

Determinants of Inclusive Community Participation in Rural Water Project Design in Dodoma

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Abstract

Despite broad recognition of the importance of community participation in rural development, disparities in engagement among different social groups remain underexplored. This study investigates the determinants and extent of community involvement in the design of rural water supply projects in Dodoma, Tanzania, using data from a cross-sectional survey of 198 respondents and applying descriptive analysis and the double hurdle regression model. Results show that while most participants had low (35.4%) to medium (46.5%) levels of involvement, participation varied significantly by gender, education, occupation, and asset ownership. Women, individuals with higher education, civil servants, those with training, and asset owners were more likely to be actively involved, particularly in later project stages. The study recommends inclusive strategies that promote meaningful participation through education, training, and improved access to productive assets, while also addressing structural barriers and applying intersectional approaches to ensure equitable involvement across all social groups.

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1 Introduction

In Tanzania, 39% of households had access to an essential water supply in 2023 (World Bank, 2023), a percentage lower than the global average of 26% (WHO/UNICEF, 2021; UNECA, 2017). The Tanzania Mainland household budget survey (HBS) in 2017-18 for non-income poverty indicators shows that the percentage of households accessing water is higher in urban areas than in rural areas (URT, 2019). Globally, the statistics on differences in access to clean and safe water among countries/ regions and between rural and urban populations are available (see, for example, UN, 2018; WHO/UNICEF, 2021; WWAP, 2019). Consequently, studies on the determinants and factors affecting access to clean and safe water exist (Tshililo et al., 2020; Abubakar, 2019; Adil et al., 2021; Adams et al., 2016). However, most of these studies pay less attention to the variations in access among different groups. Exposing these variations is essential because even in places where safe water is available, there are inequalities in access among groups of people. The World Bank Group's report on reducing inequalities in water supply shows that marginalized groups and low-income communities often lack access to essential water services (World Bank, 2017). For example, in Guatemala, only 33% of the indigenous population has access to safe water compared to 77% of the nonindigenous population (World Bank, 2017).

One of the solutions to the provision of access to water to all groups of people is to involve them in the planning and designing of water projects. Policy and practice must address issues related to exclusion and inequalities to ensure that everybody, including those most in need, is reached (WWAP, 2019). Differences in power relations embodied in cultural practices affect access to water supply services. Some people lack access to high-quality services because of factors related to gender, ethnicity, and socioeconomic status (WWAP, 2019).

In 1992, the World Summit on Sustainable Development (cf. Earth Summit) adopted Agenda 21, which, among other things, aimed at introducing integrated approaches to the governance of water resources that stakeholders should manage water, preferred a community of water users (Agenda 21, 1992). Subsequently, international organizations and national governments have been emphasizing the involvement of the community in designing water-related programs/ projects to ensure that water supply is universally accessible and sustainable (Lankford & Hepworth, 2010). Similarly, plenty of literature exists to support community participation in making decisions about things that affect their lives (Ananga et al., 2021; Gomez & Nakat, 2002; Marks et al., 2014; Mdendemi, 2013; Migwi & Atikiya, 2018; Njoh, 2002; Ofuoku, 2011; Skidmore et al., 2006). While these studies have successfully shown the importance of community participation in improving social service delivery, they have yet to consider inequalities in participation between different groups of people. They need an analysis of the engagement of other groups of people in the development processes.

The 2030 Agenda for Sustainable Development/ Sustainable Development Goals (SDG) emphasizes the relevance of addressing the needs of different types of people, which calls for the involvement of all groups of people in the development process (WWAP, 2019). To provide universal and equal access to better water supplies, goal number six of the agenda aims to ensure the availability and sustainable management of water for all and enhance the supply of clean water by 2030 (United Nations, 2018). Indicator 6.b.1 requires the counties and local authorities to establish water governance policies and to have all procedures for engaging local communities operational (UNECA, 2017). With this regard, the United Nations (UN) strives to ensure that the

governance of water development projects also includes people with different social categories of marginalization.

While the World Water Development Report (WWDR) of 2023 showed that many countries have formulated clear policies and laws to govern water resources, the level of participation for different categories of people has yet to be known. This information is necessary to ensure that the current efforts to supply water services are more appropriate to the needs and resources of poor communities (UNECA, 2017, pp. 2-3). In line with the 2030 Agenda for Sustainable Development, this study intends to go beyond the previous analysis, which assesses community participation and project sustainability, to examine the involvement of different groups of people. The aim of this study is twofold: first, to investigate the inclusion of different groups of people in participation in the designing and planning of rural water projects (cf. participation); second, to assess the extent to which various groups of people participate. The rest of the paper is organized into six sections. Section two presents the analytical framework and the conceptual framework. Section three covers research methods. Sections four and five show the study results and discuss the findings, respectively. The last section, section six, concludes the study.

2 Review of related literature

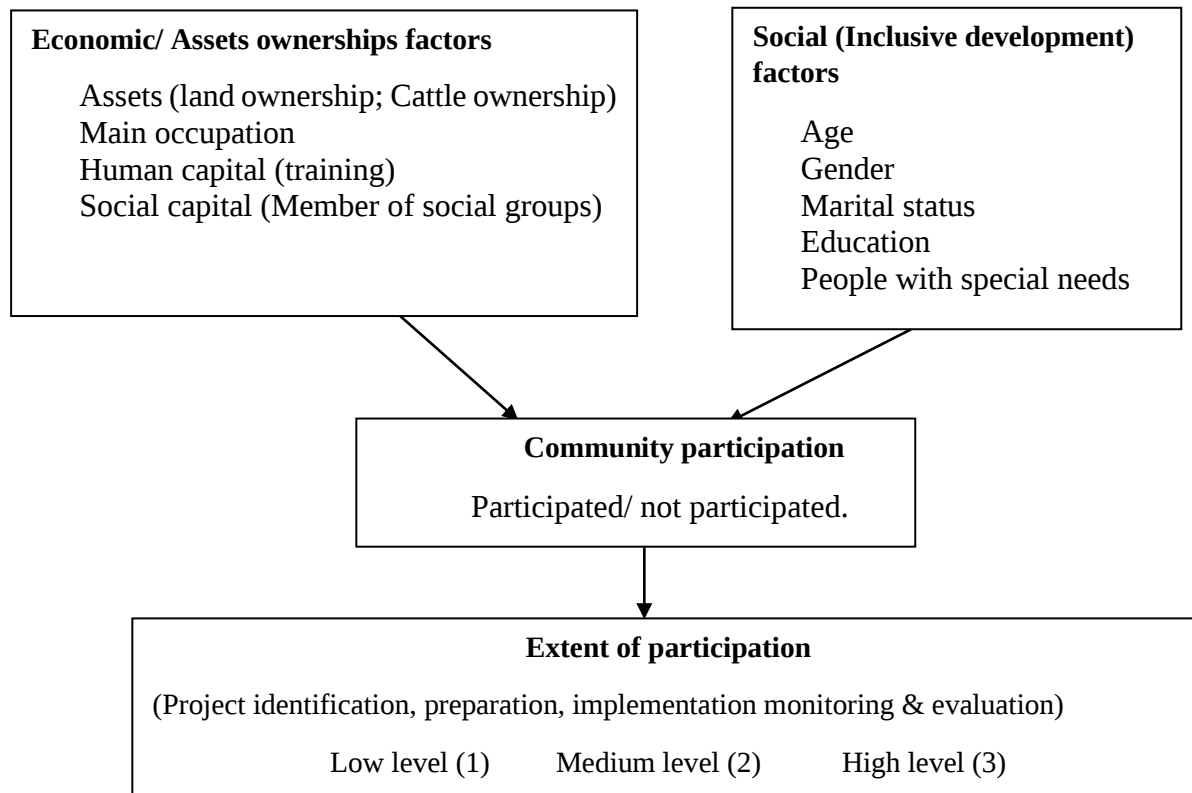
From the 1980s onwards, the focus of the international agenda shifted from economic models that target income growth and capital accumulation to include the measures of poverty that reduce inequalities among members of society, i.e., pro-poor growth (Son, 2007). The primary focus of pro-poor growth is to ensure the benefits of growth are equally distributed across poor and non-poor. The growth is pro-poor if low-income people accrue more benefits than the non-poor (Kakwani, 2000; Kakwani & Pernia, 2000; McCulloch & Baulch, 2000). From this notion, different indicators exist to measure and compare poverty at various levels. The critiques of the pro-poor growth approach contend that poverty indicators may wrongly reveal a reduction of the poverty level because growth effects dominate the inequality effect. In this case, growth is pro-poor in that poverty has fallen, but it is not inclusive because of the rising inequality (van-Gent, 2017, 9). Literature on inclusive development has emphasized shifting from the concepts of gross growth and development indicators to the ones that show the distribution of social and material benefits across social groups and related categories (See, for example, van-Gent, 2017; Hickey, 2013). Inclusive development addresses marginalized groups' challenges and brought social justice (Smith *et al.*, 2023).

Arnstein's citizen participation ladder presented different inclusion levels (Arnstein, 1969). The lowest level, just inclusion, requires only the implementors' statement on the incorporation of the needs of marginalized groups. However, when the implementors provide evidence to support the statement, the level changes from just inclusion to the inclusion of consumption. The impact level requires more evidence to prove that the targeted beneficiaries have accrued the intended benefits. To add to Arnstein's ladder, Heeks, Foster, & Nugroho (2014) presented the concept of the inclusion of process, which requires the involvement of marginalized groups in all stages of the project cycle, ranging from being consulted at the planning stage to actively involved during the implementation.

Different studies on community participation suggested viewing community participation in terms of the decision-making process and benefits from participation (Tosun, 2000; Timothy, 1999). In their study on inclusiveness in innovations Hoffecker (2021) suggested that research on

inclusiveness should address “the extent to which innovation processes address the challenges and concerns of poor and marginalized communities and the extent to which these communities benefit from the resulting innovations, either through direct uptake or because the innovations contribute to including them in systems, markets, or benefit streams from which they were previously excluded.” (5). In line with Hoffecker (2021) this study builds the analytical framework that examines the inclusion of different groups of people in the designing and implementation of rural water projects and the extent to which different groups participate in different stages of the project cycle.

Figure 1: Determinants of community participation and the extent of participation



Source: Authors own construction, 2021

Figure 1 presents the analytical framework on the determinants of and the extent of community participation in the rural water supply project design. Regardless of the nature of the participation, the variable of whether a person participated in the project or not represents community participation. For those who claimed to participate, the levels of participation capture the extent of participation. The activities comprise four stages: project identification, preparation, implementation, monitoring, and evaluation. The levels of participation depend on the number of activities of participation that a person attended.

Social (Inclusion of different groups of beneficiaries) and economic/asset ownership factors are assumed to affect participation and extent of participation in the rural water supply project design. Age, gender, marital status, education level, and special needs are the proxies of inclusion factors.

Economics/ Possession of livelihood assets regarding land ownership, Cattle ownership, Main occupation, and Human and Social capital represent the controlled factors.

There are mixed results on the effects of age and gender on participation. While some studies have shown that youth are likely to participate more in community projects because they are active in physical work, other studies reported that the morale of youth in participation is hindered by factors like unemployment and differences in social class (Obar *et al.*, 2017; Karamunya and Cheben 2016, Gupta, Pouw and Ros-Tonen 2015). In the absence of meeting their basic needs, working for survival consumes the time and energy of most youth, and participation in community activity is termed a luxury (Tosun, 2000). Gender norms and cultural practices define men's and women's roles in developing countries (Agarwal, 1997; Brohman, 1996). These practices also impact men's and women's participation in community development projects (Tosun, 2000; Botes & van Rensburg, 2000; Thein, 2015).

In SSA, society socializes women as caregivers and men as decision-makers on things that affect households and societal welfare. Even in community development projects, women may be denied the right to participate because of social practices. For a long time, SSA believed men have the right and power to decide for women, even in implementing development projects. The findings from the studies by Miruka (2016) and Nkonjera (2008) also found that men have more influence on community participation in rural water projects. Gender responsibilities of taking care of their families and giving birth hinder women's participation. Despite the cultural beliefs and norms, some studies reported women's participation to have positive impacts on project sustainability. For example, Alelah and Mueke (2017) found that women's participation in water projects significantly impacts the projects' sustainability.

Though there is little evidence in water projects, being single or married is one of the factors that can influence participation. In microfinance studies, unmarried people have limited access to loans because of their trustworthiness (Ermer & Proulx, 2019). A study by Karamunya and Cheben (2016) found that marital status is not the most crucial factor influencing community project participation. Education level shows the accumulation of knowledge and skills. Education has the highest influence on the effectiveness of community involvement in rural water projects (Miruka, 2016). Having special needs is a mental or physical condition that limits people's movement and active participation in development activities. Most previous practices considered people with special needs as beneficiaries, not as project planning and implementation participants. Best, Krieger, and Eliason (2011) discovered that people with special needs, particularly disabled women, are rarely active in social work (employment opportunities).

Economic factors in terms of occupation and access and ownership of economic resources are crucial determinants of participation in development activities (DFID 1999). The main occupation entails someone having a job or profession for earning income. In most research, occupation does not influence participation in community projects (Hassan et al., 2019; Karamunya & Cheben, 2016; Nkonjera, 2008). People who own assets are assumed to participate more in development activities. Ownership of land and/or cattle signifies a person's accumulation of assets/wealth, and it is also an essential determinant of participation and sustainability of the project (Cahn, 2006; Martey et al., 2013). The framework assumes that the respondents who own cattle can participate actively in water projects because they depend on the water for livestock feeding. Also,

respondents with cattle are likely to have more power or influence because of their perceived social status, which gives them the capabilities and power to act on something (Cahn, 2006).

Social capital, as defined by being a member of a social group, entails two or more people interacting with one another, sharing the same characteristics, and having a sense of unity. Literature reports the positive effects of social capital on participation in different economic activities (Shitima & Dimoso, 2020). Training is one of the indicators of a person's accumulation of human capital, that is, knowledge and skills. However, there are different findings on the effects of training on participation in conservation behavior. A study by Pothitou, Hanna, & Chalvatzis (2016) shows that people with environmental training are more likely to demonstrate home energy conservation behaviors, while a study by Aregay, Zhao, & Xu (2018) shows no significant effects on training on conservation.

3 Methodology

3.1 Research Design and the Study Area

The study applied a quantitative approach by conducting a cross-sectional survey of households residing in Hombolo and Nala wards in Dodoma Municipal, Tanzania, in 2021. Purposive sampling was used to select the wards based on the fact that they both implemented water-related projects. While Nala and Hombolo wards had a population of 9,505 and 20,443, respectively, only 2,347 households in Nala and 2,936 in Hombolo benefited from their respective water projects. The following formula, as used in (Yamane, 1967), was applied to determine the sample size of 372 households.

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

Where n = the sample size selected; N = the targeted population the researcher identified as 5,283 from villages that benefited from the project; and e = the sampling error percentage, which the researcher has chosen 5%. A pre-tested questionnaire was the major tool of data collection during the survey. A simple random technique was used to select the respondents to be included in the survey. The sample frame consisted of people who participated and those who did not participate in designing the water project. The unit of analysis was the head of household.

3.2 Econometrics Model

To assess the participation in designing of water supply projects and the extent to which different groups of people in the community participate, the study used double hurdle regression model to analyse the findings. The first hurdle (Community's decision to participate) shows the probability that the household participating in designing rural water supply development projects.

$$D_i^* = x_i' \beta + \varepsilon_i$$

Where D_i^* is a dormant variable that indicates whether the household participated or did not participate in designing rural water supply development projects. β represents the vector of unobserved parameters to be estimated, x_i' represents the vector of observed independent covariates explaining the event, and ε_i indicates unobserved error term capturing other factors and is assumed to be independent and normally distributed. That is μ_i

$$N \sim (0, 1), \text{ and } D_i = 1 \text{ if } D_i^* > 0$$

$$D_i = 1 \text{ if } D_i^* \leq 0$$

The variable D_i presents the value of 1 if the community members participated in designing rural water supply development projects, and it is zero (0) if otherwise. The participation was assumed to be determined by an underlying response variable that explains the economic/asset possessions factors as well as social inclusion factors. The second hurdle shows the extent to which community members participate in designing rural water supply development projects. The equation is a truncated normal distribution with characteristics different from the Probit model, which is estimated as:

$$D^* = x_i' \alpha + \mu_i$$

Where D^* is the observed extent of participation in designing rural water supply development projects measured by the number of activities in designing rural water supply development projects. The extent is low if a person participated in only one activity, medium if two to three activities, and high if four to five activities. x_i indicates the vector of covariates that explain the extent, α is a vector of unobserved parameters to be estimated and is a random variable that denotes all other factors other than X. STATA software version 16.0 was used to analyze the model, with the assumption that the two error factors are normally distributed and uncorrelated.

3.3 Variables

Five variables are used as the social inclusion factors affecting the community participation in the design of rural water supply projects (cf. participation). The study assumes that the likelihood of participation decreases as age increases by one year. Therefore, age is expected to influence the participation and extent of participation negatively. A variable man is used to capture the impact of gender on participation. Man is a dummy variable, which takes a value of 1 if a respondent is a man and 0 if otherwise. Men are expected to be more active in participation and the extent of participation than women. For the marital status variable, married people are expected to participate more in designing rural water development projects because having their own family signals responsibility. The study assumes that educated people are more likely to participate in designing rural water supply projects than uneducated ones. Four variables are used to categorize the level of education. These levels are no formal, primary, secondary, or college/ University education. No formal education is treated as a reference category because the study has assumed a positive relationship between education level and participation. The variable, people with special needs, is added to capture the community members who are believed to be marginalized. People with special needs are expected not to be involved in designing rural water development projects.

Three variables, occupation, land, and cattle ownership are used as proxies for economic factors. For the variable occupation, the argument is made that a person whose occupation directly depends on water availability is expected to participate in the designing of community water projects. The main occupation is expected to be farming, farming & livestock keeping, civil servants, and private sector employees. In this study, because of their dependence on water, people who are engaged in farming and livestock keeping are more likely to participate in designing of rural water supply projects. The variables land and cattle ownerships are both expected to influence community participation positively.

A variable education training is used as proxy for assets ownerships in terms of human capital. People who received training on the importance of participation in development projects are expected to participate more in designing rural water development projects. A member of social

group is used as a proxy of social capital. Being a member of social group is expected to influence positively the participation in designing rural water development projects.

4 Findings and Discussion

4.1 Descriptive Analysis: Participation

Table 1 summarizes the results, revealing that 174 out of 372 respondents (46.77%) did not participate, and 198(53.23%) participated. Regarding the gender of the household's head, 193(52%) households were headed by men and 179(48%) by women. Further results reveal that within the gender groups, most males participated 119(62%) compared to females 79(44%). Among 372 respondents, 260(69.9%) were married while 112(30.1%) were not. The analysis of the differences in participation shows that 55% of married respondents and only 49% of unmarried respondents participated. Regarding special needs, the majority of the respondents, 342(91.9%), had no special needs, while 30 (8.1%) had special needs. 47% and 54% of people with special and without needs participated in designing water projects, respectively.

Table 1: Summary Statistics for Participation

		No		Yes		Total
		F	%	F	%	F
Gender	Female	100	56%	79	44%	179
	Male	74	38%	119	62%	193
Age	18-38	118	53.20%	104	46.80%	222
	39-59	40	34.80%	75	65.20%	115
	60 and above	16	45.70%	19	54.30%	35
Marital status	Unmarried	57	51%	55	49%	112
	Married	117	45%	143	55%	260
Education	No formal education	25	57%	19	43%	44
	Primary education	113	50%	112	50%	225
	Secondary education	21	41.20%	30	59%	51
	Collage/ University	15	29%	37	71%	52
People with special needs	No	158	46%	184	54%	342
	Yes	16	53%	14	47%	30

Source: Field survey (2021).

Results on age groups show that the majority, 222 (59.7%) respondents, were youth aged between 18- 38 years old, followed by middled aged 39-59 years who were 115(30.9%) and 60 years old and above amounted to 35(9.4%) respondents. Fewer households (46.8%) between 18 and 38 participated compared to 65.2% and 54.3% of the respondents aged between 39 and 59 and 60 years old and above, respectively. Majority of respondents 225(60.5%) out of 372 had primary education, 44(11.8%) no formal education, 51(13.7%) secondary education level and 52(14%) college or university education level. The comparisons in each category revealed that 71% and

59% of respondents with college/university and secondary education participated. Only 50% of respondents with primary education and 43% of those with no formal education participated.

4.2 Descriptive Analysis: Extent of Participation.

For 198 respondents who participated in designing rural water supply projects, table 2 presents results on the extent of participation for each social (inclusion) factor. Among 198 respondents who participated, 35.4% and 46.5% had a low and medium level of participation, respectively. Fewer respondents, 18.2%, scored a high level.

Table 2: Summary Statistics for Extent of Participation

Variable	Variable description	Levels of participation					
		Low		Medium		High	
		F	%	F	%	F	%
Age	18-38	38	36%	57	55%	9	9%
	39-59	21	28%	31	41%	23	31%
	60+	11	58%	4	21%	4	21
Gender	Female	35	44.3%	31	39.2%	13	16.5%
	Male	35	29.4%	61	51.3%	23	19.3%
Marital Status	Unmarried	12	21.8%	36	65.5%	7	12.7%
	Married	58	41%	56	39.2%	29	20.3%
People with special needs	No	62	33.7%	90	48.9%	32	17.4%
	Yes	8	57.1%	2	14.3%	4	29%
Education Level	No formal education	13	68.4%	4	21.1%	2	11%
	Primary	39	35%	49	44%	24	21%
	Secondary	11	37%	11	37%	8	26%
	College/ University	7	19%	28	76%	2	5%

Source: Author's survey data, 2021

Table 2 shows that 119 respondents who participated in designing rural water projects were men, while 79 were women. Most male respondents, 61(51.3%), showed a medium level of participation, and the majority of females, 44.3%, had a low level of participation. Findings on marital status show that 143 respondents were married, and 55 were unmarried. While most unmarried respondents (65.5%) had a medium level of participation, the majority of the married people (41%) scored a low level.

The results on the age groups show that 104(52.5%) respondents were youth aged between 18- 38 years old, followed by 75(37.9%) aged between 39-59 years old, and 19(9.6%) who were 60 years old and above. The majority of the youth (18- 38 years) and middle age group (39-59 years) had a medium level of participation with a scored percentage of 55% and 41%, respectively. Most old respondents (58%) had a low level of participation.

Table 2 shows that only 14 people with special needs participated in the design of rural water projects. 57.1% participated at the low level, and 4 (29%) and 2 (14.3%) respondents participated at the higher and medium levels, respectively.

The results on education level indicate that the majority of respondents, 122(61.6%), had primary education, followed by 37(18.7%) and 30(15.1%) who had college/university and secondary education, respectively. 19(9.6%) respondents had no formal education. Further results indicate that while most of the respondents (68.4%) with no formal education had a low level of participation, the majority with a college education (76%) scored a medium level. Most respondents with primary and secondary education had a medium level of participation, with the indicated percentages of 44% and 37%, respectively.

4.3 Econometrics Model Results: Factors Affecting Participation and Extent of Participation.

4.3.1 Social Inclusion Factors

Table 3 presents the results from the double hurdle regression model. Social inclusion factors regarding age, gender, and people with special needs affect participation in the rural water supply project design. While age is not a significant determinant of participation in the designing of rural water supply projects, the results on the second tier revealed that for those who participated, a one-year increase in age raises the extent of participation by 0.021831. While the results on the second tier are contrary to the model prediction, they may imply that people become more concerned about societal welfare issues as they age. The findings that participation in different stages of designing projects increases with age conform to studies by Mutua (2014) and Hassan, Ong'ayo, and Osore (2019) in Kenya.

The dummy of gender (male) is statistically significant and negatively related to participation in designing rural water projects. The marginal effects results indicate that being a man decreases the probability of participation in designing rural water projects by 0.3734 compared to being a woman, holding other factors constant. The study by Nwabuzor (2015) in Nigeria and Mdendemi (2013) in Tanzania also reported gender as an influential factor in participation in the sustainability of rural water projects. Poor participation of male heads of households may be related to the fact that men are less affected by water-related issues than women. Because of gender norms, providing water to households is a female's responsibility. Consequently, women participate more in water-related issues than men. The results on the influence of age on the extent of participation are insignificant.

Table 3: Double Hurdle Model Results

	Community Participation			Extent Of Participation		
	First Hurdle (Probit)			Second Hurdle (Truncated)		
	dy/dx	Z	P>z	Coefficient	Z	P>z
Age	0.0019208	0.25	0.8	0.02183	1.66	0.098*
Gender (Male)	-0.3734469	-2.21	0.027**	-0.36989	-1.39	0.165
Marital Status (Married)	0.0055186	0.02	0.98	-0.44861	-1.34	0.181
Education level (primary education)	0.1237392	0.43	0.668	0.84791	1.15	0.251
Secondary education level	0.5515818	1.56	0.118	1.06473	1.37	0.172
College or university education level	1.83747	4.43	0.000***	0.16384	0.18	0.858
Households Occupation (Farmer)	0.2836196	1.16	0.247	0.12287	0.25	0.8
Farmer and Livestock keeper	0.6408381	1.63	0.102	0.07649	0.13	0.895
Employed in private sector	0.7228148	2.21	0.027**	0.72622	1.36	0.174
Civil servant	-1.592758	-2.55	0.011**	2.23303	3.52	0.000***
Other occupation	-0.170077	-0.55	0.584	0.97673	1.37	0.172
People with special needs	-0.7852927	-2.59	0.010**	0.24915	0.39	0.697
Location	-0.2805437	-1.54	0.124	0.14205	0.51	0.61
Land ownership	0.4460488	2.22	0.026**	0.21426	0.67	0.504
Cattle ownership	0.0995345	0.36	0.718	0.9378	2.99	0.003**
Training	0.7708832	3.15	0.002**	0.63153	2.09	0.037**
Member of social group	0.2176687	0.96	0.336	0.62161	1.71	0.088*
_cons		-2.95	0.003	0.64394	0.43	0.667
Sigma	1.29321	14.27	0.000	1.29321	14.27	0.000

Note: *10% significance level, **5% significance level, ***1% significance level

Source: Estimated from sample survey data (2021).

Education level significantly affects participation in the design of rural water projects. The college or university degree results on the first tier of the model were statistically significant and positively influenced community participation. A college or university education increases the chance of participation by 1.8374 compared to not having a formal education. In the second tier, the result is insignificant. Studies by Obar, Adekoya, and Nkwocha (2017) and Miruka (2016) also reported similar results. A higher level of education is associated with broader knowledge and positive impacts on the issues that affect social welfare.

The model results reveal a significant difference in participation between people with special needs and those without the needs. The model's first tier indicates that people with special needs are less likely to participate by 0.7852 compared to those without it. The study findings conformed to Best et al. (2011), who found that the disabled, especially disabled women, are mostly not involved in social work (employment opportunities). The findings on the extent of participation are not significant.

4.3.2 Economic/ assets ownership factors

All three variables that measure economic factors significantly affect participation. The results in Table 3 show statistically significant results on the two variables that measure occupation. While employment in the private sector increases the probability of participation by 0.7228 compared to unemployed, being a civil servant decreases the probability of participation by 1.5927. On the second hurdle, for those who participated, being a civil servant significantly increases the extent of participation by 2.23303 compared to being unemployed. Some other studies in Tanzania also revealed that occupation influenced the degree of participation in water development projects (Nkonjera, 2016; Shayo, 2013). These studies depicted that working in the private sector and government agencies increases awareness of the importance of participating in rural water supply projects.

The findings on ownership of land and cattle are statistically significant, confirming the prediction that possession of physical capital is essential for people to engage in various development activities. While land ownership (compared to non-ownership) increases the likelihood of participation in designing rural water supply projects by 0.446 compared to no land ownership, cattle ownership increases the extent of participation by 0.938. Previous studies have also found similar results (see, for example, Cahn, 2006; Martey et al., 2013; Wanjiru, 2014).

Possession of human capital in terms of training significantly affects community participation. The variable training is statistically significant in both the first and second tiers. The probability of participation in designing rural water supply projects is higher by 0.7708 for those respondents who have received training on the importance of community participation in development projects. Furthermore, being trained increases the extent of participation by 0.63153. The results imply that training imparts knowledge that increases awareness of the importance of participation in development activities. In environmental studies, Pothitou, Hanna, & Chalvatzis (2016) show that people with environmental knowledge are more likely to demonstrate conservation behaviors, while a study by Aregay, Zhao, & Xu (2018) shows that environmental knowledge does not have a significant impact on attitudes towards conservation.

Membership of a social group entails the situation in which a particular person is either a member of a particular social group or not. The regression model results on the second hurdle indicated that being a member of a social group positively influenced the extent of community participation

in designing rural water supply projects by 0.62161. However, the results were weakly significant at 10%. The findings align with Shitima and Dimoso (2020), who found a member of a social group to be an important determinant of participation in choices of activities that improve societal welfare. Social groups increase awareness and commitment to various developmental issues, including water-related projects.

5 Conclusion

The findings of this study indicate that while many community members participated in the design of rural water supply development projects, their level of involvement was generally limited. Most respondents engaged primarily in the initial stages of the project cycle, particularly during the identification phase where community members contribute ideas through village assemblies. However, participation declined significantly in the later stages such as planning, implementation, and monitoring. This limited involvement suggests that although people are present in the process, their influence and contribution are often minimal beyond the early phases.

Participation levels were found to vary across different social and demographic groups. The double hurdle model analysis confirmed disparities in both the decision to participate and the depth of engagement. Elders, civil servants, married individuals, those who have received relevant training, and people who own productive assets such as cattle were more likely to participate actively in multiple stages of the project cycle. Conversely, other groups such as women, youth, people with disabilities, and individuals without formal education or assets were underrepresented, particularly in decision-making roles within committees.

One key reason for the low extent of participation among many respondents appears to be structural limitations. After the project identification phase, the subsequent planning and implementation stages are typically led by selected committees. Membership in these committees is often limited to individuals perceived as influential or resourceful, excluding broader community involvement. As a result, many participants remain passive beneficiaries rather than active contributors to the project development and decision-making processes.

To address these disparities, the study recommends that government agencies and non-governmental organizations leading project design and implementation adopt more inclusive approaches. These should ensure that all community groups are meaningfully engaged in every stage of the project cycle. Special attention should be given to outreach programs that target disadvantaged groups. Providing training, promoting education, and increasing awareness about the importance of inclusive participation are essential strategies to empower marginalized individuals and enhance their contribution to rural development initiatives.

Moreover, the study highlights the critical role of asset ownership in determining participation levels. In rural Tanzanian communities, ownership of land and livestock is often associated with social power and influence. Individuals who lack these assets are less likely to be included in key decision-making forums. Therefore, development programs should also aim to address economic inequalities by improving access to productive resources and supporting livelihood opportunities that increase individual and household capacity to participate in communal affairs.

Finally, future research should consider exploring the concept of intersectionality to better understand how overlapping social identities shape participation outcomes. For instance, a woman who is uneducated, unmarried, and without assets may face multiple layers of exclusion, making her less likely to engage meaningfully in community development processes. On the other hand, a man who is educated, owns assets, and holds a formal job is more likely to be fully involved. Understanding these intersecting factors will help in designing targeted interventions that promote equity, ensure representation, and strengthen inclusive development in rural communities.

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