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Reframing Household Information Access for Water Project Sustainability in Rural Kenya

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Abstract

Aim: This study examines why increased access to household-level water-related information does not consistently translate into sustainable practices, using the Muhuru Community Water Supply Project (MUCOWAS) in Migori County, Kenya as a case study.

Methods: A mixed-methods approach was employed, combining 267 household reviews, 25 key informant interviews, and 3 focus group discussions. Quantitative data were analysed using Firth's logistic regression to identify predictors of sustainable behaviour, while qualitative insights were derived through thematic coding of stakeholder views.

Results: The study found that household information access alone had little effect on sustainability; however, when combined with strong community participation and effective management structures, it significantly enhanced sustainable practices.

Conclusion: The study concludes that household information is only effective when communities are actively involved in interpreting and applying it within inclusive governance systems.

Recommendations: To enhance rural water project sustainability, project managers should embed household information access within participatory governance structures, using culturally tailored, inclusive communication strategies that empower communities as co-creators of project knowledge and accountability.

Keywords: *Household information access, participatory governance, community participation, sustainability, water project management, rural Kenya*

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1.0 INTRODUCTION

Access to safe and sustainable water remains a persistent challenge in rural Kenya, where community-managed water projects often struggle to maintain their functionality beyond the initial implementation phase. Despite significant investments by governments and development partners, many rural water schemes face premature failure due to limited household engagement, weak governance, and inadequate information flows. While community participation has long been recognized as a cornerstone of sustainability, the role of household-level information access in terms of how water users receive, interpret, and act upon project-related knowledge has received insufficient scholarly attention.

Emerging evidence suggests that sustainability is not solely a function of infrastructure or funding, but of informed and empowered households who understand their roles, responsibilities, and the operational dynamics of water systems. According to the Water Services Regulatory Board (WASREB, 2022), nearly 40% of rural water schemes in Kenya become non-functional within the first five years of implementation, highlighting sustainability concerns. In this context, household information access becomes a strategic lever for enhancing project ownership, accountability, and long-term viability. Prevailing communication models in rural water governance often rely on passive dissemination, failing to engage households as active participants in the information ecosystem. Studies such as Marks and Davis (2012) in Tanzania and Whittington *et al.* (2009) in Kenya show that linear communication models alone have passive dissemination of information that fail to engage households, yet few studies address the household-level role in information flows through interactive communication models.

This study reframes household information access as a dynamic and integral component of project sustainability, drawing on systems theory and socio-economic status theory to explore its interaction with education, income, and community participation. Using the Muhuru Community Water Project in Migori County as a case study, this research investigates how access to information influences household behavior, project engagement, and sustainability outcomes. Muhuru Community Water Project was selected because it has experienced recurrent breakdowns and governance challenges despite substantial donor investment, making it a relevant case for studying sustainability. This study seeks to determine the extent to which household information access influences participation, accountability, and sustainability outcomes in rural water projects.

Unlike prior research that has examined governance or financing as sustainability drivers, this study uniquely foregrounds household-level information access as a determinant of long-term project viability. By positioning household information access as a project management priority rather than a peripheral concern, this study contributes to a more nuanced understanding of rural water sustainability. It offers practical recommendations for designing inclusive, culturally resonant communication strategies that empower households and strengthen community-led water governance. The insights are particularly relevant for practitioners and policymakers seeking to enhance the resilience and effectiveness of rural water supply systems in fragile contexts.

2.0 LITERATURE REVIEW

2.1 Household Information Access and Water Project Sustainability

Access to relevant, timely, and actionable information at the household level has emerged as a critical determinant of sustainability in rural water projects. In fragile contexts such as rural Kenya,

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where infrastructure is often community-managed and donor-supported, the flow of information between project implementers and beneficiaries directly influences participation, maintenance, and long-term functionality (Chege, 2020). Households that are well-informed about project objectives, operational procedures, and their roles in system upkeep are more likely to engage in protective behaviors and demand accountability (Korzenevica *et al.,* 2024). Similarly, studies in Tanzania (Marks *et al.,* 2012) and Uganda (Fisher, 2018) have shown that households with greater access to information demonstrate stronger commitment to project maintenance and accountability mechanisms.

The literature underscores that information access is not merely a technical issue but a socio-political one, shaped by education levels, gender dynamics, and local power structures (Mude, 2019). In many rural Kenyan communities, information dissemination is mediated through informal networks, local leaders, and culturally embedded channels such as barazas and religious gatherings. These mechanisms, while contextually resonant, often exclude marginalized groups, particularly women and low-income households, thereby undermining inclusive sustainability (Owuor & Wambua, 2021). Furthermore, women in pastoralist households often receive information second-hand through male household members, limiting their ability to directly participate in decision-making (Adams & Zulu, 2020).

2.2 Theoretical Foundations: Systems and Socio-Economic Status Theories

Systems theory provides a useful lens for understanding how household information access functions within broader water governance ecosystems. It posits that sustainability emerges from the interaction of technical, institutional, and behavioral subsystems (Bertalanffy, 1968). Within this framework, information access acts as a feedback mechanism that enables adaptive management, early problem detection, and community-driven solutions (Mwangi & Otieno, 2022). In the Muhuru Water Project, household feedback on water rationing schedules functioned as an adaptive mechanism that informed both technical adjustments (pump operation times) and institutional decisions (committee accountability).

Complementing this, the socio-economic status (SES) theory explains disparities in information access by linking them to household-level variables such as income, education, and occupation. Households with higher SES tend to have better access to communication platforms, decision-making forums, and technical knowledge, which enhances their capacity to contribute to project sustainability (Chege, 2020). Conversely, lower SES households often face informational exclusion, leading to disengagement and reduced ownership of water infrastructure (Kariuki & Musyoka, 2018). Households with secondary education or higher are more likely to attend water committee meetings and utilize mobile-based payment systems, whereas low-literacy households remain excluded from these platforms (Nyaga & Kihoro, 2019).

2.3 Empirical Gaps and the Need for Reframing

Despite growing recognition of the role of information access, existing literature tends to treat it as a secondary variable, often subsumed under broader themes of participation or governance. Few studies have interrogated the quality, frequency, and relevance of information received at the household level, nor have they explored how reframing communication strategies could enhance sustainability outcomes (Korzenevica *et al.,* 2024). This gap is particularly pronounced in rural Kenyan contexts, where donor-funded projects frequently overlook the micro-level dynamics of

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information flow. While most donor-funded water projects distribute periodic progress reports, these are often technical and inaccessible to ordinary households, limiting their practical utility (Omwenga, 2017).

Reframing household information access involves shifting from extractive, top-down dissemination models to participatory, co-designed communication systems. Such an approach recognizes households not merely as recipients of information but as active agents in its generation, interpretation, and application. This reframing aligns with contemporary project management principles that emphasize stakeholder engagement, iterative learning, and contextual responsiveness (PMI, 2021). Community radio broadcasts, participatory mapping, or mobile phone-based SMS alerts have been successfully piloted in Ethiopia and Malawi to ensure inclusivity in water governance (Tadesse & Alemu, 2020).

3.0 METHODOLOGY

This study employed a mixed-methods case study design. A total of 267 households were surveyed using stratified random sampling across socio-economic zones in Muhuru Ward, Migori County. Qualitative data were collected through 3 focus group discussions and 25 key informant interviews with stakeholders, including water committee members, religious leaders, educators, and elders.

Household information access was measured using a structured questionnaire comprising six thematic blocks, including frequency and trust in communication channels (barazas, radio, church announcements, posters), governance participation, and sustainability behaviors. Responses were rated using Likert-scale items and closed-ended formats. A composite Sustainability Index was developed to capture behavioral indicators such as tariff compliance, fault reporting, and meeting attendance.

Quantitative data were analyzed using Firth's logistic regression to account for rare event bias, with SPSS used for statistical modeling. Independent variables included information access score, education level, income bracket, and gender. Qualitative data were analyzed using NVivo through recursive thematic coding, combining deductive and emergent categories such as message credibility, cultural resonance, and feedback mechanisms.

4.0 FINDINGS

4.1 Household Information Access: Limited but Latent Potential

Quantitative analysis revealed that only 36% of households reported high access to information regarding the Muhuru Community Water Project. Despite this, statistical tests showed that household information access was not a significant predictor of sustainability (OR = 0.94, p = 0.82). This suggests that while information is available to some extent, its quality, relevance, and delivery mechanisms may be insufficient to drive behavioral change or sustained engagement.

Qualitative data revealed that the problem lies less in access and more in how information is shared. Focus group discussions and key informant interviews indicated that poor communication strategies characterized by infrequent updates, lack of feedback loops, and reliance on passive dissemination limited the impact of information on household decision-making. Households expressed a desire for more culturally resonant and locally embedded communication channels, such as barazas, religious gatherings, and trusted intermediaries.

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4.2 Disconnect Between Access and Action

The findings suggest a critical disconnect between information access and sustainability outcomes. Households with access to project-related information did not necessarily translate that access into active participation or maintenance behaviors. This gap underscores the need to reframe information access not merely as availability, but as a strategic enabler of engagement, co-creation, and accountability. For instance, some households reported receiving information about water maintenance schedules but did not participate in upkeep activities, indicating that awareness did not translate into collective responsibility.

4.3 Moderating Role of Participation and Management

While information access alone was not statistically significant, its interaction with other variables revealed important dynamics. Households that perceived community participation as important were three times more likely to report sustainable water practices (OR = 3.16, $p < 0.001$). Similarly, community collaboration (OR = 1.91, $p < 0.011$) and management effectiveness (OR = 65.25, $p < 0.001$) emerged as powerful predictors of sustainability. The very high odds ratio (OR = 65.25, $p < 0.001$) indicates that effective management was overwhelmingly the most important factor influencing sustainability, possibly because well-organized structures ensured accountability, equitable access, and long-term maintenance.

These results suggest that while information alone does not guarantee sustainability, when combined with active participation and effective management, it becomes a powerful enabler of long-term water project success.

4.4 Implications for Reframing

The findings validate the need to reframe household information access from a passive variable to an active project management lever. Effective reframing would involve: 1) Designing inclusive communication strategies tailored to local contexts such as using local-language radio and community theater.2) Integrating information dissemination with participatory governance structures such as establishing village water committees with household representation. 3) Establishing feedback mechanisms that allow households to shape and respond to project decisions such as suggestion boxes, community scorecards. 4) Leveraging trusted community actors such as chiefs, church leaders, village elders, women's group leaders to translate technical information into locally understandable terms.

5.0 SUMMARY OF FINDINGS

Household-level access to water project information in rural Kenya was found to be limited. Where available, communication was sporadic, top-down, and contextually irrelevant, reducing its ability to promote engagement or long-term behavior change. The disconnect between information availability and action underscores a critical gap in current project management approaches and practice.

Quantitative analysis showed that household information access, when considered in isolation, was not a statistically significant predictor of water project sustainability. However, qualitative insights highlighted that the issue lies not in the absence of information, but in its delivery and framing. Households expressed a need for more inclusive, culturally resonant communication strategies that reflect local realities and foster ownership. For instance, households reported that information was

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often shared only during large public meetings, with little opportunity for follow-up or feedback, limiting its relevance to daily water use practices.

Importantly, the study found that information access becomes impactful when embedded within participatory and well-managed systems. The study established that households were more likely to adopt sustainable practices when they participated in decision-making processes such as electing water committee leaders or when management structures ensured regular maintenance and transparent fee collection. These findings suggest that reframing household information access—from a passive dissemination model to an active, co-created process—is essential for enhancing project sustainability.

Broadly, the findings suggest that households should not be viewed only as recipients of information. Instead, they play a crucial role in generating, interpreting, and applying knowledge to sustain rural water projects.

6.0 CONCLUSION

This study underscores the critical yet underutilized role of household information access in sustaining rural water projects in Kenya. While access to project-related information exists in varying degrees, its current form ascharacterized by passive dissemination and limited contextual relevance fails to catalyze meaningful household engagement or long-term infrastructure stewardship. The disconnect between information availability and behavioral response reveals a fundamental flaw in conventional project communication strategies.

Importantly, the findings demonstrate that household information access gains significance only when embedded within participatory and well-managed systems. Community involvement and effective governance structures amplify the impact of information, transforming it from static data into actionable knowledge. This insight calls for a strategic reframing: households must be repositioned not as passive recipients but as co-creators and interpreters of project information.

This study contributes to existing literature by reframing household information access as a strategic enabler of sustainability rather than a secondary variable. Methodologically, it integrates quantitative and qualitative insights to provide a nuanced understanding of how information interacts with participation and governance in rural Kenyan water projects.

7.0 RECOMMENDATIONS

The findings of this study point to a pressing need for a strategic overhaul in how household-level information is conceptualized, delivered, and utilized within rural water project management frameworks. To enhance sustainability outcomes, the following recommendations are proposed:

1. Design Participatory Communication Environments: Project managers should move beyond top-down dissemination and invest in participatory communication systems that reflect local cultural norms and social structures. This includes leveraging trusted community intermediaries—such as religious leaders, women's groups, and youth networks—to co-create and relay project information in accessible formats.

2. Embed Information Access Within Governance Structures: Information access must be institutionalized within community water governance mechanisms. Establishing feedback loops, grievance redress platforms, and regular community forums can ensure that households are not only informed but also empowered to influence project decisions and monitor implementation.

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3. Tailor Messaging to Household Realities: Communication strategies should be context-sensitive, accounting for literacy levels, gender dynamics, and socio-economic disparities. Visual aids, vernacular language broadcasts, and interactive formats (e.g., community theatre or mobile-based surveys) can enhance comprehension and engagement across diverse household profiles.

4. Integrate Information Access into Project Design and Evaluation**:** Household information access should be treated as a core project component—monitored, evaluated, and refined throughout the project lifecycle. Baseline assessments and periodic reviews of information flow effectiveness can help identify bottlenecks and adapt strategies accordingly.

5. Promote Co-Ownership Through Transparent Information Sharing: Transparency in financial management, technical operations, and decision-making processes fosters trust and collective ownership. Projects should adopt open-data principles at the community level, ensuring that households have access to clear, timely, and actionable information about project status and sustainability plans.

6. Build Capacity for Local Information Stewardship: Training community members in basic communication, monitoring, and data interpretation skills can create local champions for sustainability. These individuals can serve as bridges between technical teams and households, reinforcing accountability and continuity beyond donor involvement.

These recommendations aim to reposition household information access as a dynamic and integral element of rural water project sustainability. By reframing communication as a participatory, strategic process, development practitioners can foster deeper engagement, stronger ownership, and more resilient water infrastructure systems in fragile contexts.

It is important to note that the study limitations related to geographical scope (Migori County only), reliance on self-reported data, and its focus on a single community water project may limit the generalizability of findings to other rural contexts. Future studies could expand the scope to compare multiple regions or employ longitudinal data to assess sustainability over time.

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