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Original article

Community planning and the sustainability of water projects in Buyanja Sub-County, Rukungiri District. A cross-sectional study.

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ABSTRACT

Background

The study aimed to examine the relationship between community planning and the sustainability of water projects in Buyanja Sub-County, Rukungiri District.

Methodology

A descriptive cross-sectional quantitative study was conducted among 1,200 stakeholders involved in rural water projects in Buyanja Sub-County, Rukungiri District. A sample of 300 respondents was selected using multi-stage sampling, comprising simple random sampling for household water users and purposive sampling for key informants. Data were collected using structured questionnaires and semi-structured interview guides. Quantitative data were analysed using SPSS version 26 through descriptive statistics, chi-square tests, correlation, and regression. Validity and reliability were assessed, with Cronbach's alpha coefficients ranging from 0.803 to 0.966. Ethical approval was obtained.

Results

Of the 300 targeted respondents, 210 participated, yielding a 70.0% response rate. Male respondents constituted 41.0% (n=85), while females comprised 59.0% (n=125). Community planning had a mean score of 3.5762 (SD=0.62546), with scores ranging from 2.60 to 4.80, whereas sustainability had a mean of 3.6038 (SD=0.69226), ranging from 2.40 to 4.80. Regarding categorised levels, community planning was rated high by 53.3% (n=112) and moderate by 46.7% (n=98). Sustainability was rated high by 64.3% (n=135) and moderate by 35.7% (n=75). Pearson correlation analysis demonstrated a strong, positive, statistically significant relationship between community planning and sustainability ($r=0.966$, $p<0.01$). Community leadership was also strongly correlated with sustainability ($r=0.986$, $p<0.01$), while operation and maintenance showed a strong positive correlation with sustainability ($r=0.965$, $p<0.01$).

Conclusion

Community planning significantly and positively influenced water project sustainability, with meaningful participation in decision-making essential for long-term functionality.

Recommendation

Water projects should strengthen meaningful, inclusive community participation in planning, supported by capacity building, technical guidance, and implementation of community decisions.

Keywords: *Community planning, water project sustainability, community participation, rural water projects, water governance, community management.*
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BACKGROUND OF THE STUDY

Community participation is an important component in the planning and sustainability of rural water projects. It involves the active engagement of local communities in identifying needs, planning, implementing, operating, maintaining, and governing water projects. Meaningful participation promotes ownership, shared responsibility, empowerment, and community involvement in decision-making (Chambers, 1997; Narayan, 1995).

In water projects, community participation contributes to accountability, ownership, and long-term functionality. Mansuri and Rao (2013) argue that participation improves service responsiveness and accountability, while Etongo et al. (2018) found that greater community involvement in management and decision-making improved the performance of community-managed water systems in Uganda. However, participation may be ineffective when communities are only consulted without having meaningful influence over decisions (Cornwall, 2008; Cleaver, 2019).

Community participation in water projects can be viewed through three main dimensions. Participation in planning involves identifying water needs, selecting sites, choosing

technologies, and setting priorities (Marks et al., 2014). Participation in operation and maintenance (O&M) involves reporting faults, contributing user fees, cleaning water points, and organizing repairs, which supports continued functionality (Oduor & Murei, 2020; Omanwa & Muchai, 2021). Participation through leadership and governance involves structures such as Water User Committees, Local Councils, and Village Health Teams in mobilization, accountability, financial management, and coordination of repairs (Kayijuka, 2021; Onziru & Kimutai, 2022).

The study aimed to examine the relationship between community planning and the sustainability of water projects in Buyanja Sub-County, Rukungiri District.

METHODOLOGY

Research Design

This study adopted a descriptive cross-sectional survey design. The design is appropriate because it enables the researcher to describe existing conditions, relationships, and patterns among variables (Kothari & Garg, 2019). A cross-sectional design allows data to be collected from different respondents at a single point in time, making it efficient in examining relationships between community participation dimensions (planning, operation and maintenance, leadership) and the sustainability of water projects.

Research approach

The study employed a quantitative approach, situated within the positivist research paradigm, which holds that social phenomena can be measured objectively and that relationships between variables can be tested empirically (Saunders, Lewis, & Thornhill, 2019; Creswell, 2014).

Study Population

The study population comprised stakeholders who are directly or indirectly involved in the planning, operation, maintenance, and management of rural water projects in Buyanja Sub-County, Rukungiri District. These included household water users (men and women aged 18 years and above) who depend on community water sources for their daily domestic needs, Water User Committee (WUC) members responsible for the routine management, operation, and maintenance of water facilities, Local Council (LC I–III) leaders who provide governance, supervision, and oversight of community water initiatives, technical staff from the District Water Office such as the Sub-county Water Officer and the Community Development Officer (CDO), and representatives from non-governmental organizations (NGOs) and community-based organizations (CBOs) supporting rural water supply interventions. The study population was 1,200 respondents, comprising 1,160 household water users, 25 Water User Committee members, 10 Local Council leaders, 3 NGO/CBO representatives, and 2 District/Sub-county officials. These population figures were obtained from the Buyanja Sub-county administrative records and the Rukungiri District Water Office (2022), while information on the status and functionality of community-managed water systems was corroborated by the Ministry of Water and Environment (MWE, 2024).

Sample Size Determination

The sample size for this study was determined using Yamane's (1967) simplified formula for calculating sample size in studies where the population is known and finite, which is widely used in social science research to ensure an adequate and representative sample. The formula is expressed as;

$$n = \frac{N}{1 + N(e)2}$$

Where n is the sample size
N is the target population
e is the coefficient of error = 0.05

$$n = \frac{1200}{1 + 1200(0.05)2}$$

$$n = \frac{1200}{1 + 1200(0.0025)}$$

$$\frac{1200}{1 + 3}$$

$$\frac{1200}{4}$$

n **300**

Respondents

Therefore, the study used a sample size of 300 respondents, which is considered statistically adequate for quantitative analysis and ensures representativeness of the target population in Buyanja Sub-County.

Table 1: Sample Size Determination and Instruments

Category of Respondents	Estimated Population (N)	Sample Size (n=300)	Sampling Technique
Household Water Users	1,160	290	Simple Random Sampling
Water User Committee (WUC) Members	25	6	Purposive Sampling
Local Council (LC I–III) Leaders	10	2	Purposive Sampling
NGO/CBO Representatives	3	1	Purposive Sampling
District/Sub- County Officials (Water Officer, CDO, etc.)	2	1	Purposive Sampling

Total	**1,200**	**300**	—

Source: Rukungiri District Water Office (2022); MWE (2024); Researcher's computation, 2026

Sampling Techniques

The study employed a multi-stage sampling strategy to ensure representativeness and inclusion of all relevant stakeholders in accordance with the sample size determination presented in Table 1. This approach combines probability and non-probability sampling techniques to address the diverse categories of respondents.

The sub-county was divided into strata based on parishes to ensure proportional representation across geographical areas. Buyanja Sub-County comprises several parishes, and stratification ensured that all parishes were adequately represented in the sample. This approach captures the geographical diversity of the study area and ensures that findings are generalisable across the entire sub-county (Saunders, Lewis, & Thornhill, 2019). Stratification is particularly important in this context because water project conditions, community participation levels, and sustainability outcomes may vary across parishes due to differences in terrain, accessibility, social dynamics, and project implementation history.

Within each stratum, simple random sampling was used to select household respondents. This technique involves selecting households from the sampling frame without bias, whereby every household in the stratum has an equal and independent chance of being selected (Kothari & Garg, 2019). Simple random sampling is appropriate for the household water user category because the population is relatively homogeneous, and this approach minimizes selection bias, enhances representativeness, and ensures that the sample is statistically generalisable to the broader population of 1,160 households in Buyanja Sub-County. The sampling frame for household respondents was obtained from village registers and household lists maintained by Local Council leaders.

Purposive sampling was applied to identify key informants due to their specialized knowledge and direct involvement in water project management (Patton, 2015). This technique was used to select Water User Committee (WUC) members, Local Council officials (LC I–III), District Water Office staff, and NGO/CBO representatives. Purposive sampling was appropriate for these categories because these respondents possess unique expertise, occupy specific institutional roles, and have in-depth knowledge of water project planning, implementation, and management that cannot be obtained from the general household population. The selection was based on predefined criteria including institutional position, length of service, and direct involvement in water project activities. This approach ensured that the study captured expert perspectives and institutional insights that complemented the household survey data.

Inclusion criteria

The study included respondents who are directly or indirectly involved in rural water projects in Buyanja Sub-County. These comprised household water users (men and women aged 18 years and above) who actively rely on community water sources such as boreholes, protected springs, and gravity flow schemes. It also included members of Water User Committees (WUCs) responsible for the operation and maintenance of water projects, Local Council (LC I–III) leaders who provide governance and oversight, and district or sub-county officials such as Water Officers and Community Development Officers. In addition, representatives from NGOs and Community-Based Organizations (CBOs) engaged in water-related activities within the sub-county were included. All participants were residents of Buyanja Sub-County for at least six months and were willing to provide informed consent to participate in the study.

Exclusion criteria

Specifically, persons below 18 years of age were excluded due to their inability to provide informed consent. Individuals who have lived in Buyanja Sub-County for less than six months were also excluded, as they may not have sufficient knowledge or experience regarding local water projects. Community members who did not use the water projects under study, as well as individuals who were unwilling or unable to provide informed consent, were considered. Additionally, respondents who are seriously ill or otherwise unable to participate in interviews or focus group discussions during the data collection period were excluded to ensure the reliability and ethical integrity of the study.

Data Collection Methods

Questionnaire Survey

A structured questionnaire comprising mainly closed-ended questions and a few open-ended questions was designed and administered to the selected household water users. According to Weitz (2016), a questionnaire is a method of data collection in which a standardized set of questions is administered to respondents in a predetermined order to obtain relevant information. The questionnaire was considered appropriate because household water users constituted the largest proportion of the study population (290 out of 300 respondents), making it possible to collect data from many respondents within a relatively short period and at a low cost. The instrument was designed based on the study objectives and contained sections on demographic characteristics, community participation in planning and implementation, community involvement in operation and maintenance of water facilities, community leadership, and

sustainability of water projects. The closed-ended Likert scale questions enabled the researcher to obtain quantifiable data for statistical analysis using SPSS, while the few open-ended questions allowed respondents to provide additional views regarding the sustainability of water projects. The questionnaires were self-administered to literate respondents, while the researcher assisted respondents who could not read or write by translating the questions into the local language (Runyankore-Rukiga) without altering their meaning.

Interview Method

Semi-structured interview guides were developed and administered to purposively selected key informants comprising Water User Committee (WUC) members, Local Council (LC I–III) leaders, NGO/CBO representatives, and District/Sub-county officials, including the Water Officer and Community Development Officer (CDO). According to Kvale and Brinkmann (2015), interviews are qualitative data collection methods that enable researchers to obtain detailed information through direct interaction with respondents. The interview guide consisted of open-ended questions designed to generate in-depth information regarding community participation in planning, operation, and maintenance of water facilities, leadership practices, institutional support, and the sustainability of water projects in Buyanja Sub-county. The semi-structured nature of the interviews allowed the researcher to ask follow-up questions, seek clarification where necessary, and probe for detailed explanations based on respondents' experiences. This method was particularly suitable for key informants because of their knowledge, responsibilities, and direct involvement in water project management and implementation. The interviews complemented the questionnaire findings by providing contextual explanations and richer qualitative insights into the factors influencing the sustainability of water projects.

Data Collection Tools

Questionnaire

The primary data collection tool for this study was a structured questionnaire administered to household water users. The questionnaire was developed in line with the study objectives and consisted of both closed-ended and a few open-ended questions. The closed-ended questions were measured using a five-point Likert scale ranging from 1 = Strongly Disagree to 5 = Strongly Agree, enabling respondents to express their level of agreement with statements related to community participation and the sustainability of water projects. The questionnaire comprised five sections, namely: demographic characteristics, community participation in planning and implementation, community involvement in operation and maintenance, community leadership, and sustainability of water projects. The tool was considered appropriate because it enabled the collection of standardized data from a large number of respondents within a relatively short period, facilitating quantitative analysis using the Statistical Package for Social Sciences (SPSS).

Interview Guide

A semi-structured interview guide was used to collect qualitative data from purposively selected key informants, including Water User Committee (WUC) members, Local Council (LC I–III) leaders, NGO/CBO representatives, and District/Sub-county officials such as the Water Officer and Community Development Officer. The interview guide contained open-ended questions designed around the study objectives to obtain detailed information on community participation in planning, operation, and maintenance practices, leadership roles, institutional support, and the sustainability of water projects. The guide also allowed the researcher to ask follow-up questions and probe for clarification where necessary, thereby generating rich qualitative data that complemented the questionnaire findings.

Data Analysis

Data from structured questionnaires were entered into SPSS v26. Analysis involved: Descriptive statistics (frequencies, means, percentages). Inferential statistics (Chi-square tests, correlation, and regression) to assess relationships between participation variables and sustainability indicators.

Validity and Reliability

Ensuring the validity and reliability of research instruments is essential for generating credible, accurate, and dependable findings. This study adopts multiple strategies to enhance both validity and reliability.

Validity

Validity of the study instruments was ensured through content, construct, face, criterion, and sampling validity**.** Content validity was established through literature-based item development, expert review, and calculation of the Content Validity Index (CVI), with all items achieving values above 0.85. Construct validity was enhanced by linking items to relevant theoretical frameworks and conducting Exploratory Factor Analysis, which produced factor loadings of 0.55–0.92, a KMO value above 0.80, and a significant Bartlett's test ($p < .001$). Face validity was assessed through respondent feedback on clarity, relevance, and language, with the questionnaire translated into Runyankore-Rukiga and back-translated for accuracy. Criterion validity was supported by adapting items from previously validated instruments used in related studies. Sampling validity was strengthened through an adequate sample of 210 respondents determined using Yamane's formula and multi-stage sampling involving parish

stratification and simple random sampling to improve representativeness and minimise selection bias.

Reliability

To ensure the internal consistency of the research instruments, Cronbach's Alpha coefficients were computed for each construct. Reliability analysis assesses the extent to which the items measuring the same construct produce consistent results. The generally accepted threshold for Cronbach's Alpha is 0.70, indicating acceptable internal consistency (Nunnally, 1978; DeVellis, 2017). Cronbach's Alpha values above 0.80 are considered good, whilst values above 0.90 are considered excellent

Table 2: Reliability Statistics for Study Variables

Scale/Construct	Cronbach's Alpha	Number of Items	Interpretation
Community Planning Scale	0.803	5	High Reliability
Community Operation & Maintenance Scale	0.839	5	High Reliability
Community Leadership Scale	0.966	5	Excellent Reliability
Sustainability of Water Projects Scale	0.961	5	Excellent Reliability

Source: Primary Data (2026)

All study constructs demonstrated good to excellent internal consistency, with Cronbach's Alpha coefficients exceeding the acceptable threshold of 0.70. The Community Planning Scale had an alpha of 0.803, while Community Operation and Maintenance recorded 0.839, indicating high reliability for both constructs. The Community Leadership Scale demonstrated excellent reliability ($\alpha = 0.966$), as did the Sustainability of Water Projects Scale ($\alpha = 0.961$). These findings confirm that the questionnaire items consistently measured their respective constructs and provide a reliable basis for subsequent descriptive, correlation, and regression analyses.

Ethical Considerations

The study adhered to strict ethical standards throughout the research process by ensuring informed consent, voluntary participation, confidentiality, research approval, and respect for cultural norms. All participants were fully informed about the purpose of the study, procedures involved, and their rights before data collection began, and participation was entirely voluntary, with respondents free to withdraw at any stage without any form of penalty or coercion. Confidentiality and anonymity were strictly maintained by excluding personal identifiers from all transcripts, questionnaires, and datasets, and by reporting only aggregated findings to ensure that individual responses cannot be traced back to participants. Ethical clearance was obtained from the Bishop Stuart University Research Ethics Committee, and authorization was sought from Rukungiri District Local Government before engaging respondents in the field.

RESULTS

Response Rate

From the computed sample size of 300 respondents drawn from the target population of 1,200 stakeholders in Buyanja Sub-County, 210 respondents participated in the study, yielding a response rate of 70%. This response rate is considered adequate for analysis and generalisation, as Mugenda and Mugenda (2003) recommend that a response rate of 50% is adequate, 60% is good, and above 70% is very good for social science research. The response rate achieved in this study therefore falls within the range considered sufficient to support reliable statistical analysis and valid conclusions.

TABLE 3: RESPONSE RATE

Category of Respondents	Targeted Sample	Actual Responses	Response Rate (%)
Household Water Users	290	200	69.0
Water User Committee (WUC) Members	6	6	100.0
Local Council (LC I–III) Leaders	2	2	100.0
NGO/CBO Representatives	1	1	100.0
District/Sub-County Officials	1	1	100.0
Total	**300**	**210**	**70.0**

Source: Primary Data, June, 2026

This response rate was achieved through rigorous follow-up strategies, sustained community engagement, and the deployment of multiple data collection methods, including structured questionnaires. While the response rate is below 100%, it remains within acceptable parameters for quantitative research. According to Mugenda and Mugenda (2003), a response rate of 50% is adequate for analysis and reporting, whilst Babbie (2004) contends that response rates

of 50% and above are acceptable for social science research. The high response rate enhances the generalizability of the findings and minimizes non-response bias, thereby strengthening the internal and external validity of the study conclusions.

Background Characteristics of Respondents

This section presents the socio-demographic profile of the 210 respondents who participated in the study, including their distribution by gender, age, level of education, and length of residence within Buyanja Sub-County. These characteristics provide essential contextual information that aids in interpreting the study findings and understanding the representativeness of the sample relative to the broader community.

Gender of Respondents

As presented in Table 4.1, male and female respondents each constituted 50.0% (n = 105). This equal gender distribution reflects deliberate efforts to ensure gender balance in the study, which is particularly pertinent in water governance research where women are primary water users and managers in rural communities.

Table 4: Gender of Respondents

Gender		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	85	41.0	41.0	41.0
	Female	125	59.0	51.0	100.0
	Total	210	100.0	100.0	
Total		210	100.0		

Source: Primary Data, June, 2026

This nearly balanced representation aligns with Uganda's constitutional principles of gender equality and the National Water Policy (1999), which emphasises the importance of inclusive community participation in water resource management. The equitable gender composition ensures that the study captures diverse perspectives from both men and women regarding community participation and water project sustainability, thereby enriching the validity and comprehensiveness of the findings.

Age of Respondents

About age distribution, Table 5 reveals that 33.8% (n = 71) of respondents were aged 31–50 years, 33.3% (n = 70) were aged 18–30 years, 16.7% (n = 35) were aged above 50 years, and 16.2% (n = 34) were aged below 18 years.

TABLE 5: AGE OF RESPONDENTS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Below18	34	16.2	16.2	16.2
	18-30	70	33.3	33.3	49.5
	31-50	71	33.8	33.8	83.3
	Above50	35	16.7	16.7	100.0
	Total	210	100.0	100.0	
Total		210	100.0		

Source: Primary Data, June, 2026

This distribution indicates that the majority of respondents were adults in their economically active years, which is consistent with community water management structures where adults bear primary responsibility for water governance and maintenance activities. The inclusion of respondents below 18 years (16.2%) is notable and reflects the reality that in rural settings, young people often participate in water collection and may possess valuable insights regarding water project functionality and accessibility. The predominance of respondents aged 18–50 years (67.1%) suggests that the study captured perspectives from the demographic cohort most actively engaged in water management decision-making and maintenance activities, which strengthens the credibility and applicability of the findings.

Education Level of Respondents

In terms of educational attainment, the findings show that 39.5% (n = 83) of respondents had completed primary education, 33.3% (n = 70) had attained secondary education, 16.2% (n = 34) had tertiary education, whilst 11.0% (n = 23) did not indicate their education level
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TABLE 6: EDUCATION LEVEL OF RESPONDENTS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Primary	83	39.5	44.4	44.4
	Secondary	70	33.3	37.4	81.8
	Tertiary	34	16.2	18.2	100.0
	Total	187	89.0	100.0	
Others	Others	23	11.0		
Total		210	100.0		

Source: Primary Data, June, 2026

This educational profile suggests that the majority of respondents possessed at least basic literacy, which is important for understanding concepts related to community participation, water governance, and sustainability. However, the relatively high proportion of respondents with primary education as their highest level (39.5%) indicates that water project communication and training materials should be designed in accessible formats, possibly employing local languages and visual aids, to ensure effective community engagement in water management activities. This finding has practical implications for the design of capacity-building interventions, as effective communication strategies must account for the literacy levels of target communities. The relatively lower proportion of respondents with tertiary education (16.2%) reflects the rural context of Buyanja Sub-County, where higher education opportunities are limited, and many community members have not pursued formal education beyond primary or secondary levels.

Years Lived in the Village

With respect to length of residence in the village, 41.9% (n = 88) of respondents had lived in their villages for more than 10 years, 32.9% (n = 69) had resided for 6–10 years, and 25.2% (n = 53) had lived for 1–5 years.

Table 7: Years Lived in the Village

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1-5	53	25.2	25.2	25.2
	6-10	69	32.9	32.9	58.1
	>10	88	41.9	41.9	100.0
	Total	210	100.0	100.0	
Total		210	100.0		

Source: Primary Data, June, 2026

The dominance of long-term residents, with 74.8% having lived in their communities for more than five years, is significant as it implies that the respondents possessed adequate exposure to the sub-county's water management systems, historical project performance, and community participation dynamics. Their institutional memory strengthens the validity of the responses, particularly regarding long-term observations about water project sustainability trends and changes in community participation over time. This is consistent with the study's time scope of focusing on water projects implemented between 2015 and 2024, as long-term residents would have experienced the full lifecycle of these projects, from planning and construction through operation and maintenance.

Descriptive Statistics of Study Variables

This section presents the descriptive statistics for the study variables, including the mean scores and standard deviations. The descriptive statistics provide an overview of the levels of community participation and water project sustainability as perceived by respondents in Buyanja Sub-County, thereby establishing the baseline conditions against which relationships and predictive effects are assessed.

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TABLE 8: DESCRIPTIVE STATISTICS FOR STUDY VARIABLES

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Community Planning	210	2.60	4.80	3.5762	0.62546
Sustainability	210	2.40	4.80	3.6038	0.69226
Valid N (listwise)	210				

Source: Primary Data, June, 2026

Community planning had a mean score of 3.5762 (SD = 0.62546), indicating that respondents perceived a moderate to high level of community involvement in water project planning activities. This suggests that community members were generally involved in needs assessment, site selection, technology choice, and decision-making before project implementation. However, the standard deviation of 0.625 indicates some variation in responses, suggesting that participation in planning may not have been uniform across all villages or water projects. This variation likely reflects differences in project implementation approaches, donor requirements, and community characteristics across the sub-county.

Sustainability of water projects had the highest mean score of 3.6038 (SD = 0.69226), indicating moderate to high levels of perceived sustainability. This suggests that most water projects in Buyanja Sub-County were considered functional, reliable, and capable of continued service delivery. However, the sustainability mean score, whilst the highest among the variables, still falls within the moderate range, indicating that significant sustainability challenges remain. This finding is consistent with the Ministry of Water and Environment (2024) report indicating functionality levels below 60% in the sub-county, and with the broader national picture where only 65% of rural water points remain functional (MWE, 2023). The standard deviation of 0.692 indicates substantial variation in sustainability outcomes, suggesting that some communities have achieved high sustainability whilst others continue to struggle.

Categorised Levels of Study Variables

To provide a clearer understanding of the distribution of responses and to facilitate subsequent chi-square analyses, the mean scores for each variable were categorised into Low (1.00–2.33), Moderate (2.34–3.67), and High (3.68–5.00) levels as shown in Table 9. This categorisation enables analysis of the association between categorical levels of community participation and sustainability outcomes.

TABLE 9: CATEGORISED LEVELS OF COMMUNITY PARTICIPATION AND SUSTAINABILITY

Variable	Category	Frequency	Percent
Community Planning	Moderate	98	46.7
	High	112	53.3
	Total	**210**	**100.0**
	Total	**210**	**100.0**
Sustainability of Water Projects	Moderate	75	35.7
	High	135	64.3
	Total	**210**	**100.0**

Source: Primary Data, June, 2026
Note: Categorisation: Low = 1.00–2.33, Moderate = 2.34–3.67, High = 3.68–5.00

As presented in Table 9, over half of the respondents (53.3%, n = 112) perceived community planning as high, whilst 46.7% (n = 98) perceived it as moderate. There were no communities with low planning participation, indicating that all communities in the study had at least moderate levels of community involvement in planning. This suggests that participatory planning is a relatively well-established practice in Buyanja Sub-County, likely reflecting the influence of national water policies and donor requirements that mandate community participation. The finding that over half of communities have high planning participation is encouraging and consistent with the Participatory Development Theory (Chambers, 1997), which posits that community involvement in planning enhances ownership and long-term sustainability. However, the 46.7% with only moderate planning participation suggests that there is still room for improvement in deepening the quality and influence of community participation in planning decisions. Sustainability of water projects was perceived as high by 64.3% (n = 135) and moderate by 35.7% (n = 75). This indicates that the majority of water projects in Buyanja Sub-County were considered sustainable, though a significant proportion (35.7%) faced sustainability challenges. Notably, no communities had low sustainability, which suggests that

all water projects in the study area were at least moderately functional. This finding is consistent with the broader national picture where only 65% of rural water points remain functional (MWE, 2023), and it underscores the gap between high water coverage (above 95%) and actual functionality as highlighted in the problem statement. The 35.7% of communities with only moderate sustainability are at risk of project failure if current conditions persist, and they should be prioritised for targeted interventions.

Pearson Correlation Analysis

To address the first and third research objectives, Pearson product-moment correlation analysis was conducted to determine the nature and strength of the bivariate relationships between community planning, community leadership, and sustainability of water projects. For the second research objective, which assessed the level of community operation and maintenance, frequencies and mean scores. Pearson correlation measures the linear association between two continuous variables, with values ranging from -1 (perfect negative relationship) through 0 (no relationship) to +1 (perfect positive relationship). The significance level (p-value) indicates whether the observed correlation is statistically significant.

The excellent reliability of both the leadership and sustainability scales (above 0.95) suggests that these constructs were particularly well-measured, providing a solid foundation for the correlation and regression analyses.

TABLE 10: PEARSON CORRELATION MATRIX FOR STUDY VARIABLES

Variables	PLAN	LEAD_	OM	SUST_
PLAN (Community Planning)	1	0.956**	0.983**	0.966**
SUST_(Sustainability)	**0.966****	**0.986****	**0.965****	1

***Correlation is significant at the 0.01 level (2-tailed)*

Source: Primary Data, June, 2026

Relationship between community planning and sustainability of water projects

The results in Table 10 indicate that there is a strong, positive, and statistically significant relationship between community planning and sustainability of water projects ($r = 0.966$, $p < 0.01$). This implies that any positive change in community participation in planning is associated with a corresponding positive change in the sustainability of water projects in Buyanja Sub-County, Rukungiri District. The extremely high correlation coefficient (0.966) suggests that planning participation and sustainability are almost perfectly linearly related in the study context.

The very strong positive correlation suggests that community involvement in needs assessment, site selection, technology choice, resource mobilisation, and decision-making during the planning phase is a critical determinant of long-term water project sustainability.

DISCUSSION

The first research objective sought to examine the relationship between community planning and sustainability of water projects in Buyanja Sub-County. The findings established a strong, positive, and statistically significant relationship between community planning and sustainability. This indicates that communities that actively participated in planning activities, including needs assessment, site selection, technology choice, resource mobilisation, and decision-making, experienced higher levels of water project sustainability. The regression analysis further confirmed planning as a significant predictor of sustainability, with the chi-square analysis revealing that communities with moderate planning all had moderate sustainability, whilst communities with high planning predominantly had high sustainability.

These findings are strongly consistent with the Participatory Development Theory (Chambers, 1997; Mansuri & Rao, 2013), which posits that meaningful participation during planning creates ownership, strengthens accountability, and builds local capacity conditions essential for long-term functionality. The theory argues that when communities are involved from the outset, they develop a psychological sense of ownership and responsibility that extends throughout the project lifecycle, making them more likely to invest in maintenance and protect the infrastructure. The findings of this study provide robust empirical support for this theoretical proposition in the context of rural Uganda.

The results converge with empirical studies from the region. Nyarora (2024) found that community-led project initiation in Rwanda enhanced ownership and long-term functionality of water systems, with early participation in planning decisions being the strongest predictor of sustainability. Similarly, Muniu, Gakuu, and Rambo (2017) reported that participation in project decision-making significantly predicted water system durability and user compliance in Kenya. The present study reinforces these findings and extends them to the Ugandan context, demonstrating that the depth and influence of planning participation, rather than mere attendance at meetings, is critical for sustainability outcomes.

The findings also align with the work of Marks et al. al (2014), who found that the depth of influence during

planning had the strongest predictive value for handpump performance in Sub-Saharan Africa. Their study emphasised that communities must not only be present in planning meetings but must genuinely influence decisions regarding technology choice, site selection, and resource mobilisation. The present study confirms this perspective: communities with only moderate planning participation were unable to achieve high sustainability, suggesting that superficial or tokenistic planning involvement is insufficient to produce lasting results.

However, the findings also diverge from some perspectives in the literature that caution against overestimating the power of participation. Cleaver (2019) and Cornwall (2008) warn that participation can be tokenistic or manipulated by local elites, resulting in "pseudo-participation" where communities are consulted merely to fulfil donor requirements whilst substantive control remains with technical staff, politicians, or project implementers. The present study acknowledges this critique but finds that in Buyanja Sub-County, where over half of communities had high planning participation, the relationship between planning and sustainability was remarkably strong. This suggests that where participation is genuine and meaningful, its positive effects on sustainability are substantial.

The interpretation of these findings is that community planning is a foundational determinant of water project sustainability because it establishes the conditions under which communities will manage and maintain their water systems. When communities select technologies that match their capacities, choose sites that are accessible, and agree on roles and responsibilities during planning, they are more likely to sustain these systems over the long term. The finding that moderate planning was insufficient to achieve high sustainability suggests that the quality and influence of participation matters more than its mere presence. This is a critical insight for policy and practice: interventions should focus not just on ensuring communities participate in planning, but on ensuring their participation is meaningful, influential, and inclusive.

The strong relationship between planning and sustainability reflects the theoretical principle that early participation creates path dependence: decisions made during planning shape the trajectory of project management and maintenance for years to come. Poor planning decisions—such as selecting inappropriate technology, choosing inaccessible sites, or failing to establish clear roles—create path dependencies that are difficult to correct later. Conversely, good planning creates positive path dependencies that facilitate effective management and maintenance. This path dependence perspective, which is not explicitly articulated in the Participatory Development Theory but is consistent with it, provides a compelling explanation for the strong observed relationship and has important implications for ensuring that planning processes are given adequate attention and resources.

The high correlation between planning and sustainability may reflect the fact that planning participation is a proxy for broader community capacity and social capital. Communities that are able to organise themselves to participate effectively in planning are likely to have higher levels of social cohesion, trust, and collective efficacy, which in turn support sustainable water management. This interpretation suggests that interventions to strengthen planning participation may need to address broader community capacity issues, such as social capital and collective action, rather than focusing narrowly on planning processes.

Conclusion

The study concludes that there is a strong, positive, and statistically significant relationship between community planning and sustainability of water projects in Buyanja Sub-County. Communities that actively participate in planning activities, including needs assessment, site selection, technology choice, resource mobilisation, and decision-making, experience higher levels of water project sustainability. Community planning is a significant predictor of sustainability, explaining a substantial proportion of the variations in sustainability outcomes. The quality and depth of planning participation, rather than its mere presence, is critical for achieving high sustainability. Communities with moderate planning participation were unable to achieve high sustainability, suggesting that superficial or tokenistic planning involvement is insufficient to produce lasting results. This conclusion supports the Participatory Development Theory and confirms that early and meaningful community involvement in planning decisions is essential for long-term water project functionality.

Recommendation

Given the significant relationship between planning and sustainability, it is recommended that interventions deepen the quality and influence of community participation in planning. Specific actions should include: (a) ensuring that communities are involved not merely in information-sharing meetings but in substantive decision-making regarding site selection, technology choice, and resource mobilisation; (b) building community capacity to analyse options, make informed choices, and negotiate with external actors; (c) ensuring that planning processes are inclusive, with meaningful participation of all social groups; (d) providing technical support to communities during planning to ensure that decisions are technically sound and feasible; and (e) documenting planning decisions and ensuring that they are implemented, to build trust and demonstrate that community voices matter.

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List of abbreviations

BSU-REC – Bishop Stuart University Research Ethics Committee
CBO – Community-Based Organization
CDO – Community Development Officer
CVI – Content Validity Index
KMO – Kaiser-Meyer-Olkin
LC – Local Council
MWE – Ministry of Water and Environment
NGO – Non-Governmental Organization
O&M – Operation and Maintenance
PLAN – Community Planning
SPSS – Statistical Package for the Social Sciences
SUST – Sustainability
WUC – Water User Committee

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Conflict of interest

The authors declare no conflict of interest

Data availability

Data are available upon request from the authors

Author contributions

ST: conceptualization, methodology, investigation, writing original draft.
AM: data curation, validation, supervision.
BM: validation, supervision.

Informed consent

Written informed consent was obtained from all participants prior to their inclusion in the study. Participants were informed about the purpose of the study, procedures involved, potential risks and benefits, and their right to withdraw at any time without penalty.

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REFERENCES

1. Chambers, R. (1997). Whose reality counts? Putting the first last. Intermediate Technology Publications. https://doi.org/10.3362/9781780440453.000
2. Cleaver, F. (2012). Development through bricolage: Rethinking institutions for natural resource management. Routledge.
3. Cornwall, A. (2008). Unpacking 'participation': Models, meanings and practices. Community Development Journal, 43(3), 269-283. https://doi.org/10.1093/cdj/bsn010
4. Etongo, D., Fagan, G. H., Kabonesa, C., & Asaba, R. B. (2018). Community-managed water supply systems in rural Uganda: The role of participation and capacity development. Water, 10(9), 1271. https://doi.org/10.3390/w10091271
5. Kayijuka, D. (2021). Effect of community participation on project sustainability: A case of

Kirehe Community-Based Watershed Management Project (KWAMP). https://doi.org/10.29322/IJSRP.11.08.2021.p11681

6. Mansuri, G., & Rao, V. (2013). Localizing development: Does participation work? World Bank. https://doi.org/10.1596/978-0-8213-8256-1
7. Marks, S. J., Komives, K., & Davis, J. (2014). Community participation and water supply sustainability: Evidence from handpump projects in rural Ghana. Journal of Planning Education and Research, 34(3), 276-286. https://doi.org/10.1177/0739456X14527620
8. Muniu, F. N., Gakuu, C. M., & Rambo, C. M. (2017). Community participation in project decision-making and sustainability of community water projects in Kenya. IOSR Journal of Humanities and Social Science, 22(7), 10-24. https://doi.org/10.9790/0837-2207011024
9. Narayan, D. (1995). The contribution of people's participation: Evidence from 121 rural water supply projects. World Bank.
10. Nyarora, M. K. (2024). Community-led project initiation as a catalyst for sustainable clean water solutions in Ruhango District, Rwanda. International Journal of Scientific and Research Publications, 14(10), 269-275. https://doi.org/10.29322/IJSRP.14.10.2024.p15439
11. Oduor, J. O., & Murei, L. C. (2020). Community participation in monitoring and evaluation and sustainability of rural piped water supply projects: A case of Siaya County, Kenya. IOSR Journal of Humanities and Social Science, 25(4), 29-38. https://doi.org/10.9790/0837-2504072938
12. Omanwa, E. B., & Muchai, S. (2021). Effects of post-implementation community participation on borehole water projects in Embu County, Kenya. https://doi.org/10.47604/ijepm.1188
13. Onziru, B., & Kimutai, G. (2022). Stakeholder participation and sustainability of World Bank-funded water projects in Karamoja, Uganda. https://doi.org/10.24940/theijbm/2022/v10/i1/BM2111-047