Financing Rural Water Projects for Sustainable Communities: The Role of Community Financial Participation in Tanzania

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Abstract

Community participation is increasingly seen as crucial to achieving C high quality, efficient and collaborative way in planning for rural water projects. However, project implementers including government and donors are still searching for the best and most effective ways to engage community in planning process for sustainability of rural water projects. The purpose of this study was to provide analysis of community participation in planning process for sustainability of rural water projects in Simiyu region. To achieve the purpose, the study was guided by three specific objectives; to examine determinants of community participation in planning for rural water projects, to describe stages of community participation in planning for rural water project and to describe perception of community participation in planning towards sustainability of rural water projects. Cross sectional research design was employed to collect data from 217 respondents. Primary data were collected through structured questionnaire and analyzed by using descriptive and econometric analysis using logit regression model. The study emphasizes the importance of community participation in rural water project planning, emphasizing the need for education on participatory rights, clear project policies, and donor requirements. Empowering communities fosters ownership, pride, and sustainability, contributing to the long-term success and functionality of these initiatives. Policy implication of the study is gender equality is crucial in water policy formulation, as women and children are primarily responsible for domestic water collection in rural Tanzania. Local governments should educate communities on equal participation in water project planning, enhance equal rights and power-sharing, and decentralize the National Water Policy and WSSA. Capacity building and enacting water laws for Community Based Water Supply Organizations (CBWSOs) are also necessary.

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1. Introduction

Globally, access to safe and clean water remains a significant challenge, especially in rural areas. Every year, two million people die because of unsafe water, sanitation, and hygiene, with children and young women living in rural communities being the most affected groups. To address this problem, governments and non-governmental organizations (NGOs) have implemented various water projects across the world, but their sustainability is often questionable due to insufficient community involvement. Community participation is widely recognized as a crucial element for the sustainability of rural water supply projects in developing countries. However, many rural water projects have failed due to poor community participation, particularly in the planning phase. This lack of participation leads to projects that do not align with community needs and priorities, ultimately compromising their long-term sustainability.

The problem of community participation in rural water supply projects is a pressing issue, particularly in developing countries like Tanzania. Despite widespread recognition of the importance of community involvement in ensuring the sustainability of these projects, many initiatives continue to face significant challenges. In the Simiyu Region, for instance, only about 20% of the urban and 40% of the rural population have access to clean drinking water (Ndungu & Karugu, 2019). This limited access is exacerbated by the region's reliance on the Simiyu River, which has become seasonal due to climate change, resulting in unreliable water supply and increased vulnerability to droughts and floods (Shunglu et al., 2022a). The lack of effective community participation in the planning and management of water projects contributes to their unsustainability and failure.

Previous studies Korir et al., 2021; Mgulo & Kamazima, 2022) have indicated that the effectiveness of community participation is often hindered by various factors, including governance structures and community awareness (Many rural water projects in Tanzania have historically been designed and implemented without adequate input from local communities, leading to a disconnect between the projects and the actual needs of the beneficiaries. This disconnect not only undermines the sense of ownership among community members but also results in inadequate maintenance and management of water supply systems once external support is withdrawn (Usman, 2020). Consequently, understanding the dynamics of community participation is crucial for developing strategies that enhance the sustainability of water supply projects in the region.

The Simiyu Climate Resilient Project, initiated in 2017, aims to address these challenges by promoting community-based adaptation planning and ensuring active participation of local communities (Marzo et al., 2023). However, despite these efforts, many projects still struggle to achieve their sustainability objectives. Effective community participation is not merely a matter of involving local populations; it requires a comprehensive understanding of the factors that influence engagement at various stages of project development. Research has shown that ineffective participation often leads to project failure, highlighting the need for targeted interventions that empower communities and facilitate their involvement in decision-making processes (Ponok et al., 2021). The persistent challenges associated with community participation in rural water supply projects in the Simiyu Region underscore the need for further research into the factors influencing engagement and sustainability. This study aims to explore these factors in depth, providing insights that can inform the design of more effective interventions. By identifying the barriers to community participation and understanding the local context, stakeholders can develop strategies that not only enhance the sustainability of water supply projects but also improve the overall quality of life for communities in the region.

2. Review of Related Literature

Empirical review

Community participation in project planning and management has been acknowledged by various development practitioners and vast researches have been conducted to find out what exactly determine community participation in the planning process. For example, Huber & Arnberger, (2021), conducted the study on factors influencing the level of local participation in planning and management of planned Salzburger Lungau & Kärntner Nockberge Biosphere Reserve in Austria. The Variables investigated included, age of the respondent, gender of respondent's education of the respondent's ownership of agriculture land, involvement in tourism, previous participator experience and willingness to participate. Primary data were collected from 449 Business owners' respondents by using questionnaires and focus group discussion while secondary data were gathered from past surveyed reports. Data collected were analyzed both descriptively and using linear multiple regression Findings from the study assert that, neither gender nor education level showed a significant influence.

Furthermore, Htay et al., (2022), conducted a study on factors influencing communities' attitudes and participation in protected area conservation in Northern Myanmar, Japan. The variables employed under this study were age, gender, ethnicity, education, occupation, land ownership, crop, residency status, income, perception, conservation awareness, attitude towards protected areas, relationship with protected areas staff, conservation involvements and compliance with protected areas laws. The cross-sectional study design was adopted whereby data were collected by using open and close ended questionnaire from 368 household respondents. The collected data were analyzed by using logit regression and descriptive analysis. Findings revealed that, distance, crops, perceived benefits, income from protected areas, perceived costs and conservation awareness were positively and significant influencing communities' attitudes and participation in protected areas conservation. Furthermore, Regency & Sanjayani, (2016), conducted a study on factors influencing community participation in development planning in Wetan District Malang Regency, Indonesia. In this study, data were collected by using questionnaire. Data collected were analyzed by using descriptive and statistical analysis. Partial Least Square (PLS) were used to test whether the independent variables employed in this study consist of culture, educational level, income, length of stay, perception, and communication, significantly influence the dependent variable namely community participation. Findings show that, among other factors, income level significantly affects the community participation.

Additionally, Derkyi et al., (2021), conducted a study on factors influencing community participation in the implementation and monitoring of voluntary partnership agreement projects in Ghana. The study was cross sectional design. Data were collected from 105 community members using semi-structured questionnaire and analyzed by using logistic regression analysis. The variables employed were sex, age, educational level, participation in forestry training programs, taboo day, leadership status, perception on voluntary partnership agreement projects, direct benefits obtained from the forest and duration of staying in the community. Findings revealed that, there was no significant association between age groups and local people participation in Ghana. Also, Waweru, (2019), conducted a study on factors which promote community participation in the community driven development approach in Kenya. The variables employed under this study were financial status, material benefits, development interest, previous development experience, wanting to belong, to serve the community, project meet needs and peer pressure. The study employed cross-sectional survey research design where by probability (quota) sampling technique was used to select a sample of 810 respondents. Data were collected through focus group

discussion and interview and descriptively analyzed. Findings revealed that, key factors which make beneficiary communities to participate in development in the community driven approach are benefits (financial and material), development interest, development need, previous development experience, wanting to belong, to serve the community and project meets needs.

Moreover, Dongol et al., (2021), conducted a study on the determinants of community participation in water projects in Turkana County in Kenya. The variable investigated included, cultural practices, education, income level, age, resource availability and popularity gain as the determinants of community participation in water projects. The study employed stratified and purposeful sample techniques to select the sample size which comprised of 100 community members and 18 management committee members of the scheme. Data were collected using semi-structured questionnaires and interview schedule and employed both descriptive and inferential statistics in analyzing collected data. Pearson correlation coefficient was used to test the relationship between variables (cultural practices, education, income level, age, resource availability and popularity gain as the determinants of community participation in water projects). Finding shows that, cultural practices ($\beta = 0.674$) were found to be positively related to community participation. From t-test analysis, the t -value was found to be 3.129 and the ρ -value 0.000, meaning that cultural practices are significantly and important variables affecting community participation in water projects. Also, Hassan et al., (2019), conducted a study on assessing the influence of demographic factors on community participation in a demand driven development project in Coastal Kenya. Data were collected from 326 community members by using semi-structured questionnaire and analyzed by using multinomial logistic regression. The variables employed in this study were age, gender, type of economic activity, income level and level of education. Findings opined that, there was no statistically significant difference ($p > 0.05$) of individuals' income level in participation in development initiatives. Furthermore Zande & Mzuza, (2022), conducted a study on investigation of the factors influencing community participation in forest management in Balaka District, Malawi. Simple random sampling was employed to select 100 community members who were interviewed in the study. Descriptive statistics and logistic regression model were used to analyze data. The variables employed under this study were community participation, community awareness, economic factors, and level of education. Results from the study asserts that, economic benefit satisfaction and community awareness were positive and significantly influence community participation in forest management.

However, the study by Ntibona et al., (2023), conducted a study on the willingness and drivers of community participation in mangrove conservation in the Rufiji Delta in Tanzania. Data were collected through focus group discussions, key informant interviews, semi-structured interviews, participant and non-participant observations, across three designated management blocks - Northern delta (ND), Central delta (CD) and Southern delta (SD). Qualitative data were analyzed using content analysis while quantitative data were analyzed for descriptive and inferential statistics. The variables used in the study was gender, age, marital status, tribe, household size, education level, residence time and source of income, age of household head, education level, source of income and awareness of mangrove governing laws were the most significant drivers positively associated with community willingness to participate in conservation activities. The binary logistic regression model was used to deduce the relationship between independent variables (drivers) and one dependent variable (community willingness) The findings revealed that, age of household head, education level, source of income and awareness on mangrove governing laws are significant factors and were positively associated with community willingness

to participate. The study suggest that government should strengthen implementation of participatory forest management approaches as emphasized by the National Forest Policy of 1998, National Forest Policy Implementation strategy of 2018-2028 and Forest Act of 2002. Moreover, Fredrick & Ahmad, (2023), conducted a study on the factors influencing community participation in planning and implementation of agricultural development projects at Matongoro cattle auction project in Kongwa district in Dodoma region, Tanzania. The study employed a cluster sampling technique where clusters were formed based on villages (each village stands as a cluster). Agro Pastoralists were grouped according to their villages as a cluster and then a simple random selection through lottery was used to select 150 respondents. Purposive sampling technique was used to select the key informants. Data were collected by using questionnaires, key informant interviews, and focus group discussions. Descriptive statistics and binary logistic regression model were used to analyze data collected. Binary logistic regression was used to determine the association between the explanatory variables (income level, occupation status, level of education, age, number (No.) of cattle owned, household size, experience, level of awareness and sex, which were used as independent variables) and community participation. Results revealed that, income level, livestock keeping, age, awareness, experience, and sex were found to be significantly influence community participation projects. The study recommends that, government should design ways to increase local community participation throughout conceptualization, formulation, and implementation to ensure the success and sustainability of these agricultural projects.

Theoretical foundation and conceptual framework

Participatory Theory

The main idea of participatory theory, which has its roots in the literary works of Midgey, Hall, Hardiman, and Narine (1986), is the complete involvement of the local populace and other stakeholders in the planning, development, and implementation of policies and programs that have the potential to improve people's lives. According to the notion, citizens have the power to alter the course of events (Carpentier et al., 2019). Therefore, the local community must be involved in the planning and decision-making process in order to implement any changes and to direct the interventions.

According to the participatory theory, it is important to acknowledge the abilities, contributions, and efforts of the local community since involving them increases the likelihood that the project will be completed on schedule and sustainably throughout time (Lee et al., 2017). Participatory theory, according to Li et al. (2018), examines community engagement, its cooperation with all stakeholders, and their interest in the project or program. In his analysis, Brysch (2018) examined the evolution of the notion of participation, noting that throughout the 1960s and 1980s, research was done on the relationship between involvement in projects and programs and the development of communities as well as the well-being of the impoverished. Participation has been the standard approach to managing development and achieving project success and sustainability since the 1990s. According to Carpentier et al. (2019), if project owners and leaders want their projects to succeed and last, they should incorporate the local community in the planning process.

Six guiding principles form the foundation of participatory theory, which makes it effective in promoting inclusion, high project production, and sustainability. The guiding principles encompass equitable collaboration among all project participants; transparency through promoting candid handling of all project-related matters and transparent communication; power-sharing, which permits a fair distribution of authority among the various project stakeholders; responsibility sharing within the project; empowerment and collaboration. By promoting collaboration and including all relevant parties, these concepts can be applied to any project, resulting in the adoption

of sustainability indicators (Lee et al., 2017). One of participatory theory's drawbacks is that it creates an environment of equal cooperation, which may lead to conflicts that are unresolvable during project planning. Since all interested parties must be heard before a final decision is made, planning may take a while (Bartels & Furman, 2023).

Given the results of this study, the participatory theory provided support for the first variable of community engagement, which anchored community participation in the design for the rural water project. This is so that initiatives can be sustained for a longer amount of time when all members of the local community are involved in the planning process. The theory aims to explain how community members' perspectives might support water projects' performance and sustainability initiatives.

Theoretical model

Participatory Theory in community participation often involves the idea that involving community members in decision-making processes leads to better outcomes.

The study assumed that higher community participation generally leads to greater project sustainability and sustainability is also dependent on the resources allocated to the project. Therefore, A simple linear model could express project success as a function of participation and resources.

$S = aP + bR$ …… (1)

Where:

a and b are coefficients that represent the impact of participation and resources on project sustainability.

Then in this study participation is considered more important than resources, then the study might use a weighted model.

$S = \phi P + \propto R$ …… (2)

Where:

ϕ and $\propto$ are weight with ϕ be > $\propto$

But in reality, Participation and resources might interact to affect sustainability of the project. Therefore, interactive model are as follows

$S = c(\mathrm{P\ X\ R}) + dP + eR$

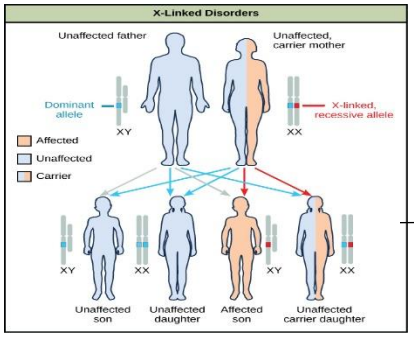
Where:

$c, d, and\ e\ are$ coefficients.

Figure 1: Study's conceptual framework for determinants of Community Engagement in Rural Water Project Planning in Simiyu.

Institutional Characteristics **Decision to participate**







Source: Adopted and modified from Participation theory approach

3. Methodology

The study uses cross-sectional data, which was collected directly from the representative subset household of selected areas in Simiyu. The cross-sectional study normally uses cross-sectional regression, which enables categorizing the existence and magnitude of the effect of one or more independent variables toward the dependent variable of concentration at a given place in time. Thus, this cross-sectional data was used because of the limit of time and financial problems as well as to be able to determine the effect of independent on dependent variables during the study in Simiyu region. The study uses a quantitative research design; this design helps the researcher to come up with statistical conclusions about the relationship towards determinants of Community Engagement in Rural Water Project Planning in Simiyu by using the numeral data that was collected on the field. The study involves measurement, classification, analysis, comparison, and interpretation of data.

Sample size

The sample was selected from the studied population and was determined by using adjusted Yamane's formula (Adam, 2020). This formula was proposed by a researcher because of its simplicity and ability to determine the sample size of both continuous and categorical variables. Where by the primary conditions for using this formula include the necessity of having a known population size, as it is designed to calculate an appropriate sample size from a defined group. Additionally, the formula is applicable when the population is heterogeneous, meaning that the individuals or items within the population are diverse and not uniform. It is also essential to specify the margin of error (e) that reflects the acceptable level of precision for the study, typically

expressed as a decimal (e.g., 0.05 for a 5% margin of error). This formula is particularly effective for populations that do not exceed 600 individuals. The formulae are described as follows: -

$n = \frac{N}{1+Ne^2}$ ..... (3)

Where by

n = minimum returned sample size

N= Population size

e = the degree of accuracy expressed as a proportion

ρ= the number of standard deviations that would include all possible values in the range

t= t-value for the selected alpha level or confidence level

E= adjust margin of error [E = (pe/t)]

The study population (N) is estimated to be 543 where by E = margin errors and the confidence level is 95%. Then the sample size is considered to be: -

$$n = \frac{543}{1 + 543(0.05)^2}$$

$$n = \frac{543}{2.5} = 217$$

$n = 217$..... (4)

Analytical modelling

Model: Logit model

Logit Regression was used to determine the association between sex, age, occupation status, awareness, education level, income level, experience, household size, marital status, project policy community culture and government regulations which were explanatory variables and community participation which was dependent variable. This model was used because the an outcome variable was dummy variable that is decision to participate or not (Fredrick & Ahmad, 2023).

Referring to Ntibona et al., (2023)(Tile et al., 2024; Uttoh & A.Tile, 2023), the model was employed as it can simultaneously analyze the impacts of both continuous and categorical explanatory variables. Hence the binary choice was estimated by using logit which uses a cumulative logistic distribution function. The choice of this model over other related model was based on its strengths over other models such as probit model. This includes its simplicity in estimation unlike the cumulative distributive normal function of the probit model which lacks quantified integral, direct interpretability of the inverse linear transformation of logit as logarithms of chance in a multivariate setting. The logit function gives the best result when there is existence of extreme independent variables(Fredrick & Ahmad, 2023; Tile & Alfred, 2024).

Referring to (Fredrick & Ahmad, 2023a) if the probability of participation was given by Pi, then the cumulative logistic distribution function was expressed as follows: -

$$P_i = E(Y = 1|X_i) = \frac{1}{1 + e^{-z}} \quad \ldots (5)$$

Where Z =$\beta_0 + \beta_1 X_1 + \beta_2 X_2$. Equation (1) can further be modified to; -

$$P_i = \frac{e^z}{1 + e^z} \quad \ldots (6)$$

Given that the probability of participation is represented by P_i , the probability of not participating is given by (1 – P_i) which is given by the following equation.

$$1 - P_i = \frac{1}{1 + e^z} \quad \ldots (7)$$

Dividing equation (2) to equation (3) gives the odds ratio $(P_i/(1 - P_i)$ which is given as: -

$$\frac{P_i}{1-P_i} = \frac{\frac{e^z}{1+e^z}}{\frac{1}{1+e^z}} = e^z \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (8)$$

By applying the natural logarithm to the left- and right-hand sides of equation (4) to aid estimation of the model, the equation translates into equation (5) which was used to estimate socio economic determinants and institutional factors for community participation in planning process for water projects as: -

$$ln\left[\frac{P_i}{1-P_i}\right] = Z = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_{4+} \dots \beta_{12} X_{12+} \mu_i \dots\dots\dots\dots\dots\dots\dots (9)$$

Whereby z is a binary indicator for participation P = decision to participation in planning for rural water project, (1-P) represents the decision not participate, βo = Constant, β1—β12 = Parameter estimates, and X1=Age, X2=Sex X3=Occupation status, X4=Education levelX5 = Income level X6= Experience X7 = Awareness X8 = House hold size X9=Marital Status X10=Project Policy X12 = Community Culture and μ = is the error term.

Table 1 Measurement of the key variables

Variables	**Measuring**	**Measurements scales**	**Expected Sign**
Decision To Participate	Yi = 1, If one participates Yi = 0, If one does not participate	Binary	+/-
Sex	Measured in terms of proportion of sex in participation 0 = Female 1 = Male	Categorical	+/-
Age	Measured in terms of number of years household head have	Continuous	+/-
Occupation	1.= Agriculture 2.= Small business 3 = Livestock 4. = Civil servant	Categorical	+/-
Awareness	Measured if individual is aware of the concept of participation or not 0= If is not aware	Categorical	+/-
Education	Household head level of education he/she has attained	Ordinal	+/-
Income	Measured in terms of the amount that household head obtain in all sources of his/her income per year	Continuous	+/-
Household Size	Number of household members	Continuous,	+/-
Marital Status	Measured by the marital status of a household head	Categorical	+/-

Variables	Measuring	Measurements scales	Expected Sign
	1.= Married		
	2.= Separate		
	3.= Unmarried		
	4.= Divorced		
	5. = Widow		
	6.= Widower		
Experience	Measure if individual is experienced or not experienced	Categorical	+/-

Descriptive Statistics

Table 2 revealed that; there were 105 females (48.39%) and 112 males (51.67%) who responded to the questionnaire. Both sexes were well represented, making the data relevant and reliable despite most respondents being male. This skewed representation reflects the higher number of men participation in planning for rural water projects.

Table 2: Description of respondents' characteristics

Component	Attribute	Number of respondents	Percentage
Sex	Male	112	51.61
	Female	105	48.39
	Total	**217**	**100%**
Marital Status	Married	136	62.67
	Separated	32	14.75
	Unmarried	32	14.75
	Divorced	7	3.23
	Widow	7	3.23
	Widower	3	1.38
	Total	**217**	**100%**
Education Level	No education	25	11.52
	Primary education	64	29.49
	Secondary education	70	32.26
	Tertiary level	58	26.32
	Total	**217**	**100%**
Occupation status	Agriculture	49	22.58
	Small business	88	40.55
	Livestock keeping	55	28.34
	Civil Servants	35	16.13
	Total	**217**	**100%**
Awareness	Aware	199	91.71
	Not aware	18	8.29
	Total	**217**	**100%**
Experience	Have experience	161	74.19
	Not have experience	56	25.81
	Total	**217**	**100%**

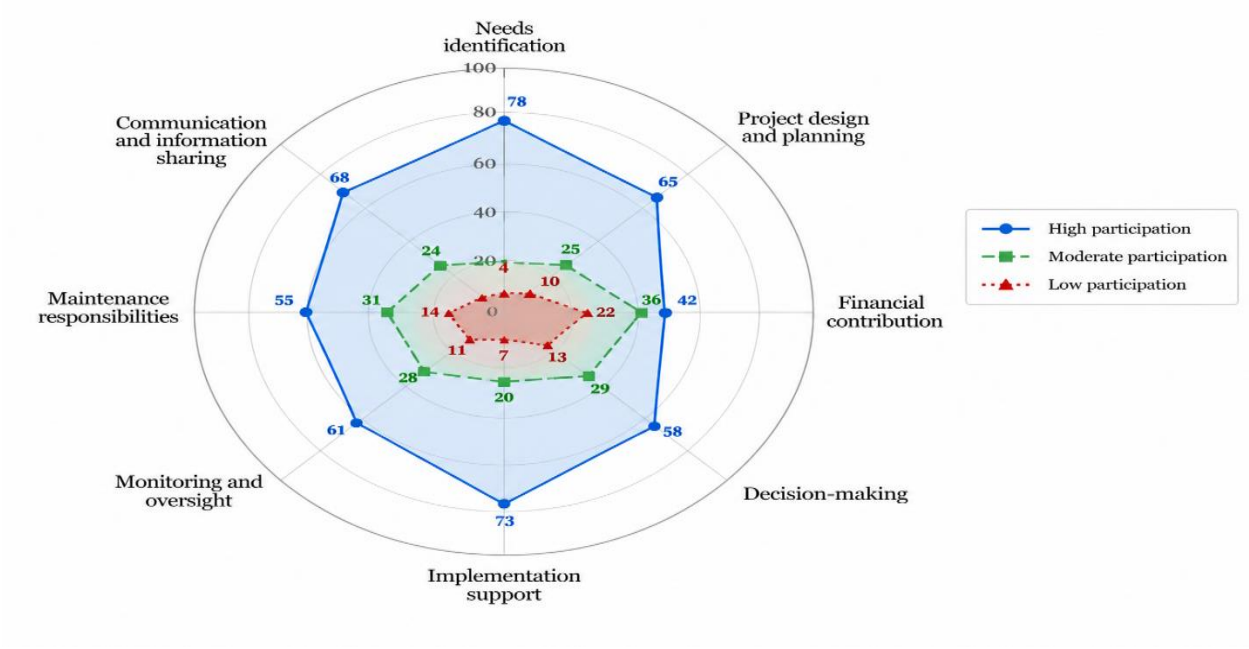
Also, among 217 respondents, 136 individuals (62.67%) were married, 32 individuals (14.75%) were separated, 32 individuals (14.75%) were unmarried, 7 individuals (3.23%) were divorced, 7 individuals (3.23%) were widow and 3 individuals (1.38%) were widower. Moreover, results support success of the government efforts to make sure that, rural communities attain primary and secondary education where by 25 respondents (11.52%) had no education, 64 respondents

(29.49%) had primary education, 58 respondents (26.32%) had tertiary education and 70 respondents (32. 26) had secondary education.

Furthermore, table 2 revealed that, among 217 respondents, 199 individuals (91.71%) were aware about the concept of community participation in project planning process and 18 individuals (8.29%) were not aware. Through public meetings, workshops and conferences, community members become aware about the concept of participation and its importance. Lastly, table 2 shows that, among 217 respondents, 161 individuals (74.19%) had experience about projects planning while 56 individuals (25.81%) were not experienced. Results support that a large number of individuals in project beneficiary's households participated in planning process for rural water projects compare to those who were not aware. The reason bend was that, large number of community members acquired experience by being involved in project planning process through force account system where by local people were involved in planning and implementation of rural water projects.

The radar in figure 2 shows that participation of the community in rural water project planning is relatively strong across a range of dimensions, especially needs identification (78%), implementation support (73%), communication and information sharing (68%) and project design and planning (65%). The participation is relatively lower in financial contribution (42%), indicating that while communities are actively involved in identifying needs, planning, implementation and information sharing, their direct financial involvement is more limited. Participation has been most moderate in financial contributions (36%) and maintenance responsibilities (31%) and most low in these areas as well, at 22% and 14%, respectively

Figure 2. Dimensions of Community Financial Participation in Rural Water Project Planning



This pattern reflects a higher community participation in the consultative and implementation stages than in the financial aspects of rural water projects. The findings emphasize the necessity of putting in place mechanisms for meaningful community participation in the financing of rural water projects for sustainable communities in terms of financial contributions, budgeting, resource

mobilization and financial decision-making while ensuring that such participation is equitable and affordable. Greater financial participation could increase community ownership and accountability and strengthen the long-term sustainability of rural water projects.

Results and Discussions

Model specification test justifying the use of logistic regression

According to Gujarati's (2014) explanation of model specification, it has been suggested in his study that the model's specification is a crucial component of econometric analysis and that it must be appropriately stated. If this component is not examined, it could lead to biased or incorrect model specification. The link test command in STATA 15 was used to conduct the test in this investigation. When the dependent variable is related to the independent variables, this test looks for specific errors.

Variable	Coefficient	z
Hat	0.988***	3.790
	(0.261)	
hat square	-0.022	-0.240
	(0.092)	
Number of observations	217	
LR χ^2 (2)	76.51	
Prob > χ^2	0.0000	
Log likelihood	-16.801287	
Pseudo R^2	0.6948	

*Note: *** p < 0.01. The Link test assesses the specification of the fitted model. A statistically significant hat together with an insignificant hat square indicates no evidence of a major specification error in the fitted model.*

Once the estimates were obtained, the model specification error was calculated to see if the model accurately reflected the direction that the hypothesis suggested. Hypothesis null (H_O): Alternative hypothesis (H_1): the model is not well specified; the model is well specified. The P>IzI of _hat should be significant at 1% and the P>IzI of _hatsq should be negligible in order for the model to be specified. The probability P>IzI of _hat was significant at 1% (0.000), while the P>IzI of _hatsq was negligible at 1% (0.811), where the model results failed to reject the null hypothesis, according to the obtained results of the model specification error shown above in table 3 The model is hence well-specified.

The findings of this study provide valuable insights into community participation in planning process for sustainability of rural water project in Simiyu region. Results have important implications for water policymakers, government agencies (RUWASA), and donors in ensuring the sustainability of the implemented rural water projects. First, the analysis revealed a significant and positive relationship between age and community participation in planning process for sustainability of rural water project. This finding aligns with previous research that underscores the willingness and drivers of community participation in mangrove conservation in the Rufiji Delta, Tanzania (Axel Marx, Kari Otteburn, Vineet Hegde, Weiyuan Gao, Guillaume Van der Loo & Melisa Deciancio, Juliana Peixoto, 2018; Ntibona et al., 2023). It was revealed that, age was the most significant drivers positively associated with community willingness to participate in conservation activities. Also, sex (male) was significant and positive related to community participation in planning process for sustainability of rural water project. The findings support Fredrick & Ahmad, (2023(Jha et al., 2020)) who conducted a study on the factors influencing

community participation in planning and implementing agricultural development in Matongoro Cattle auction in Kongwa district, Tanzania. This implies that sex aspects are often considered relevant as in many traditional systems male play a prominent role in decision-making (Huber & Arnberger, 2021). Government and water policy makers should ensure gender equality in participation in planning process for rural water projects.

Table 4: Determinants of Community Engagement in Rural Water Project Planning in Simiyu.

Variables	Coefficients	Marginal effects
Age	1.133324	0.116483**
	(0.622487)	(0.063336)
Sex		
Male	0.953626	0.09805**
	(0.459935)	(0.04532)
Marital status		
Separated	-0.20584	-0.02212
	(0.544336)	(0.05898)
Unmarried	0.156184	0.01527
	(0.550932)	(0.053278)
Divorced	-0.20919	-0.0225
	(0.967205)	(0.107838)
Education		
Primary education	-1.19267	-0.10615
	(0.746149)	(0.060631)
Secondary education	-1.02421	-0.08682
	(0.747529)	(0.057193)
Tertiary level	-1.03535	-0.08805
	(0.859878)	(0.080222)
Household size	0.046528	0.004782
	(0.050728)	(0.005063)
Occupation		
Small business	1.453318	0.161392**
	(0.593849)	(0.059521)
Livestock	1.67837	0.176897**
	(0.731766)	(0.063613)
Awareness	2.340606	0.246565**
	(0.840689)	(0.083703)
Availability of Project policy		
	0.173716	0.01731
	(0.687231)	(0.066045)
Culture and altitudes of people		
	-2.01349	-0.21341
	(0.798464)	(0.081234)
Experience of the households on project		
	1.331405	0.174588**
	(0.520125)	(0.0828)
Constant	-5.61119	
	(2.459664)	
Observations	217	217

Similarly, analysis revealed occupation (small business and livestock keeping) was found positive and significantly influence community participation in planning for rural water project at 5 percent which implies that, being a livestock keeper and small business men or women increases the

probability of participation in planning for rural water projects. The findings underscores the fact that, there is a rapid transformation in rural economies in Tanzania resulted by electrification and tarmac roads linking which enabled the introduction of small industries and business that stimulated rural economic activities (Magorombe et al., 2024; Priyan & Nyabakora, 2023).

In addition, analysis revealed that, awareness and experience were positive and significant at 5 percent influence community participation in planning for rural water project. This finding underscore involvement of local people in implementation of construction projects through force accounts in Tanzania rural areas. Local communities acquire experience and employment by being involved in project planning process through force account system introduced by the government of Tanzania (Matto, 2021). This support Waweru, (2019) who asserts that, awareness and previous development experience was a key driver for community participation in in the community driven development approach in Kenya.

4. Conclusion and Recommendations

The study unaliased about the community participation in planning process for sustainability of rural water projects in Simiyu region. The study results reveal that; there was a strong relationship between community participation in planning process and sustainability of the implemented projects. Age, sex (male), occupation (small business and livestock keeping), income level, awareness and experience were positive and significant at 5 percent influence community participation in planning for rural water projects. Sex (male) was more likely to participate in planning for rural water projects due to various factors, such cultural norms. The study suggests that, government and water policy makers should make sure that, gender equality is considered in formulating water policies. Since women and children are the one who search for domestic water in most Tanzania rural areas, local government should have educated community on gender equality so as to create awareness on the importance of equal chance of men and women to participate in planning for water projects. Also, government should enhance equal rights and sharing of power in water policy making so as to enhance full community participation of the local people in policy making.

Moreover, government should direct its effort in decentralization of National Water Policy (NAWAPO 2002) and Water Supply and Sanitation Act and its regulations (WSSA) No. 12 of 2009 which provides the right for community to participate in rural water project. Additionally, government and donors should provide capacity building to rural community members on the importance of their participation in rural water projects to enhance effective and active participation. Also, government should ensure that, National water policy provide a clear guideline for development partners and firms contracted to develop rural water projects that stipulates structures, steps and process that build and sustain effective community participation in planning process.

Furthermore, government should enact water laws and regulations which enhance the legal rights for Community Based Water Supply Organizations (CBWSO's) to be an independent entity in planning and implement the planned activities without political interference or interest from other institutions. Moreover, government should supervise and provide a mechanism (by laws) to eradicate corruption and misuse of water tariffs which was a consequence of lack of accountable, transparency and integrity leadership. Furthermore, frequent seminars, training and capacity building sessions such as workshops for building understanding on the consequence of corruption and misuse of collected water tariffs should be conducted to community and water user management teams.

Additionally, county government leaders should ensure good political will in planning, implementing and operation of the government project in rural areas as it was found that, most of government projects implemented in rural areas was influenced by political will and popularity gains rather than addressing the needs and problems of local people in rural areas. This situation limits rural communities to participate in planning for the implemented projects. Lastly, government should allocate enough budget to pay monthly allowances and allowances of CBWSO's members as it was found that, in most areas CBWSO's Chairpersons were not paid their mostly allowances. Additionally, CBWSO's members were not paid their monthly salary and allowances on time despite of monthly water tariffs collected and submitted to government through Rural Water Supply and Sanitation Agency (RUWASA).

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