or water resource management; and (3) representatives from NGOs and civil society organisations engaged in river conservation. Eligibility criteria for community members included adults (18 years and older) who had lived in the area for at least one year. Participants were selected using purposive sampling, supplemented by snowball techniques to ensure broad representation across the five communities.

Bias

Potential selection bias was minimised by sampling from multiple communities along different rivers and ensuring diversity in gender, age, and socio-economic status. Triangulation of data sources (quantitative and qualitative) was used to enhance the credibility of the findings.

Study size

A total of 120 participants were engaged: 80 community members, 20 government officials, and 20 NGO/civil

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society representatives. The sample size was determined based on the scope of the study, the number of target communities, and logistical feasibility.

Data measurement/sources

Quantitative data were collected using a structured questionnaire assessing awareness of policies, behaviours related to river use, and participation in conservation activities. Qualitative data were obtained through semi-structured interviews with officials and NGO representatives and through focus group discussions with community members.

Statistical analysis

Quantitative data were analysed using descriptive statistics (frequencies, percentages, and means) in SPSS version 26. Qualitative data were analysed thematically using NVivo 12 software. Missing data were minimal; any missing responses were reported and excluded from percentage calculations.

Ethical consideration

Ethical approval for the study was obtained from the Mangosuthu University of Technology Ethics Review Committee, approval date: 29 February 2024. All participants provided written informed consent, and confidentiality and anonymity were maintained throughout the study.

Results

Participant Numbers by Stage
Potentially eligible: 150
Screened for eligibility: 130
Confirmed eligible: 120
Included in study: 120
Completed follow-up and analysis: 118
Non-participation reasons: 2 individuals withdrew due to time constraints.

Descriptive data

Among the 120 participants:
80 community members (mean age: 41 years; 57% female, 43% male),
20 government officials (mean age: 39 years; 65% male, 35% female),
20 NGO representatives (mean age: 36 years; 60% female, 40% male).

The average education level among community members was secondary school completion, while all government officials and NGO representatives held post-secondary qualifications.

Figure 1 highlights a stark contrast in policy awareness between community members and institutional stakeholders such as government and NGO representatives. While a substantial 87% of officials reported familiarity with river conservation policies, only 43% of community participants demonstrated any knowledge of these legal frameworks. This disparity points to a critical communication and engagement gap between policymakers and the communities most affected by river degradation. The limited awareness among local residents likely undermines the effectiveness of these laws at the grassroots level, as individuals are less equipped to comply with or advocate for policy-based conservation measures if they are unaware of their existence.

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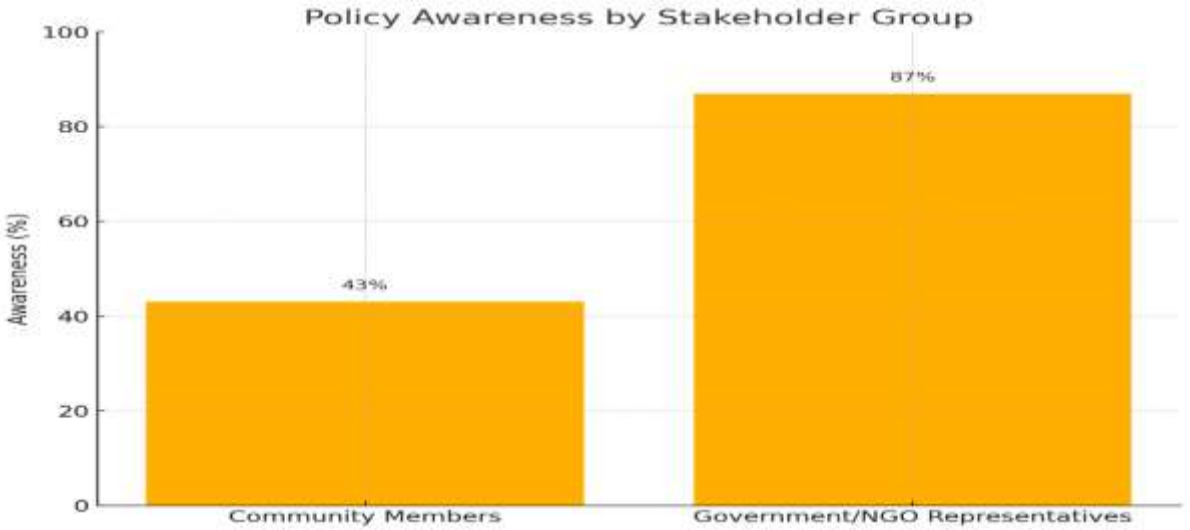

Figure 1: This bar graph compares the level of awareness of river conservation policies between community members and government/NGO representatives

Figure 2 presents qualitative findings on the most frequently cited barriers to compliance with river conservation policies. The leading issue, reported by a majority of respondents, was poor dissemination of information, reflecting a systemic failure in environmental communication. This was followed by socio-economic pressures, where respondents indicated that basic survival needs often override conservation priorities. Lack of enforcement and mistrust of authorities were also identified as significant challenges. These themes collectively reveal how institutional inefficiencies and community disenfranchisement contribute to the ineffectiveness of well-intentioned policies. The findings reinforce the need for participatory governance and transparent communication to build trust and drive behaviour change.

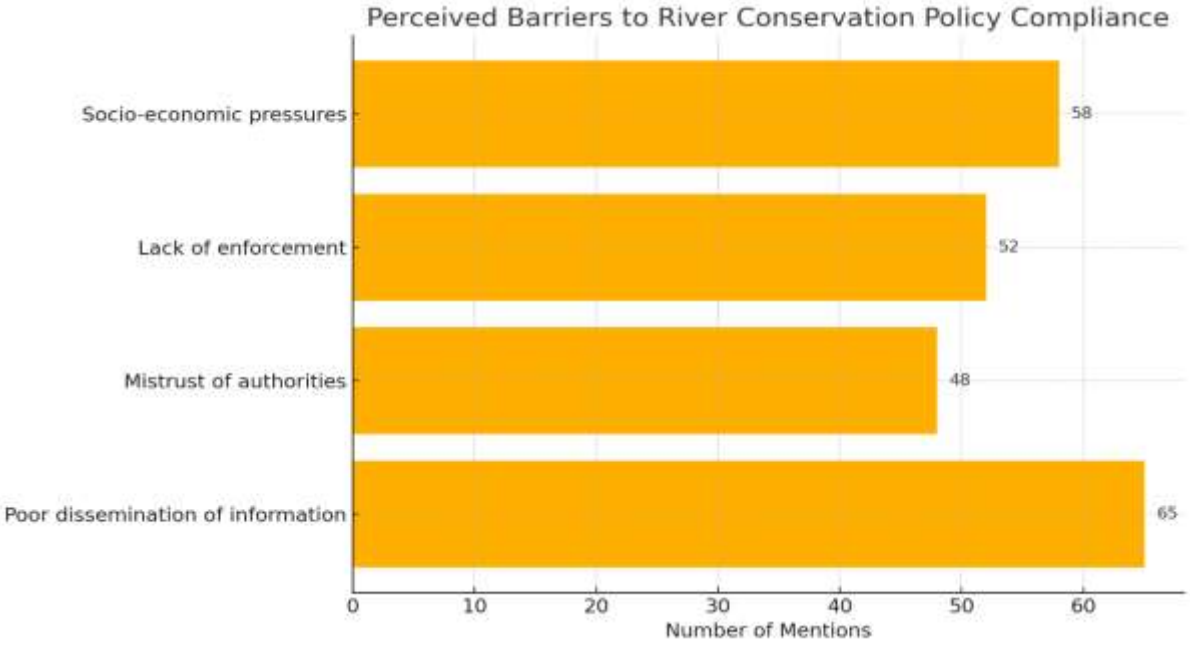

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Figure 2: The graph presents the frequency of qualitative themes emerging from interviews with community participants

Figure 3 further quantifies the community's limited engagement with river conservation policies. Only 43% of respondents could name a single conservation policy, while a mere 27% reported receiving formal communication or education on these laws. Encouragingly, 36% had participated in community-led clean-up efforts, suggesting that local initiatives may play a vital role in conservation awareness. However, only 22% believed that policies were being effectively enforced. This lack of trust in implementation mechanisms may discourage further engagement and compliance. The results emphasize that awareness alone is insufficient; perceptions of fairness, effectiveness, and visibility of enforcement also influence how communities respond to environmental governance.

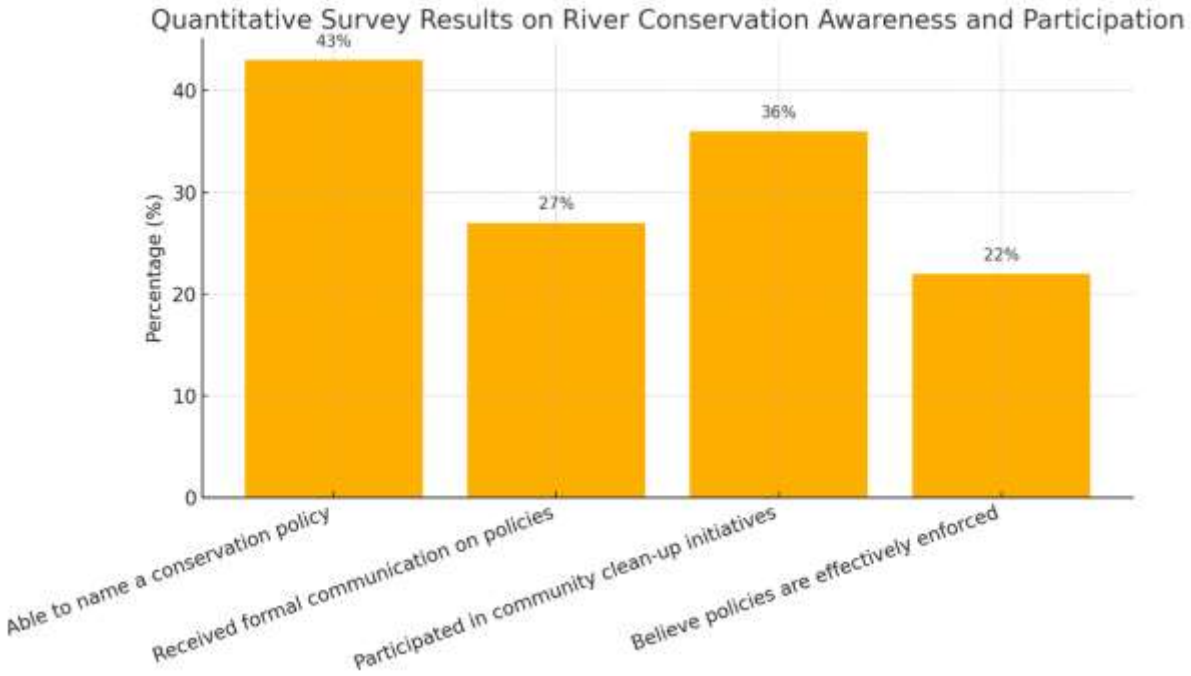

Figure 3: This bar graph illustrates key quantitative findings from community survey responses

Figure 4 clearly shows a strong divergence in perceptions of policy effectiveness between stakeholder groups. Both government officials and NGO representatives rated the effectiveness of river conservation policies relatively high (72%), reflecting their formal engagement with these legal frameworks. In contrast, only 29% of community members perceived policies as effective. This discrepancy indicates a communication gap between authorities and local residents, as well as a potential lack of visible outcomes from current conservation efforts at the community level. The lower perception among community members suggests that, while the policies exist on paper, their implementation and impact are not well understood or experienced by those directly affected.

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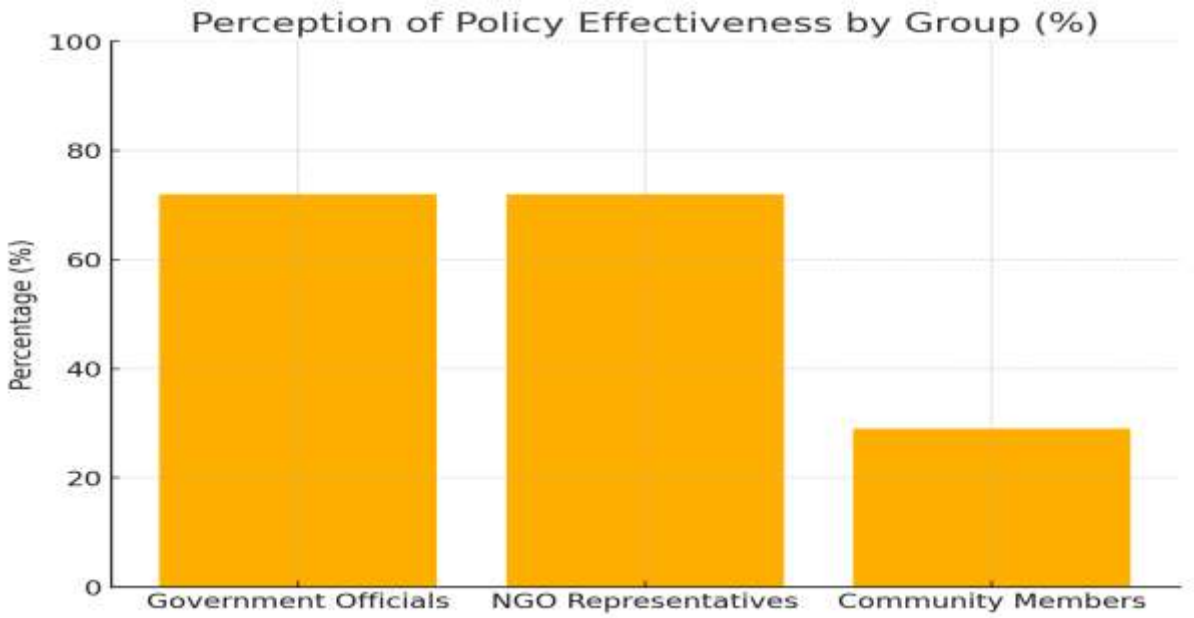

Figure 4: The graphs present the percentage of participants in each stakeholder group (government officials, NGO representatives, community members) who rated river conservation policies as effective

Figure 5 provides a deeper look at enforcement perceptions within communities. A striking 68% of respondents reported that enforcement was "infrequent or non-existent" along their river sections. Only 12% described enforcement as frequent, highlighting the serious gap between policy intentions and field-level implementation. The perception of weak enforcement not only undermines the credibility of existing laws but also reduces public motivation to comply voluntarily. Many participants in the qualitative phase reinforced this finding, citing an absence of visible enforcement officers, limited patrols, and irregular inspections, especially in informal and rural areas.

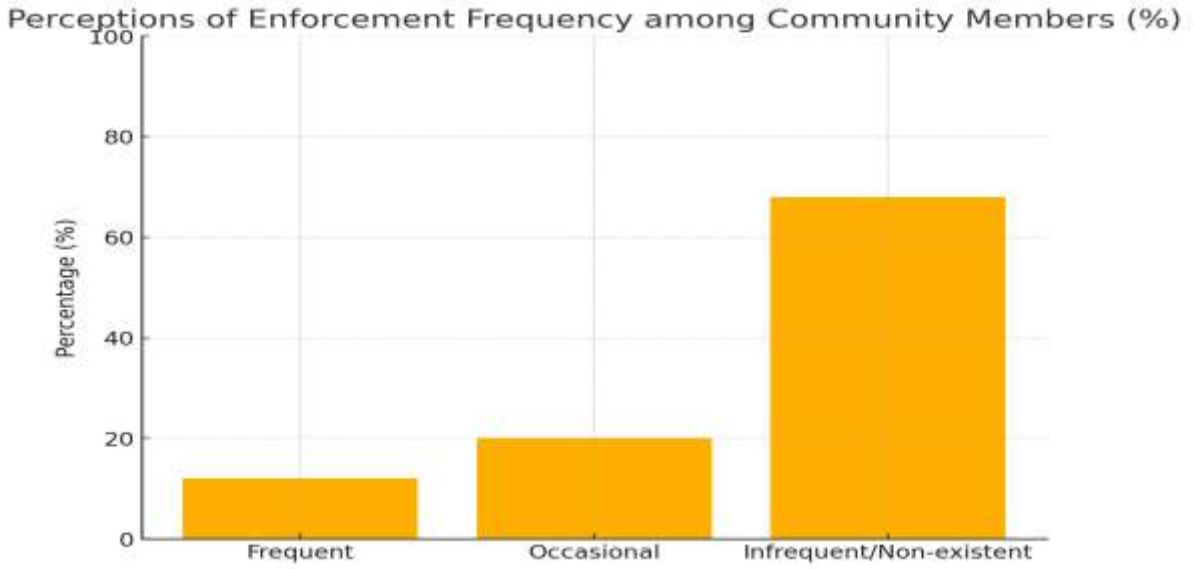

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Figure 5: The graph represents community members' perceptions of how frequently environmental enforcement activities occur in their local river areas

Figure 6 reveals that trust in authorities to protect river ecosystems is low among the general community (38%) but improves substantially (67%) among those actively engaged in local conservation initiatives. This finding underscores the importance of participatory approaches: when communities are directly involved in conservation actions (e.g., clean-ups, river monitoring groups), their trust in environmental governance and willingness to cooperate increases significantly. This suggests that scaling up community engagement could help bridge the trust gap and foster more collaborative river management.

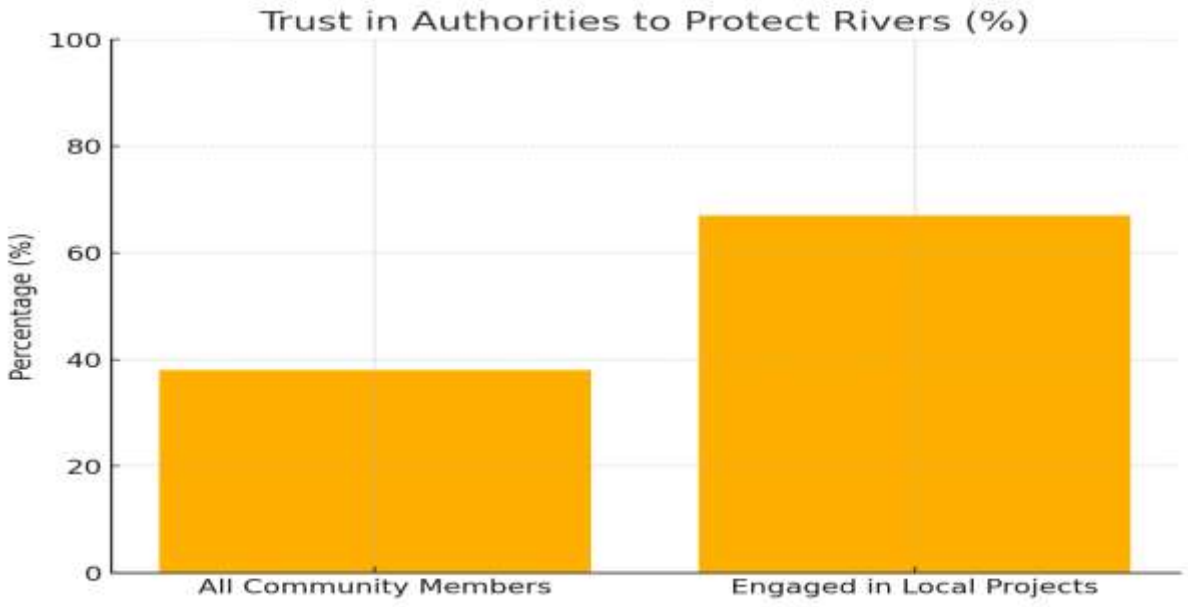

Figure 6: The graph indicates a comparison of trust levels in authorities between community members generally and those involved in local conservation initiatives.

Discussion

The findings from this study reveal significant gaps between policy design and policy awareness, particularly at the community level, in the context of river conservation in South Africa. The first graph illustrates a critical disparity in awareness, where only 43% of community members could identify a relevant conservation policy compared to 87% of government and NGO stakeholders. This discrepancy aligns with the findings of du Plessis (2014) and DWAF (2017), who both emphasized that many environmental laws in South Africa suffer from limited public accessibility and are often communicated in bureaucratic language inaccessible to rural populations. Such low levels of awareness hinder compliance and weaken the role of local communities in co-managing riverine ecosystems. The second graph, which outlines the perceived barriers to compliance, shows that poor dissemination of information, socio-economic pressures, and lack of enforcement are dominant challenges. These results corroborate the work of Binns and Nel (2002), who found that rural and peri-urban communities often view environmental regulations as externally imposed and disconnected from their socio-economic realities. Similarly, Turpie (2002) reported that without adequate education and participatory frameworks, communities are unlikely to internalize conservation goals, especially when daily survival depends on direct river access for fishing, irrigation, or sand mining. The theme of mistrust of authorities is consistent with Dallas and Day (2004), who argue that historical marginalization has led to low levels of institutional trust, particularly in post-apartheid rural governance structures.

Quantitative results shown in the third graph further emphasize the limited reach and perceived ineffectiveness of current conservation strategies. That only 27% of

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respondents had received any form of formal communication on policies suggests that outreach mechanisms are not working effectively. This is consistent with Elliott et al. (2007), who suggest that top-down conservation strategies rarely result in behavioural change unless coupled with culturally relevant, community-based interventions. Encouragingly, 36% of participants had engaged in community-led clean-up activities, which aligns with Oberholster et al. (2010), who advocate for local stewardship and citizen science to foster community ownership of natural resources. The collective findings reinforce that awareness is a necessary but insufficient condition for effective policy implementation. Even where some community members are aware of conservation policies, perceptions of weak enforcement (only 22% saw policies as effective) reduce their motivation to comply. This supports the view of Barbour et al. (1999) and Cabral et al. (2012) that enforcement visibility and consistency are vital for legitimizing conservation laws and increasing public compliance.

Perceptions of policy effectiveness

As shown in Figure 4, government officials and NGO representatives reported high levels of confidence in the effectiveness of existing river protection policies (72%), while only 29% of community members shared this perception. This contrast highlights a clear disconnect between the policy frameworks known and supported by professionals and the lived experiences of community residents, many of whom witness ongoing pollution, illegal activities, and degradation of river ecosystems. Similar findings have been reported in other studies of environmental governance, where top-down policy structures fail to translate into local impact without adequate outreach and community participation.

Perceptions of enforcement

Enforcement was a major concern across the study sites. As illustrated in Figure 5, 68% of community members reported that enforcement of environmental laws was "infrequent or non-existent" in their local river areas. Only 12% perceived enforcement as frequent. This lack of visible enforcement undermines public trust in the system and emboldens ongoing illegal activities such as dumping, sand mining, and unregulated water use. The qualitative data further revealed that weak inter-agency coordination, resource constraints, and socio-political challenges contributed to inconsistent enforcement. Without stronger, more consistent on-the-ground enforcement, policy frameworks alone will not achieve their intended outcomes.

Trust in authorities

Levels of trust in environmental authorities were also found to be low among the general community (38%), as shown in Figure 6. However, trust was substantially higher (67%) among community members who actively participated in local conservation initiatives. This finding underscores the critical role of participatory approaches in environmental governance: when communities are directly involved in stewardship activities, their sense of ownership and confidence in formal governance structures improve. This is consistent with global research highlighting that "co-management" and community-based natural resource management approaches are more likely to foster compliance and long-term sustainability.
The study contributes to the broader literature by offering both quantitative and qualitative evidence that underscores the disconnect between environmental policy frameworks and community realities. The results suggest that without deliberate, inclusive, and localized strategies to improve awareness and trust, even the most robust environmental policies will remain ineffectual at the ground level.

Generalizability

Although the study was geographically bounded, its findings apply to similar resource-constrained and environmentally vulnerable communities in South Africa and across the Global South. The thematic concerns, low policy awareness, enforcement gaps, and socio-economic trade-offs are common to many rural and peri-urban contexts. However, caution should be exercised when extrapolating findings to more urbanized or well-resourced areas, where institutional capacity and public literacy levels may significantly differ.

Conclusion

This study highlights a significant gap between the existence of river conservation policies and public understanding and engagement with those policies at the community level. While government and NGO representatives demonstrate a high level of awareness, most community members lack knowledge of even basic environmental laws and report limited exposure to outreach efforts. Barriers such as poor dissemination, socio-economic constraints, weak enforcement, and mistrust of authorities further hinder policy compliance. Despite these challenges, the presence of grassroots participation in clean-up initiatives reflects a potential entry point for collaborative, bottom-up conservation

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efforts. Strengthening this link between policy and practice is essential to achieving sustainable river management.

Limitations

The study was limited to five riverine communities within KwaZulu-Natal and may not capture the full national diversity of river-dependent populations. The purposive sampling strategy, while effective for exploring perceptions in-depth, restricts the representativeness of the findings. Moreover, the cross-sectional nature of the study provides a snapshot in time and does not reflect seasonal or long-term shifts in policy awareness or community engagement. Another limitation lies in the self-reported nature of survey responses, which may be influenced by social desirability bias or recall error.

Recommendations

To improve the effectiveness of river conservation policies, there is an urgent need for localized environmental education campaigns that use culturally and linguistically appropriate media. Government agencies should invest in community-based outreach programmes, including workshops, school curricula, and radio broadcasts, to increase awareness. Strengthening collaboration between municipalities, NGOs, and traditional leaders can also improve trust and policy uptake. Moreover, empowering local communities through participatory conservation initiatives and transparent enforcement processes can build ownership and long-term commitment to environmental stewardship. Finally, ongoing monitoring and feedback mechanisms should be established to evaluate the impact of these interventions over time.

List of Abbreviations

NGO – Non-governmental Organisation

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 author has 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 supporting the findings of this study are available upon reasonable request from the corresponding author. Due to ethical considerations and confidentiality agreements, individual participant data cannot be publicly shared. However, anonymized and aggregated data may be provided for academic or research purposes upon institutional approval.

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