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Village Level Community's Engagement in Community-Based Water Supply Projects in Arumeru District, Arusha, Tanzania

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ABSTRACT

This study assessed village-level community engagement in Community-Based Water Supply Projects (CBWSPs) in Akheri Ward, Meru District Council, Arusha, Tanzania. A cross-sectional research design was employed, and simple random sampling was used to select 120 community members as respondents. Data were collected through questionnaires and analyzed descriptively using SPSS version 21. The findings reveal that community engagement in CBWSPs is primarily driven by sustainable water resource management (19.2%) and the need to increase access to clean and safe water (19.2%). Additionally, disaster resilience (16.7%) and compliance with regulations and policy frameworks (15.0%) are significant motivators. These factors highlight the community's recognition of both the immediate and long-term benefits of water resource management. Furthermore, the study indicates that community participation in CBWSPs is considerable, with active involvement through village-level water user committees and the implementation of sustainable water supply initiatives. These structures enable local people to contribute to decision-making, ensure accountability, and promote resource sustainability. The study underscores the importance of strengthening institutional support, enhancing community awareness, and improving participatory governance to sustain engagement in CBWSPs.

Keywords: Village level, engagement, Community-Based, Water supply, Projects or Schemes.

BACKGROUND OF THE STUDY

Access to clean and sustainable water sources is a fundamental aspect of rural development, particularly in village communities where water scarcity, poor infrastructure, and governance challenges persist. In this context, Community-Based Water Supply Projects (CBWSPs) have emerged as an essential approach to addressing rural water challenges by emphasizing local ownership, participation, and governance. Community engagement is central to the success of these projects, as it enhances sustainability, accountability, and resource management [1], [2]. However, the motives driving community engagement in CBWSPs vary across social, economic, environmental, and institutional factors, influencing both the effectiveness and long-term impact of these initiatives [3].

At the global level, village governments play a crucial role in mobilizing communities, enforcing water regulations, and ensuring equitable access to water resources. While is some countries community engagement in water projects is often driven by water scarcity and pollution

control in other parts including some countries in Asia and Latin America, the engagement aimed at ensuring community-led water conservation efforts, ensuring local ownership of water resources and infrastructure [4]. Many developing countries, including Pakistan, are facing appalling state of water supply in terms of impracticability, ineffectiveness and the lack of local involvement [5]. The community's engagement in water management initiatives might play part in mitigation of seasonal droughts and flooding through participatory planning and local governance mechanisms. Behailu et al [6] Associates the long-served traditional management systems with the efficiency in community engagements in water supply projects. These motives highlight the importance of self-reliance, disaster resilience, and participatory governance in community water management.

In Africa, the motives for community engagement in water projects vary significantly across economic, environmental, and governance factors. Local governments encourage participation through district-level water governance frameworks, ensuring that communities have a voice in decision-making processes [7]. Taking an example of the east African countries including Kenya and Ethiopia, community engagement in CBWSPs is strongly linked to climate variability, agriculture, equitable distribution and sustainable resource use [3], [6].Community participation is essential to outline the issues, problems and needs of local community as without their participation it is not possible [5]. The use of bottom-up approach is insisted for its advantages in ensuring community participation, provoking community management, and advertising community financing so as to increase the sustainability of the systems [6]

Tanzania presents a unique case where community engagement in CBWSPs is shaped by a mix of environmental challenges, socio-economic factors, and governance structures. While Tanzania is considered water-abundant, seasonal and geographical variability pose significant challenges to water availability. Studies shows that continuous community participation and engagement are instrumental to their survival as an actor in the water service provisioning domain [8]–[10]. However, poor water governance, climate change impacts, and increasing demand from agriculture and industry make community engagement in CBWSPs essential for sustainable water management [11]. Further, ignorance and non-participation of local community members lead to non-functioning of water supply system [12]. Therefore, this study is aimed at assessing the community engagement in community based water supply projects at the village level.

Statement of the Problem

Water sources management is a critical aspect of community development and livelihood. The government of Tanzania has made institutional reforms that rent management of water supply to the local institutions namely CBWSOs which operate under the immediate supervision of the rural water supply and sanitation agency (RUWASA) at the district level. Despite the critical role of Community-Based Water Supply Projects (CBWSPs) in enhancing access to clean and sustainable water in rural Tanzania, significant barriers hinder effective community engagement and participation. These barriers include weak governance structures, limited financial resources, inadequate technical expertise, and political interference [11]–[13]. As a result, the effectiveness and sustainability of CBWSPs are compromised, leading to persistent challenges in water scarcity, poor infrastructure, and inequitable access to water resources.

This study aims to investigate the socio-economic, environmental, and institutional factors that influence community engagement in CBWSPs in Tanzania, identifying the motives driving participation and the barriers to effective engagement. By understanding these dynamics, the research seeks to propose actionable strategies to strengthen community participation, enhance governance, and ensure the long-term sustainability of water supply initiatives in rural areas.

MATERIAL AND METHODS

Description of Area of the Study

The study was conducted in Akheri ward in Arumeru district of Arusha, Tanzania. The Akheri ward of Arumeru was chosen because it is one of the highly populated Ward in the district with multiple water sources including Lake Duluti, Malala River, Nduluma River and it is around Meru mountains which are source of water for domestic use in most parts of Arumeru and districts of Arusha region. The research aimed to provide comprehensive insights on CBWSPs in the study area, and the engagement practices play part on water governance.

Study design, Sampling and Sample Size

A study employed a cross sectional study design of which facilitated the collection of data at one time throughout the study. A sample size of 120 respondents was obtained from three villages of Akheri Ward namely Patandi, Akheri and Nguruma. The study employed probability sampling where by a simple random sampling approach was used to get 120 community members, forming a representative sample for the research.

Data Collection

The study used primary data, collected through survey questionnaires. Structured set of questions were prepared by a researcher and were administered among the randomly selected respondents in the study area. Pre-testing of the tools was conducted by the principal investigators with the help of two research assistants. Later the data were collected to 120 respondents in the study area.

Data Analysis and Presentation

The SPSS version 21 was used in the analysis of the quantitative data. Descriptive statistics was used to summarize the findings using their frequencies and percentages.

FINDINGS OF THE STUDY

Demographic Characteristics of Respondents

Sex of Respondents:

The findings in [Table 1] indicate that out of the total 120 respondents, 53 (44.2%) are male, while 66 (55.8%) are female. This shows a higher proportion of female respondents compared to males. The relatively balanced gender distribution ensures that perspectives from both sexes are adequately represented in the study. The slight dominance of female respondents may suggest that women were more available or willing to participate in the study. Such gender representation is crucial in research as it helps provide a comprehensive understanding of the population dynamics and perspectives from both male and female participants.

Age of Respondents:

The study aimed to analyze the age distribution of respondents to gain insights into the age

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groups that participated. The findings in [Table 1] reveal that the largest group falls within the 31-40 years age bracket, comprising 34 respondents (34.2%). This is followed by the 21-30 years group with 31 respondents (30.8%). The older age category, 41 years and above, accounts for 19 respondents (19.2%), while the youngest group, aged 18-20 years, makes up 16 respondents (15.8%). These findings indicate a concentration of respondents in the younger to middle adulthood age range, which may suggest a higher level of engagement in the research topic among individuals in these age groups. This age distribution suggests that the majority of participants are in their prime working and decision-making years, which could influence the research findings.

Marital Status of Respondents:

The study also examined the marital status of respondents to understand how different categories are represented. The findings in [Table 1] indicate that the majority of respondents are married, accounting for 50 (41.7%) of the total sample. Single respondents form the second-largest group with 32 (26.7%), followed by separated individuals at 19 (15.8%). Additionally, 14 respondents (11.7%) are divorced, while widowed individuals form the smallest group, totaling 5 (4.2%). This distribution suggests that marital status may have an influence on the study variables, as married individuals constitute the largest proportion. The presence of respondents from different marital backgrounds ensures diverse perspectives, which could contribute to a more holistic understanding of the research topic. The significant representation of married individuals may indicate their active role in societal and economic responsibilities, which could be relevant to the study.

Education Level of Respondents:

The study also sought to determine the education levels of respondents to assess how their academic background may influence their perspectives. The findings in [Table 1] show that the largest proportion of respondents, 52 (43.3%), have attained a secondary level of education. Respondents with either primary education or higher education each constitute 30 (25.0%). The smallest group consists of respondents who have never attended school, totaling 8 (6.7%). These findings indicate that a significant majority of respondents have attained at least a basic level of education, which may facilitate their ability to engage with the research topic and provide informed responses. The presence of individuals with higher education further enhances the reliability of the study, as they are likely to understand and articulate their views effectively. These results also highlight the impact of educational advancements in the country, suggesting improvements in access to education over time.

Occupation of Respondents:

The study further examined the occupations of respondents to identify the most common economic activities among them. The findings in [Table 1] show that farming is the dominant occupation, with 41 respondents (34.2%) engaged in agricultural activities. Business is the second most common occupation, with 34 respondents (28.3%) involved in commercial enterprises. Employment in formal sectors accounts for 19 respondents (15.8%), while 26 respondents (21.7%) are engaged in other activities. This distribution highlights the significance of agriculture as a primary source of livelihood in the study area. The substantial involvement in business suggests a dynamic entrepreneurial environment, while formal employment and other activities contribute to the economic diversity of the respondents. These occupational patterns provide valuable insights into the economic engagements of the

community and may have implications for policy recommendations based on the study findings.

Table 1: Demographic information

Variable	Categories	Frequency (N=120)	Percentage
Sex	Male	53	44.2
	Female	66	55.8
Age	18-20	19	15.8
	21-30	37	30.8
	31-40	41	34.2
	41 and above	23	19.2
Marital Status	Married	50	41.7
	Single	32	26.7
	Separated	19	15.8
	Divorced	14	11.7
	Widow or widower	5	4.2
Education Level	Primary level	30	25.0
	Secondary level	52	43.3
	Higher education	30	25.0
	Never going to school	8	6.7
	Business	34	28.3
Occupation of respondents	Farming	41	34.2
	Employed	19	15.8
	Other activities	26	21.7

Source: Research findings 2025

Motives of the Community Engagement in Water Sources Management

The findings as shown in [Table 2] reveal that community engagement in Community-Based Water Supply Projects (CBWSPs) at the village level is driven by multiple motives, reflecting a combination of social, economic, environmental, and institutional factors [1]. Among the key motives, increasing accessibility to quality water and sustainable water resource management were the most cited, each accounting for 19.2% of responses. This highlights the community's recognition of the importance of reliable and safe water sources for daily use, agriculture, and overall well-being [14]. A com- munity and its members have to become motivated about water services [15]. The emphasis on sustainability suggests that villagers are aware of the long-term benefits of actively managing their water sources to prevent depletion and ensure continued access.

Disaster resilience emerged as the third most significant motive (16.7%), indicating that communities are increasingly concerned with the effects of climate variability, droughts, and floods on water availability. This aligns with global trends where rural populations engage in water management initiatives to mitigate the adverse impacts of extreme weather conditions. Similarly, compliance with regulations (15.0%) underscores the role of policy frameworks and local governance in shaping community participation. Village governments and regulatory bodies likely play an influential role in ensuring adherence to water management policies, reinforcing accountability and equitable distribution [16].

Economic considerations were also evident, as reducing the cost of water (10.8%) motivated engagement in CBWSPs. Community members likely perceive collective management as a means to minimize the financial burden of purchasing water from private vendors or travelling long distances to access safe water [3], [15]. Rural communities must have access to resources if they are to participate actively in community development [4] Additionally, the sense of ownership and social cohesion (10.0%) suggests that engagement in CBWSPs fosters unity and strengthens communal ties, promoting responsibility for water resources at the village level.

Lastly, community environmental responsibility (9.2%) was the least mentioned motive. While this indicates some awareness of environmental conservation, it suggests that immediate water access concerns outweigh long-term ecological considerations. However, integrating environmental education and awareness programs into CBWSPs could enhance this aspect of participation.

Overall, these findings demonstrate that community engagement in CBWSPs is driven by both immediate needs and long-term sustainability goals. The local people should be supported to undertake all responsibilities of the project, from initiation through designing to implementation and ongoing management [5] Strengthening governance structures, promoting awareness, and ensuring financial and technical support are crucial in enhancing community participation and ensuring the sustainability of water supply projects in rural areas [17].

Table 2: Motives for community engagement in water sources management

Motive for participation	Frequency	Percentage
Community environmental responsibility	11	9.2
To increase sense of ownership and cohesion	12	10.0
Ensure reduced cost for water	13	10.8
Compliance to regulations	18	15.0
Disaster resilience	20	16.7
Increase accessibility of quality water	23	19.2
Sustainable water resource management	23	19.2
Total	**120**	**100.0%**

Source: Research findings, 2025

The Ways in Which Local People Participate in Water Projects

The findings in [Table 3] indicate that community engagement in the management of water sources at the village level takes various forms, with differing levels of participation. The most common form of engagement is involvement in the village water user committees, which accounts for 25.0% of responses. This suggests that structured governance mechanisms, such as community-led committees, play a significant role in water resource management. Water user committees provide a platform for decision-making, conflict resolution, and oversight of water-related activities, ensuring accountability and community ownership. Engagement in informal and formal local institutions is expected to increase social cohesion and hence, contributes to enhanced participation in community affairs [3], [14].

The second most prominent form of participation is collaborative efforts in implementing sustainable water practices (19.2%). This highlights the community's recognition of the need

for long-term water resource sustainability through activities such as rainwater harvesting, watershed protection, and conservation strategies. Additionally, inclusion in decision-making processes related to water management (15.0%) signifies that some community members are actively engaged in policy formulation and governance structures. However, the percentage suggests that decision-making remains limited to a specific group. Hierarchical or institutional barriers might be partly restrictive to the broader community involvement [7].

Participation in community-led water conservation initiatives (13.3%) reflects efforts at the grassroots level to safeguard water sources, ensuring their continued availability. These activities may include tree planting, preventing water pollution, and promoting efficient water use. Meanwhile, active participation in community awareness programs and engagement in infrastructure maintenance activities each accounted for 10.0% of responses. These activities are essential for ensuring that community members understand their role in sustainable water management and that the physical infrastructure supporting water supply remains functional [14]. The lowest form of participation is contribution to monitoring and reporting water issues (7.5%), which may indicate a gap in structured reporting mechanisms or limited community awareness regarding the importance of consistent monitoring. Strengthening participatory monitoring frameworks could enhance community engagement by ensuring that water issues are promptly identified and addressed. Systematic involvement of users in all stages of a project cycle can ease the management process and result in a sense of ownership [14]. Community management approach by executing agency to involve community organisations in water supply related duties has a significant empowering effect [18].

These findings reflect a community-centred approach to water management, echoing research highlighting the effectiveness of participatory governance[17], [18]. Studies by Smith et al, [19],underscore how local involvement enhances governance by aligning policies with community needs, promoting sustainable practices, and improving water access and quality. These participatory efforts foster community resilience to water challenges and support broader development goals, emphasizing the importance of inclusive decision-making and collaborative initiatives for sustainable water resource management [7].

Table 3: The ways which local people participate in management of water sources

Motives for participation	Frequency	Percentage
Contribution to monitoring and reporting water issues	9	7.5
Active participation in community awareness programs	12	10.0
Engagement in infrastructure maintenance activities	12	10.0
Participation in community-led water conservation initiatives	16	13.3
Inclusion in decision-making processes related to water management	18	15.0
Collaborative efforts in implementing sustainable water practices	23	19.2
Involvement in water user committees	30	25.0
Total	**120**	**100.0**

Source: Research findings, 2025

CONCLUSION

Community participation in water management is notable, with local people actively involved in water user committees, community awareness programs, monitoring and reporting water issues, infrastructure maintenance, water conservation initiatives, decision-making processes,

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and collaborative sustainable practices. The levels of involvement range from very high to very low, indicating varying degrees of engagement and suggesting a need for more inclusive strategies to ensure broader community participation in water management efforts. Strengthening community education, expanding participatory decision-making, and enhancing the role of local institutions could further improve engagement and ensure the long-term sustainability of water resources.

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