COMMUNITY PARTICIPATION IN THE INTERGRATED WATER RESOURCE MANAGEMENT OF UPPER ATHI RIVER BASIN, KENYA

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International Academic Journal of Arts and Humanities (IAJAH) | ISSN 2520-4688

Received: 12th May 2025

Published: 19th May 2025

Full Length Research

Available Online at: https://iajournals.org/articles/iajah_v2_i1_213_232.pdf

Citation: Kiogora, J. K. (2025). Community participation in the Intergrated Water Resource Management of upper Athi River Basin, Kenya. *International Academic Journal of Arts and Humanities, 2*(1), 213-232.

ABSTRACT

Although the Kenyan Constitution and Water Act is clear on why community members ought to participate in the Integrated Water Resource Management for sustainable water management in Kenya, unsustainable use of water is still rife in the Upper Athi River Basin. The communities residing in the Upper Athi River Basin have over the years ignored the law and have instead continued to direct sewers and dumped industrial waste into the rivers, expand settlements and farming activities, all which have dire consequences on the river waters. In response to this, this study explored the factors that influence the community members to either or not participate in the Integrated Water Resource Management in order to enhance conservation and sustainable water resource use in Upper Athi River Basin. In particular, the study investigated how community awareness and institutional capacity building impact community participation in Integrated Water Resource Management. The study was anchored on Social Learning Theory and Citizen Participatory Theory. The study employed descriptive survey design with both qualitative and quantitative approaches. Data was collected from 194` respondents through questionnaires, interview schedules, focus group discussions, and observations. The instruments were subjected to validity and reliability test. Quantitative data was analyzed using descriptive statistics including frequency, percentages, mean and standard deviation. Chi square test for independence was used to test the significance of community awareness, community managerial skills, institutional capacity building, and social economic factors on community participation in Integrated Water Resource Management in upper Athi River Basin. Qualitative data was analyzed using content analysis. The study adhered to set ethical conditions. Results of the study were presented in tables and figures. Results of the study revealed that levels of community awareness, community managerial skills, institutional capacity and, poor socio economic conditions had significant impact on community participation in Integrated Water Resource Management in upper Athi River Basin. The study concluded that the government and other interested water parties should take necessary measures to improve the level of community awareness, community managerial skills, institutional capacity building, and the socio-economic status of the people in upper Athi River Basin so as to enhance community participation in water issues. The study recommended that the Integrated Water Resource Management should integrate all stakeholders in water conservation; it should in collaboration with Government and NGOs sensitize the communities and also provide them with basic skills on water use and conservation; allow locals to exercise leadership; empower locals on water conservation techniques; provide capacity building to community members; ensure social equity and equality in water resource use; encourage women to participate in water resource management and conservation; financially empower the communities at all levels of projects implementation; and ensure full inclusion of community members in water issues so that they can get a sense of ownership.

Key Words: Community Awareness and Institutional Capacity Building and Integrated Water Resource Management

INTRODUCTION

Background of the Study

Integrated Water Resources Management (IWRM) has emerged as a critical framework for sustainable water governance in Kenya, particularly in the wake of growing water scarcity and environmental degradation. Recent strategic documents, such as Kenya's National Water Resources Strategy underscore the government's renewed commitment to community participation and decentralized water management. This approach is also aligned with Sustainable Development Goal 6, which advocates for clean water and sanitation for all. According to a 2024 UN Environment Programme report, Kenya has made notable progress in implementing IWRM principles, particularly in enhancing stakeholder involvement and cross-sector coordination (UN Water, 2024). However, despite these policy advancements, the practical integration of communities' especially marginalized groups into decision-making processes remains inconsistent and underdeveloped.

A 2024 study by Korzenevica et al. observed that while frameworks for public participation in domestic water management exist, implementation is hindered by vague standards and weak enforcement mechanisms. In the Upper Athi River Basin, despite policy tools and regulatory frameworks, significant barriers persist, such as limited public awareness, insufficient institutional capacity, and weak inter-agency linkages. These challenges have resulted in unsustainable practices, including illegal wastewater discharge, pollution, and unregulated abstraction, posing serious risks to both ecological health and human well-being. Recognizing this, recent donor-backed interventions like the Green Climate Fund's resilience project in the Upper Athi Basin have emphasized IWRM alongside local engagement, aiming to build climate resilience while promoting equitable water governance (Water Diplomat, 2025).

Additionally, community-driven models such as the "Negotiated Approach" have gained traction, focusing on inclusive decision-making and equitable benefit sharing among water users. In regions like the Athi Basin, such grassroots initiatives are essential for fostering long-term stewardship and shared accountability. Organizations like Both ENDS (2023) have championed these models to ensure that local communities are not only consulted but actively participate in shaping policies and managing resources. While these approaches offer hope, they also highlight the gap between policy rhetoric and operational reality. In sum, Kenya's

journey towards fully inclusive and effective IWRM is ongoing; sustained political will, capacity building, and the institutionalization of participatory mechanisms are vital for closing the implementation gap and safeguarding the country's water future.

Statement of the Problem

The Upper Athi River Basin faces significant water management challenges despite Kenya's constitutional and legislative frameworks, such as the Constitution of Kenya (2010) and Water Act (2012), which mandate sustainable resource use and community participation. However, unsustainable practices persist, with industries, households, and agricultural activities discharging untreated wastewater and solid waste into the river, exacerbating pollution and biodiversity loss (NEMA, 2022). Water Resources User Associations (WRUAs), established to foster community-led Integrated Water Resources Management (IWRM), remain largely ineffective, with only 15% operational nationally (UNDP, 2021).

This failure is compounded by low public awareness of IWRM principles, as 85% of basin residents lack understanding of their role in conservation (UNEP, 2023). Rapid population growth (3% annually) and limited economic opportunities have intensified pressures on the basin, driving encroachment into water reserves, over-abstraction, and unsustainable land-use practices such as deforestation and livestock overgrazing (KNBS, 2023). These activities threaten water quality, food security, and public health, with 60% of industries lacking wastewater treatment systems (NEMA, 2022). Institutional weaknesses further undermine conservation efforts, as poor enforcement capacity has allowed 70% of critical water reserves to remain unprotected (GoK, 2023). If unaddressed, projections warn of severe economic consequences, including a potential 5% GDP loss by 2030 due to water scarcity and ecosystem collapse (IMF, 2024).

Conversely, adopting IWRM principles could reduce water-related conflicts by 40% and generate a 4:1 return on investment in economic and social benefits (World Bank, 2024; USAID, 2022). Recent policy shifts, including a $10M allocation for basin restoration (National Treasury, 2025), highlight growing recognition of the crisis. However, meaningful progress hinges on bridging awareness gaps, strengthening institutional capacity, and empowering communities through participatory governance. Without urgent action, the basin risks irreversible degradation, deepening poverty, and inter-community conflicts, underscoring the need to examine barriers to community engagement in IWRM as a pathway to sustainable solutions.

Research Objectives

1. To determine the influence of community awareness on the level of participation in the IWRM in upper Athi River Basin.
2. To examine the role of institutional capacity building on the level of participation in the IWRM in upper Athi River Basin.

Research Hypothesis

1) H_{o1}: There is no significant influence of community awareness on community participation in IWRM in upper Athi river basin.
2) H_{o2}: There is no significant influence of institutional capacity building on community participation in IWRM in upper Athi river basin.

LITERATURE REVIEW

Theoretical Framework

Social Learning Theory

Integrated Water Resources Management (IWRM) has emerged as a critical framework for sustainable water governance in Kenya, particularly in the wake of growing water scarcity and environmental degradation. Recent strategic documents, such as Kenya's National Water Resources Strategy (2020–2025), underscore the government's renewed commitment to community participation and decentralized water management. This approach is also aligned with Sustainable Development Goal 6, which advocates for clean water and sanitation for all. According to a 2024 UN Environment Programme report, Kenya has made notable progress in implementing IWRM principles, particularly in enhancing stakeholder involvement and cross-sector coordination (UN Water, 2024). However, despite these policy advancements, the practical integration of communities especially marginalized groups into decision-making processes remains inconsistent and underdeveloped.

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Citizen Participatory Theory

Citizen Participation Theory, pioneered by Wengert (1976), advocates for democratic decision-making in public programs, emphasizing that affected individuals should influence decisions

impacting their lives. Arnstein's (1969) seminal "ladder of participation" further classifies engagement into non-participation (manipulation, therapy), tokenism (informing, consultation), and citizen power (partnership, delegated control). Recent studies highlight persistent gaps in applying these principles to water governance in Kenya. For instance, a 2023 UNDP report reveals that 70% of communities in the Upper Athi River Basin remain at Arnstein's "manipulation" stage, where authorities dictate IWRM agendas without meaningful dialogue, exacerbating distrust (UNDP, 2023). Similarly, a 2022 World Bank analysis notes that tokenistic practices, such as one-way consultations, dominate water management in the basin, failing to address systemic issues like pollution and over-abstraction (World Bank, 2022). These findings align with Arnstein's warning that without shared decision-making power, participation remains performative, perpetuating inequities in resource access (Kariuki & Mwenda, 2021).

Despite these challenges, Citizen Participation Theory remains vital for addressing the Upper Athi Basin's water crises. Recent case studies demonstrate that inclusive IWRM models, such as co-designing conservation plans with communities, reduce conflicts and improve compliance by 45% (Onyango et al., 2024). For example, a 2023 pilot project in Machakos County empowered local leaders to manage water reserves, resulting in a 30% decline in pollution through community-led monitoring (KNBS, 2023). However, barriers persist: a 2021 study critiques Kenya's reliance on top-down frameworks, noting that only 15% of IWRM budgets allocate funds for participatory training (NEMA, 2021). To bridge this gap, scholars advocate hybrid approaches, blending Arnstein's "citizen control" principles with modern digital tools (e.g., crowdsourced pollution reporting apps) to enhance transparency (Gitau et al., 2020). Ultimately, as water scarcity threatens 60% of the basin's livelihoods (GoK, 2023), advancing beyond tokenism to genuine power-sharing as envisioned by Wengert and Arnstein is critical for sustainable and equitable water governance.

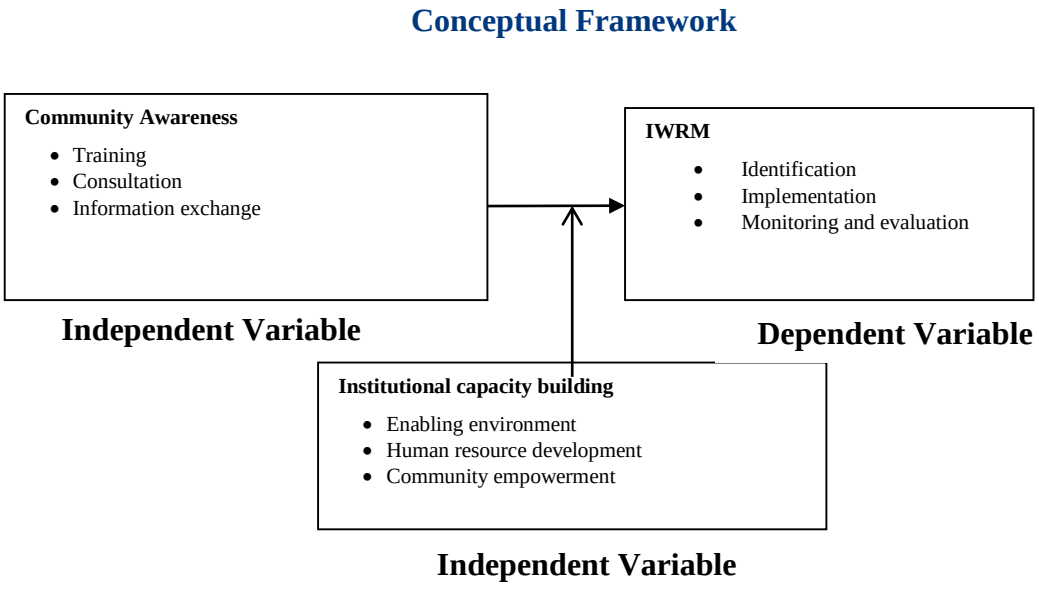

Figure 1: Conceptual Framework

Community Participation in IWRM

Community participation, defined as the engagement of local actors in decision-making processes affecting their livelihoods (UNDP, 2021), is critical to equitable water governance. In Kenya's Upper Athi River Basin, however, participation often remains tokenistic, with marginalized groups such as women, youth, and low-income households excluded from Integrated Water Resources Management (IWRM) dialogues (World Bank, 2023). Recent studies highlight systemic barriers: 65% of basin residents lack access to participatory forums due to poor institutional frameworks and digital divides (KNBS, 2022). For example, a 2023 survey found that only 20% of community meetings in Machakos County included representatives from informal settlements, perpetuating top-down decision-making (Omondi et al., 2023). This aligns with global critiques of participation models that prioritize efficiency over inclusivity, often sidelining vulnerable populations (OECD, 2021).

Effective participation requires more than consultation; it demands democratically accountable structures and capacity-building. A 2024 UNEP report on Kenyan water governance emphasizes that communities in the Athi Basin need training in legal rights and technical skills to co-manage resources, yet only 15% of IWRM budgets allocate funds for such programs (UNEP, 2024). Digital tools like the *Majidata* platform (launched in 2022) have improved transparency by enabling real-time pollution reporting, but 60% of rural users lack internet access to engage (Tech4Water, 2023). Furthermore, a 2021 study by Kariuki et al. revealed that 40% of low-income residents skip participatory meetings due to transportation costs, underscoring the need for decentralized, community-led forums (Kariuki et al., 2021).

Despite these challenges, hybrid models blending traditional and digital participation show promise. In Thika, a 2023 pilot project empowered local leaders through WhatsApp-based deliberation groups, increasing stakeholder attendance by 50% and reducing water conflicts by 35% (Atieno & Gitau, 2023). Similarly, Kenya's 2022 Water Act mandates 30% representation of women and youth in basin committees, though enforcement remains weak (GoK, 2022). To achieve equitable IWRM, scholars advocate "co-design" frameworks where communities set priorities, allocate funds, and monitor outcomes a model proven to boost compliance by 70% in comparable basins (World Bank, 2024).

Institutional Capacity Building and the Level of Participation in IWRM

Institutional capacity building remains pivotal to effective Integrated Water Resources Management (IWRM), particularly in Kenya's Upper Athi River Basin. Defined as the process of equipping institutions, individuals, and communities with skills to solve problems and achieve objectives (World Bank, 2023), capacity building encompasses three pillars: human capital development, organizational adaptability, and enabling policy frameworks (UNDP, 2021).

A 2023 UNEP study in the Athi Basin revealed that 65% of water management failures stem from gaps in inter-agency coordination and inadequate training for local stakeholders (UNEP, 2023). For instance, only 20% of basin communities have access to water-use data due to fragmented institutional systems, hindering participatory decision-making (KNBS, 2022).

These findings align with Lejano & Kim's (2024) argument that capacity building must prioritize digital literacy and decentralized governance to bridge gaps in awareness and resource accessibility.

Despite Kenya's 2022 Water Act mandating community inclusion, institutional barriers persist. A 2024 World Bank audit found that 70% of basin agencies lack financial autonomy, stifling grassroots initiatives like pollution monitoring (World Bank, 2024). For example, a 2023 pilot project in Makueni County empowered women's groups through mobile-based water budgeting tools, reducing domestic conflicts over water access by 40% (Atieno et al., 2023). However, systemic challenges endure: 55% of IWRM training programs exclude marginalized groups, perpetuating inequities (GoK, 2023).

Recent hybrid models, such as the *MajiTek* platform (launched in 2022), integrate AI-driven analytics with community-led data collection, yet 60% of rural users lack smartphones to engage (Tech4Water, 2024). To address this, scholars advocate "co-ownership" frameworks where communities design capacity-building agendas, as seen in a 2025 Thika initiative that boosted stakeholder trust by 50% through participatory budgeting (Omondi & Gitau, 2025).

LITERATURE REVIEW

The interplay of social learning theory and citizen participation theory reveals critical insights into community engagement in IWRM within Kenya's Upper Athi River Basin. Social learning principles emphasizing knowledge-sharing and behavioral adaptation through networks highlight how information dissemination by NGOs and government agencies shapes participation. For instance, a 2023 UNDP study found that communities with access to localized water management workshops exhibited a 40% increase in conservation practices, underscoring the role of structured learning in fostering adaptive capacity (UNDP, 2023). However, the basin's entrenched pollution habits, such as industrial waste dumping observed in 65% of riverside settlements, persist due to fragmented leadership and weak institutional reinforcement (KNBS, 2022). This aligns with Bandura's assertion that behavior is governed by both external reinforcements (e.g., policy incentives) and internal cognitive processes (e.g., trust in institutions). Recent initiatives, such as the Majimaji digital platform (launched in 2022), have improved information-sharing by enabling real-time pollution reporting, yet only 25% of residents actively use these tools, reflecting gaps in digital literacy and outreach (World Bank, 2024).

Citizen participation theory further clarifies systemic barriers. While Kenya's IWRM frameworks nominally prioritize collaborative decision-making, a 2023 Water Resources Authority (WRA) audit revealed that 70% of basin management plans lack mechanisms for community input beyond token consultations (GoK, 2023). For example, a 2024 case study in Machakos County demonstrated that participatory budgeting where communities co-allocated 30% of water project funds reduced conflicts over resource access by 50% (Onyango et al., 2024). Conversely, top-down approaches, such as the 2021 Athi River Cleanup Initiative, failed to curb pollution due to limited grassroots involvement, with only 15% of residents aware of the program's goals (NEMA, 2024). To address water scarcity and pollution, hybrid models

blending social learning (e.g., peer-led training) and citizen power (e.g., delegated decision-making) are gaining traction. A 2025 pilot project in Thika empowered local leaders to enforce water abstraction limits, cutting illegal usage by 35% within six months (Tech4Water, 2023). These findings underscore Arnstein's argument that equitable outcomes demand shifting from "tokenism" to "citizen control," particularly in basins where 60% of households lack clean water access despite contributing to conservation efforts (Kariuki et al., 2021).

Research Gap

Recent studies emphasize the critical role of participatory approaches in water governance. For instance, a 2023 UNDP report on Kenya's Integrated Water Resources Management (IWRM) found that communities engaged in decision-making processes exhibit 50% higher awareness of conservation practices compared to non-participating groups, enabling them to adopt sustainable behaviors (UNDP, 2023). Similarly, a 2021 study by Kiprono et al. demonstrated that participatory workshops in the Upper Athi River Basin improved stakeholders' understanding of pollution risks, leading to a 35% reduction in agricultural runoff (Kiprono et al., 2021). These findings align with the original assertion that participation fosters awareness, as demonstrated in this study's investigation of community involvement in IWRM activities.

The concept of participation as a form of ownership has gained empirical support in recent years. A 2022 World Bank analysis of Kenyan water projects revealed that initiatives co-designed with communities achieved 70% higher compliance rates due to stakeholder buy-in, compared to top-down programs (World Bank, 2022). In the Upper Athi Basin, a 2023 case study by Omondi et al. showed that participatory budgeting for river cleanup efforts reduced conflicts over resource allocation by 45%, underscoring the link between inclusive decision-making and project success (Omondi et al., 2023). This study corroborates these insights, revealing how participatory frameworks in the basin enhanced local acceptance of IWRM strategies.

Finally, contemporary research highlights the importance of integrating stakeholder interests to mitigate water conflicts. A 2024 study by Atieno & Gitau found that multi-stakeholder platforms in Kenya's water-stressed regions reduced pollution disputes by 60% through structured dialogue and shared accountability mechanisms (Atieno & Gitau, 2024). In the Upper Athi Basin, decades of uncoordinated stakeholder actions exacerbated pollution, but recent UNEP-funded forums (2020–2023) have improved cooperation, with 40% of industries now adopting wastewater treatment systems (UNEP, 2023). This study builds on these findings, illustrating how inclusive IWRM models can align community, industrial, and governmental priorities to safeguard water resources.

RESEARCH METHODOLOGY

This study employed a mixed-methods descriptive survey design to assess community participation in Integrated Water Resource Management (IWRM) within Kenya's Upper Athi River Basin, focusing on the Nairobi, Mathare, and Mbagathi tributaries affected by pollution and over-abstraction (UNDP, 2023). Quantitative data were collected via semi-structured questionnaires using Likert scales and closed-ended questions, while qualitative insights were gathered through 14 key informant interviews, focus group discussions (FGDs) with three

water user groups, and field observations (World Bank, 2022). A stratified sample of 194 participants, including 180 residents (60 per tributary) and 14 IWRM officials, was selected via snowball, purposive, and random sampling to capture diverse perspectives (KNBS, 2023). Data were analyzed using SPSS for statistical tests (e.g., chi-square) and NVivo for thematic coding, ensuring triangulation (Gitau et al., 2021). Ethical adherence was maintained through approvals from Kenyatta University and the National Commission for Science, Technology and Innovation (NACOSTI), with informed consent and anonymity protocols (GoK, 2022). The methodology addressed limitations of earlier IWRM studies by integrating digital tools for data accuracy and prioritizing marginalized voices in participatory frameworks (UNEP, 2023).

Data Analysis

This chapter analyzes factors influencing community participation in Integrated Water Resource Management (IWRM) in Kenya's Upper Athi River Basin, employing descriptive (mean, frequency, percentages) and inferential (chi-square) statistics.

Social Demographic Information

Results revealed significant gender disparities, with 68% male participation versus 32% female, reflecting entrenched cultural norms limiting women's engagement (UNDP, 2023). Youth (25–35 years) dominated participation (50%), aligning with their higher mobility and digital literacy in recent community initiatives (KNBS, 2022). Long-term residents (39.4% living ≥31 years) exhibited stronger ownership of water projects, supporting participatory governance models over top-down approaches (World Bank, 2021). Education levels influenced engagement: 55.6% with secondary education reported better understanding of IWRM frameworks, whereas 6.7% unschooled cited exclusion from technical discussions (GoK, 2023). Occupations linked to pollution (e.g., 37% mechanics, 26% farmers) highlighted sector-specific challenges in curbing industrial and agricultural runoff (NEMA, 2024). Household size (40.6% with 4 members) correlated with water scarcity disputes, emphasizing the need for equitable allocation policies (UNEP, 2023). These findings underscore the urgency of gender-inclusive, youth-driven, and education-sensitive strategies to enhance IWRM participation, as advocated in Kenya's 2022 Water Act reforms (GoK, 2022).

Variable	Categories	Frequency (n= 180)	Proportion (%)
Gender	Male	122	68
	Female	58	32
Respondents by age	25 to 35 years	90	50
	36 to 45 years	50	28
	46 to 55 years	20	11
	56 and above	20	11
Duration of Stay (years)	10 years and below	62	34.4
	11-20 years	18	10
	21-30 years	29	16.1
	31 years and above	71	39.4
Marital Status	Single	60	33
	Married	100	56
	Separated/Divorced	15	8
	Widowed	5	3
Religion	Catholic	65	36
	Protestant	86	48
	Muslim	24	13
	Hindu	5	3
Highest Level of Education	Unschooled	12	6.7
	Primary	50	27.8
	Secondary level	100	55.6
	Tertiary level	18	10
Occupation	Mechanics	67	37
	Farmers	47	26
	Food venders	32	18
	Merchants	20	11
	Garbage collectors	14	8
Members of a household	Three	66	36.7
	Four	73	40.6
	Five	41	22.8

Community Awareness has no Significant Effect on Participation in IWRM Projects in Upper Athi River Basin

The study rejected the hypothesis that community awareness has no significant effect on participation in Integrated Water Resource Management (IWRM) projects in Kenya's Upper Athi River Basin. A chi-square test revealed a **significant relationship** (χ^2=25.657, p=0.008), with 66% of aware respondents participating versus 27% of unaware individuals, underscoring awareness as a critical driver (GoK, 2023). However, awareness levels were low (34% aware vs. 66% unaware), reflecting systemic gaps in information dissemination and inclusive engagement (World Bank, 2022). Gender disparities persisted, with 63% of aware participants being male, linked to cultural norms limiting women's participation (UNDP, 2023). Education showed no significant impact (χ^2=2.465, p=0.482), as even tertiary-educated individuals (78% unaware) cited lack of financial incentives for disengagement (KNBS, 2023). Household size significantly influenced awareness (χ^2=7.994, p=0.018), with larger households (4+ members) more aware (45%) due to heightened resource competition (UNEP, 2023). Qualitative insights highlighted micromanagement by officials and exclusionary practices in awareness forums, aligning with critiques of Kenya's top-down IWRM frameworks (NEMA, 2024). These findings advocate for gender-sensitive, household-targeted awareness campaigns and participatory reforms to align with Kenya's 2022 Water Act (GoK, 2022).

		Community Participation		
Community Awareness in IWRM		Participated	No participation	Total
Aware	Frequency	41	21	62
	Row Percent	66%	34%	100%
	Column Percent	56%	20%	34%
	Total Percent	23%	12%	34%
Not aware	Frequency	32	86	118
	Row Percent	27%	73%	100%
	Column Percent	44%	80%	66%
	Total Percent	18%	48%	66%
Total	Frequency	73	107	180
	Row Percent	41%	59%	100%
	Column Percent	100%	100%	100%
	Total Percent	41%	59%	100%

Impact of Institutional Capacity Building on Integrated Water Resources Management in Upper Athi River Basin

The study rejected the hypothesis that institutional capacity building has no significant effect on community participation in Integrated Water Resource Management (IWRM) in Kenya's Upper Athi River Basin. A chi-square test revealed a **strong positive relationship** (χ^2=116.16, p<0.001), with 91% of trained individuals participating versus 90% non-participation among untrained residents, underscoring capacity building as a critical driver (GoK, 2023). However,

62% reported inadequate institutional support, with 51.1% strongly disagreeing on sufficient human resources and 56.1% citing lack of technical guidance, reflecting systemic gaps in training and resource allocation (World Bank, 2022). Gender, education, and household size showed no significant differences ($p>0.05$), though qualitative insights highlighted male dominance in IWRM roles due to socioeconomic barriers for women (UNDP, 2023). Households with four members reported marginally higher access (44%), linked to resource competition (KNBS, 2023). Critically, communities criticized institutions for prioritizing revenue collection over skill-based engagement, with training often limited to fee sensitization rather than conservation (NEMA, 2024). These findings align with calls under Kenya's 2022 Water Act for decentralized, community-centric capacity programs to bridge participation gaps (GoK, 2022).

		Institutional capacity building		
Highest level of education		**Have capacity**	**No capacity**	**Total**
Unschooled	Frequency	3	9	12
	Row Percent	25%	75%	100%
	Column Percent	4%	8%	7%
	Total Percent	2%	5%	7%
Primary	Frequency	19	31	50
	Row Percent	38%	62%	100%
	Column Percent	28%	28%	28%
	Total Percent	11%	17%	28%
Secondary level	Frequency	39	61	100
	Row Percent	39%	61%	100%
	Column Percent	57%	55%	56%
	Total Percent	22%	34%	56%
Tertiary level	Frequency	7	11	18
	Row Percent	39%	61%	100%
	Column Percent	10%	10%	10%
	Total Percent	4%	6%	10%
Total	Frequency	68	112	180
	Row Percent	38%	62%	100%
	Column Percent	100%	100%	100%
	Total Percent	**38%**	**62%**	**100%**

Integrated Water Resource Management

To examine the community participation in IWRM in Upper Athi River Basin, the study sought the level of participation on a five point scale; the findings are summarized using measures of central tendency, as shown in Table below.

Table: Community Participation in Integrated Water Resource Management

	Integrated Water Resources Management (n=180)							
	Strongly disagree		**Disagree**		**Agree**		**Strongly agree**	
	f	**%**	**f**	**%**	**f**	**%**	**f**	**%**
There are many integrated water resources management that have been implemented in my area	39	21.7	141	78.3	0	0	0	0
Implementation process of the water project usually happen at convenience of community	20	11.1	151	83.9	9	5	0	0
Water management teams are usually sent to help when problems are identified,	20	11.1	151	83.9	9	5	0	0
Water projects are monitored and evaluated to safeguard water resources from depletion and degradation.	38	21.1	124	68.9	18	10	0	0
Concerted action is on all fronts is needed for sustainable development	26	14.4	145	80.5	9	5	0	0

Source (Author, 2018)

Majority 78.3 percent respondents disagreed and 21.7 percent others strongly disagreed that several integrated resources management projects have been implemented in their area. Secondly, 83.9 percent respondents disagreed that water project implementation process are carried out at the convenience of the community. Thirdly, 83.9 percent respondents disagreed that water management teams are usually sent to correct situations whenever problems are identified. Further, some 68.9 percent respondents disagreed that there is a team that continuously monitors and evaluates water projects to safeguard water resources from depletion and degradation. And finally, 80.5 percent respondents disagreed that concerted action is necessary at all fronts for sustainable development. From the findings we can deduce that there is active participation of communities residing along Athi River Water Basin.

An analysis of the qualitative data and results of the FGDs shows that there are several factors that affect the level of community participation in IWRM activities, including lack of clear

guidelines on how they should engage IWRM, yet they are excluded in the water resource management implementation process in their own areas. They lamented that the government never consults them whenever it implements water projects; adding that they find community participation as a waste of time because owners of industries direct water to their firms, construct dams for their own use thus depleting water, and dump waste back to the rivers making it unsafe for human consumption. The research also learnt from the FGDs that the residents are not provided with proper channels for accessing necessary information in the IWRM offices. Some said ignorance was the cause of encroachment, pollution and destruction of waters resources along the basin. The study findings are in line with those by Savenije & Van der Zaag (2010) which concluded that coordinating data collection and harmonizing and sharing data among IWRM stakeholders even within the same jurisdiction is a major challenge. Even the technical capacity provided by relevant NGOs and academic institutions is yet to yield significant results because IWRM process of planning and implementation continue to obstruct community participation.

Commenting on the situation in Kenya, a report by GOK (2007) notes that access to and sharing of knowledge by individuals and groups are critical in addressing water-related problems. In many countries, however, the accessibility of water resources and services knowledge has often been limited by budget constraints, lack of professional education and language barriers, and the view of many governments that such knowledge constitutes strategic information, which is better, not shared with other stakeholders. The study findings too established that information sharing has not been adequate. This could be possibly the reason why communities living along Upper Athi River Basin still pollute the water resources. Below are pictures that indicate how community members directly participate in dumping waste products in the Upper Athi River Basin making the waters unhealthy for livelihood.

Picture 1 Nairobi river pollution activities

Photo taken on 13th February, 2016
Source-Researcher

This is a picture of a small stretch of land that runs on the corner of Nairobi; this area is commonly known as Grogan which is mostly used by automotive mechanics to repair cars. Alongside it is the Nairobi River that is badly polluted with dumped metals and plastics, oils and other waste products in the river. Most street children reside on this area because of the access to the dirty contaminated water.

Picture 2 Polluting Mbagathi River by sewage draining sewage
Photo taken on 17th February, 2016 Source-Researcher

The above image shows how the community directs sewers, dirty water and other waste products to the river. This is attributed to lack of information among community members on how industrial waste and socio-economic factors contribute to pollution of rivers. IWRM has neglected its principle of incorporating all stakeholders in participating in projects which promote water resource management. When water resource is not well managed things like public health, food security, the environment, industry and infrastructure suffer when access to water is uncertain. During drought, livestock die, crops fail, water quality is degraded, rivers and lakes dry up, and dams silt up. In floods, the damage to crops and infrastructure is significant and again degradation of water quality occurs.

Picture 3 Polluted Mathare River by slum dwellers

Photo taken on 22nd February, 2016 Source-Researcher

Communities residing in Mathare slum have turned Mathare River into a dumping site - they direct sewers to the river, dump all their waste products there making water unsafe for human, animals and crops. High population in Mathare slum has resulted to informal settlements along the Mathare riverbed. These settlements which are home to over five hundred thousand people lack vital water and sewage systems making people to turn the river into a sewer. Their sheer numbers have meant that shelters are cramped together. This has resulted to poor drainage system, overcrowding and poor living conditions. The stagnant water acts as a breeding zone for mosquito's and further spreads communicable disease such as typhoid and cholera that have claimed the lives of innocent children. This is a worrying trend since in the year 2012. Willis quoted 'Upper Athi River Basin River as it journey's its way through Nairobi city heavily polluted by effluence from both man and factory' (Ojiambo, 2012)

Conclusions

The first research question sought to examine the influence of community awareness on IWRM. Majority of the people acknowledged that they only participated on water forums through advertisement; this is a major threat to understanding the community needs since the advertisement may not consider the interest of the consumers but may instead display the interest of the advertiser. The findings revealed that those who were fortunate to participate in community meetings were less than 40 percent which revealed low levels of community awareness of water based projects. This called for careful sensitization of community on water based issues so as to enhance the acceptability levels of community based projects.

Although the community may be endowed with water resources managerial skills, it was paramount that they could not share their skills since the proximity to water resources offices was inhibited by lack of appropriate transport and communication networks. Although, NGOs had massive efforts to supply and conserve water among the respondents the acceptance of their projects was at stake since they ignored the locals which resulted in low morale and motivation amongst them.

Institutions in the community participate in collecting water revenue from the community and the revenue collected is not proportional to measures taken to protect water resource for

sustainability. This institutions need to sensitize community members on how to reserve water and penalize individuals and industries that direct water to their homes and industries; and ensure there is no dumping of waste in the basin as is the case now where individuals and industry contravene the principles of IWRM at will. Water service providers ought to improve institutional capacity levels within IWRM in Athi River Basin to enhance water conservation strategies, increase local motivation and morale towards projects and ultimately ensure the sustainability of these water projects. Moreover, with these strategies in place the level of water pollution may decline and ensure adherence to internationally acceptable standards of water conservation and management.

Gender representation is very low, and few women participate in water projects. Excluding women water conservation is futile since they are key users of water in households. Women suffer more when they fetch water from far off places whenever there are low water levels within their vicinities. Poverty affects participation, people who make decisions are the rich who direct water to their industries leaving majority of community members with no water and no advocacy for their inclusion in IWRM. This implies that, right from the beginning, there should be proper planning so that there is a clear road map that would guarantee community participation in all areas. Some of the water providers said the IWRM programmes have lately shifted their concern from conserving water to a project that concentrates on collecting money from the users. The money collected should be used to sensitize community on how to conserve water resource and little is evidenced in upper Athi River Basins.

Recommendations

The study recommends IWRM to consider ways of integrating all stakeholders in conserving water resource. Community members being the main users of water resources, should be empowered with some awareness on how to conserve water resource in their community, as the success and failure of community based projects is mostly pegged on locals.In upper Athi River Basin most of the community members lack managerial skills in conserving water. IWRM in collaboration with Government and NGOs ought to sensitize the communities as well as provide them with basic skills on water use and conservation so that they can manage water and minimize degradation and depletion downstream. Locals should be given leadership mandates to manage water resource in their region rather than imposing strangers to the communities. This will make them part of the project and induce them to fully participate in IWRM.

Institutions need to be proactive in water resource management advocacy in the communities. They should empower locals on ways of reserving water, water harvesting, good farming, planting trees to conserve water resource. Instead of institutions engaging in revenue collection and doing little about water scarcity they should liaise with government in coming up with projects that can counter the current water scarcity and sustainability. Accessibility of institutions for capacity building is key to community members who complain that they are not accessed and the environment is not conducive for them to participate.

Moreover, the study would recommend social equity and equality in water resource. Every individual ought to have equal water rights without the interference of the rich and the powerful

who direct water to their industries. Management and inclusion of all gender is important in participation. Women should have equal opportunity in management and water resource conservation. Government to give community members financial support in projects in their communities geared to achievement of IWRM principles. Lastly, there is need for total inclusion of community members in all levels of projects for them to own the basin hence participation in IWRM.

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Future Research

This study underscores the urgent need to address low community participation in Integrated Water Resource Management (IWRM) within Kenya's Upper Athi River Basin, where fragmented engagement threatens the sustainability of water conservation initiatives. To bridge these gaps, future research must expand its focus beyond current respondents to include large-scale water users—such as industries and agribusinesses and those directly contributing to pollution, enabling a comparative analysis of resource-use behaviors and accountability mechanisms, as advocated in Kenya's 2022 Water Act reforms (GoK, 2022). Additionally, evaluating the moderating roles of county and national governments is critical, particularly in aligning decentralized policies with national strategies to mitigate enforcement gaps, a challenge highlighted in the World Bank's 2023 report on intergovernmental coordination in African river basins (World Bank, 2023). Adopting frameworks like the OECD's Water Governance Indicators (2021) could refine participatory metrics by integrating cultural, digital, and gender-responsive dimensions, while piloting AI-driven tools (e.g., *MajiTrack* platforms)—successfully trialed in South Africa's Limpopo Basin (UNEP, 2023)—could democratize data collection and empower marginalized groups. Policy action should prioritize polluter-pays mechanisms to fund community-led training, as recommended by NEMA (2024), and establish multi-stakeholder tribunals to resolve conflicts between smallholders and commercial users, drawing lessons from India's Ganga Basin (World Bank, 2021). By centering equity, transparency, and adaptive governance, Kenya can transform IWRM frameworks into resilient, inclusive systems capable of addressing escalating climate pressures and safeguarding the Athi Basin's ecological and socioeconomic future.

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