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ACCOUNTABILITY AND DELIVERY OF QUALITY WATER SERVICES IN IRAMBA AND SINGIDA RURAL DISTRICTS, TANZANIA

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Abstract

The objective of this paper was to assess the relationship between accountability and delivery of quality water services in Iramba and Singida rural districts involving six villages. The paper used a cross-sectional research design and multistage sampling. A sample of 350 households was drawn from the population by using stratified random sampling based on the location of the households within each local administrative area. Quantitative data were collected using a structured questionnaire, while qualitative data were collected through focus group discussions. The collected data were analysed using both the Statistical Package for Social Sciences (SPSS) version 16 and STATA. Ordinal logistic regression was used to establish the relationship between accountability elements and the delivery of

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quality water services. Based on the study, the level of delivery of quality water services in the study area is low. However, it shows a positive statistically significant relationship between accountability and delivery of quality water services. The study recommends that, for effective delivery of quality water services, local authorities and Community Owned Water Supply Organisation (COWSOs) should strengthen accountability as a means of improving delivery of quality water services.

Introduction

Accountability is much more raised in economic development and funding programmes of WB, IMF, the Organisation for Economic Cooperation and Development (OECD) and funding programmes of Non-Governmental Organisations (NGOs). Organisations and donors have always linked accountability with the improvement of public service delivery. In 2010, the United Nations explicitly recognized water and sanitation as one of the human rights. It also acknowledged that clean drinking water and sanitation are essential to the realization of all human rights [41]. Water is a scarce resource in many countries, people do not have access to quality water service, and therefore live in inappropriate and unfavourable conditions [39]. A challenge in access to quality water service is not due to lack of fresh water resources or financial or physical equipment, rather it is because of a crisis of governance: man-made, with ignorance, greed and corruption at its core [37]

This means with poor governance characterized with corruption, fresh water will only be available for very few individuals. This argument was insisted that good governance, characterized by transparency, participation, accountability, and low levels of corruption leads to a better government management and performance in the task of guaranteeing access to quality water service [3]. For example in Tanzania, rural water supply project executed between 2006/07 and 2015/16 were achieved below 50% despite the 93.7% disbursement of allocated funds [29].

Accountability in public service delivery may be understood and discussed from the governance perspective. The most concise description of accountability is that it is the obligation to explain

and justify conduct [7]. This implies that being able to clearly explain and justify the relationship between an actor, an accountor, and a forum, the account-holder, or accountee. Accountability is the relationship between actor and a forum, where the actor has an obligation to explain and justify his or her conduct; the forum can ask questions and pass judgement, and actor face consequences [8].

It is increasingly argued that a limited access to quality water service depends on institutional failure. Accountability is viewed as a key entry point because it describes the types of relationship between service providers and the recipients. It also explains and justifies every action or plan taken so that in case of any failure either party may be sanctioned for the act [38] Because of its traits of fairness and equitable governance, accountability is of crucial importance for delivery of quality water services for both people living in rural and urban areas [7]. Accountability is an approach that permits water service stakeholders to hold an agency (service providers) accountable through provision of information, participation of stakeholders in project design and implementation, and provision of feedback [16] A study conducted in Sierra Leone found that accountability as a decision making structure influences effective service delivery and sustainable solutions towards delivery of quality water services [10] According to [1], in the study for the OECD, affirms that in Latin American and Caribbean (LAC) countries the primary challenge is the policy gap, followed by the accountability gap and the funding gap.

Much has been written on accountability in Tanzania, in particular some studies focused on accountability at local level [17], [48] and [26]. Other studies looked at accountability on health issues [28], [36],and [4], also others discuss accountability in education [20],[25],[27] and a large body of literature discuss on political accountability at the national level [40], [24], [32] and [35]. However, very little has been written on accountability and quality of water services delivery in the country. In this aspect, this study attempt to fill this gap.

In 1991, Tanzania launched water policy which emphasized on community participation and decentralized management of water supply [45]. In 2002, a New Water Policy (NAWAPO) was launched as a response to the backdrops identified in the 1991 policy. The 2002 policy recognizes access to clean and safe water as a basic need and right for all. It also aims to provide

adequate, affordable and sustainable water supply services to the rural population. The policy applies principles of decentralization in managing rural water services [46], [44]. Subsequently, delivery of rural water supply has been decentralised to local government authorities (LGAs) and the role of the central government has been confined to policy making, regulation, and monitoring and performance assessment [46]. In 2007, Water Sector Development Programme (WSDP 2006-2025) was launched following a pilot phase implemented between 2002 and 2007 in twelve districts [44]. The WSDP is implemented at village level and LGAs are responsible for village selection, technical support and monitoring [45]; [23]. Tanzanian government's efforts to provide safe water to its citizens through enhancing NAWAPO and WSDP are also seen in the development and implementation of the water resource management Act No. 11 of 2009 and the water supply and sanitation Act No. 12 of 2009 [47].

In Tanzania, like other countries in the world, there are water governance structures that operate at various levels to govern water service delivery. At the national level, water resource is governed by the Ministry of Water and Irrigation through Water Basin Authorities [46]. Tanzania Central Government has cascaded the power of water management to the local government authorities at district and village levels. To that effect, governance structures including Village Councils and Community Owned Water Supply Organisations (COWSOs). Water Supply and Sanitation Authorities and District authorities are identified by the Water Resource Management Act (WRMA) no 11 and 12 of 2009 being responsible for water management. At community level, community-owned water supply organizations (COWSOs) are responsible for operation and maintenance. COWSOs can take a number of different forms, including water user groups and private companies, and are to be established and registered as independent legal entities. In Iramba district, boreholes are the major source of water supply which account for 48.36%, followed by rain water 23.36 %, shallow wells 18.09%, charcoal/ dam 10% and spring water that appeared to be the last accounts 0.33% [42].

The rural population in Iramba district served with clean water over years has change from 2012 to 2015. Through government's initiatives and development partners', including religious institutions efforts, the percentage of rural population served with clean water increased from 37.18% in 2012 to reach 45.93% in 2015 [42]. In Singida Rural District, the coverage of water

supply is about 52.5% of 243,743 people (census 2012). The remaining population (47.5%) is using water for domestic use from unprotected water source such as dug well and ponds [42]. The current water sources for the water supply schemes are shallow wells that count for 67.97%, boreholes (deep wells) 10.27%, rain water 9.6% and dams tha count for 9.06%. The technologies applied in suppling and distributing water to users includes; motorized pump and hand pumps. Other methods applied are construction of dams and rainwater harvesting.

2.0 Theoretical and Conceptual Framework

2.1 Theoretical framework

This paper is guided by [12] agency theory. This theory is commonly used to describe the existing relationships between the principal and agent. According to the [12] review conducted in 2012, this theory offers a unique insight into the body of knowledge, outcome uncertainty, incentives and risks. The theory is concerned with resolving two problems that can occur in principal-agent relationships. For instance, when it is difficult or expensive for the principal to verify what the agent is actually doing or when there is risk sharing that arises when the principal and agent have different attitudes towards the risks.

In this paper, the agency theory is adopted to explain the existing relationships between water service providers as agent and the water users as principal. [21]. Maintain that the agency theory is applicable when there is discrepancy between interests and goals of individuals with other stakeholders. Therefore, in this case, the theory was adopted to explain the situation of water supply in rural areas where quality of service and water scarcity have remained major challenges despite all the efforts made by the government of Tanzania to increase water access to rural people. Basing on the fact that if service providers are accountable to the water users, then it is possible for water users to verify what service providers is doing. The agency theory establishes the service provision relationship between the people as a principal and the government who is the service provider as an agent [14] It was, therefore, expected that change in budget allocation, performance monitoring, rules and regulations, participation and feedback mechanism would influence the delivery of quality water services in terms of quantity, safety, availability, accessibility and reliability.

2.2 Conceptual Framework

The conceptual framework of the study was based on the assumption that background variables such as age, sex, education, household size, marital status had direct influence to the (institution factors) independent variables. Independent variables were guided by indicators such as water budget, performance monitoring, participation, feedback mechanism and rules and regulations. These independent variables had direct influence on the level of quality water service delivery in the study area.

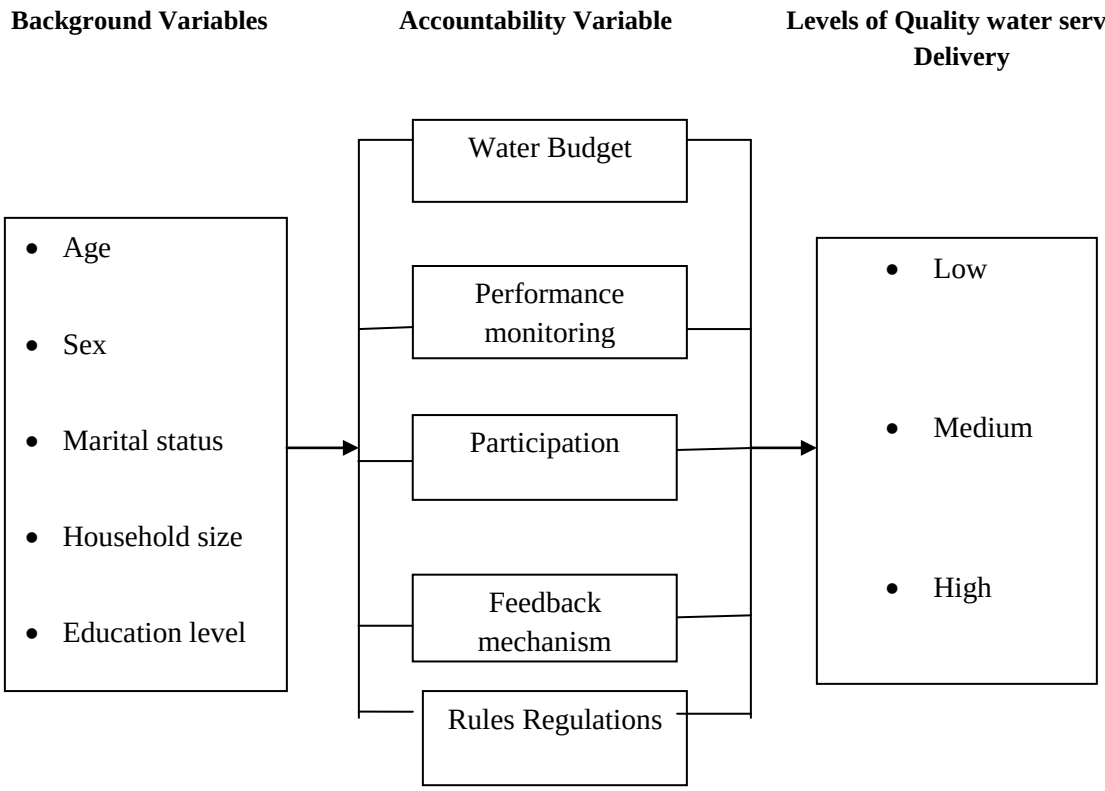

Figure: Conceptual Framework

3.0 Methodology

3.1 The study area

The study on which this paper is based was conducted in Iramba and Singida Rural Districts in Singida Region in the central part of Tanzania. The districts are located in a semi-arid area of central Tanzania and have little permanent surface water. They depend mostly on ground water for domestic uses [19].These districts were among the pilot districts chosen by the Ministry of Water and Irrigation for implementing the Rural Water Supply and Sanitation Programme (RWSSP) Phase I. In Singida Rural District, three villages Mtinko, Mgori and Ilongero were selected for the study. According to the 2012 national census,the population of Singida rural district was 225 521 people [41].As for Iramba District whose population, according to the 2012 census, was 236 282 people [43], Misigiri, Nselembwe, and Nguvumali villages were selected for the study. These villages were selected because of availability of a piped water supply system.

3.2 Research design sampling procedure and sample size

The study adopted a cross-sectional research design whereby data on the variables of interest were collected only once [9]. The research design has a greater degree of accuracy and precision in social science studies than other designs and is more appropriate in examining current situation [22]. A sample of 350 households was involved in the study. Proportional sampling using a household village register was applied to determine sub-samples from each village, and thereafter simple random sampling was used to pick respondents from each village.

3.3 Data collection

A combination of both qualitative and quantitative data collection methods were used to achieve triangulation and complementarities. Qualitative data collection involved six (6) Focus Group Discussion (FGD) sessions with eight participants Household questionnaire survey was used to collect quantitative data.

3.4 Data analysis

Quantitative data collection involved the household survey whereby 350 households were involved. Qualitative data were analysed by using content analysis whereby words transcribed from recorded information were compressed into fewer content categories resulting in synthesized meanings, based on the study objectives. Quantitative data were analysed using SPSS Statistics Version 16 and STATA version 12 to determine the outcomes of an Ordinal logistic regression model. Descriptive statistics were used to identify the water users' responses to accountability and levels of quality of delivery of water services.

The dependent variable (Y) was categorised into three levels of quality of delivery of water services (1 = low, 2 = medium and 3 = High) level. There were eight (8) explanatory variables, which included a mixture of socio-demographic variables and variables of accountability. The former were marital status, household size, household's education level. The latter were, water budget, performance monitoring, participation, rules and regulations and feedback mechanism. Levels of accountability were established. The statements representing the elements of accountability were graded on five-point index scales with the following alternative answers: 'strongly agree', 'agree', 'disagree', 'strongly disagree' and 'undecided' with 5, 4, 3, 2, 1 scores respectively. Then an index was developed based on each element of accountability, namely budget, performance monitoring, participation, rules and regulation, feedback mechanism[13].
Thus the formula was specified as follows:

$$EAIndex = \frac{ObservedScores}{MaxExpScores} x100$$

Where:

EAIndex = Elements of Accountability Index (BI, PMI, PI, RRI and FMI)
Observed score = Total score obtained
MaxExpscore = Maximum expected score

Thereafter, the accountability index was developed as a composite index from the elements as follows:

Where:

AI = Accountability index,

BI = Budget index,

PI = Participation index,

PMI = Performance monitoring index,

RRI = Rules & regulation index,

FMI = Feedback mechanism index,

Thereafter, accountability levels were categorised from the index using mean and standard deviation (SD) into: low = below (mean – SD), medium = between (Mean ± SD) and high = above (Mean + SD).

Model specification

The ordinal logistical regression model was specified as follows:

$$P(y) = \frac{e^{\alpha + \beta 1x1 + \ldots \beta kxk \quad k}}{1 + e^{\alpha + \beta 1x1 + \ldots \beta kxk}}$$ (Agresti and Finlay, 2009), where:

P (y) = the probability of the quality of delivery of water services being high

e = the natural log

α = the intercept of the equation

β_1 to β_k = coefficients of the predictor variables

x_1 to x_k = predictor variables entered in the regression model

The dependent and predictor variables that were used in the ordinal logistic regression model were defined in Table 1.

Table 1: The variables used in the ordinal logistic regression analysis

Variable symbol	Variable Name	Explanation
P (y)	Levels of delivery of quality water service	1= Low, 2 = Medium, 3 = High
X_1	Marital status	1= Married, 0= Otherwise
X_2	Education level	1= Formal education, 0= Otherwise
X_3	Household size	Number of persons in a household
X_4	Budget for water services	1 = Presence, 0 = Otherwise
X_5	Performance monitoring for water services	1 = Yes, 0 = Otherwise
X_6	Rules and regulations	1 = Presence, 0 = Otherwise
X_7	Feedback mechanism in water services	1 = Presence, 0 = Otherwise
X_8	Water users' participation in decision making	1 = Yes, 0 = Otherwise

4.0 Results and Discussion

4.1 Socio-Demographic Characteristics of the Respondents

The socio-demographic characteristics of the respondents analysed were, sex, age, marital status, level of education and household size. Majority of the respondents were aged between 25 and 44 years that is 50% and 59.3% in Iramba and Singida Rural District respectively. Most of the respondents were females 58% and 55% for Iramba and Singida Rural Districts respectively. Also about 80% of respondents in Iramba and 59% Singida Rural District were married. Similarly, majority of the respondents 78% for Iramba and 64% Singida had primary education. It was further identified for slightly more than half of the respondents had household size of 5 to 10 persons

Table 2: Socio-demographic Characteristics (n = 350)

Variables	SINGIDA Frequency (%)	IRAMBA Frequency (%)
Age –		
15 - 24	9(6)	10(5)
25 – 44	89(59.3)	100(50)
45 – 54	26(17.3)	42(21)
55 – 64	12(8)	31(15.5)
65 +	14(9.3)	17(8.5)
Sex :		
Male	67(45)	84(42)
Female	83(55)	116(58)
Marital status		
Single	34 (23)	16(8)
Married	88(59)	160(80)
Widowed/Widower	22(15)	20(10)
Divorced	6(4)	4(2)
Education		
None	9(6)	14(7)
Adult education	7(5)	1(0.5)
Primary	96(64)	155(78)
Ordinary secondary education	24(16)	20(14)
Advanced secondary education	3(2)	6(3)
Certificate	4(3)	0(0)
Diploma	5(3)	3(2)
First Degree	2(1)	1(0.5)
Household size		

(1-4)	65(43)	88(44)
(5–10)	79(53)	108(54)
(11–18)	6(4)	4(2)

4.2 Level of Accountability in Delivery of Quality Water Services

It was important to know the level of accountability through indictors (availability of budget, performance monitoring, and participation, existence of rules and regulation and feedback mechanism). It was found that only 20% of the respondents experienced high level of accountability. Generally, the results indicate that the level of accountability on the delivery of water service was low as presented on Table 3.

Table 3: Level of Accountability on Delivery of Water Services n = 350

Levels		**Frequency**	**Percent**
Low	(Low < 32%)	158	45
Medium	(33% - 68%)	122	35
High	(High >68%)	70	20

4.2.1 Level of Delivery of Quality Water Service

On the level of delivery of quality water services, different questions were developed to capture aspects pertaining to quality (safety), quantity, accessibility, availability and reliability of delivery of water service. The descriptive analysis of responses of water users on the delivery of quality water were as in Table 4.

Table 4: Descriptive Analysis of Quality Water Services in Iramba and Singida

Variable	**High**	**%**	**Medium**	**%**	**Low**	**%**
Quality (Safety)	35	10	174	49.7	141	40.3
Quantity	35	10	204	58.3	111	31.7
Availability	125	35.7	130	37.1	95	27.1
Accessibility	0	0	251	71.7	99	28.3
Reliability	174	49.7	99	28.3	77	22.0

Five elements of quality water services were combined together and an index were developed to identify high, low or medium service level. Interestingly, the results indicate that the level of quality of water service delivery was low (see Table 5) as only 9% had high level service and 50.9% indicated low level

Table 5: Levels of Delivery of Quality Water Services n = 350

Levels		**Frequency**	**Percent**
Low	(< 1.2)	178	50.9
Medium	(1.2 – 2.4)	140	40.0
High	(> 2.4)	32	9.1

4.3 Relationship between Accountability and Delivery of Quality Water Services

To determine the relationship between the selected factors and level of delivery of quality water services in Iramba and Singida Rural Districts, ordinal logistic regression model was used, and the results are as presented in Table 6. The results reveal that, among eight (8) independent variables, seven variables significantly influenced the delivery of quality water service in the study area. These were marital status, education ($p < 0.01$), water budget, performance monitoring, participation, household size ($p < 0.05$) and feedback of users, ($p < 0.1$). The p-value was statistically significant showing that the model containing all the predictors fitted well the data. The findings further show that the Pseudo R^2 statistic which represents the adjusted Cox and Snell R^2 was 0.5610, which implies that 56% of the variance in the model was associated with delivery of quality water services.

4.3.1Availability of Budget and Delivery of Quality Water Services

The availability of budget for delivery of quality water services was found to be statistically significant ($p = 0.025$) in the delivery of quality water services. In other words, the availability of budget for water services is associated with an increase in delivery of quality water services as shown in Table 6. It was also found that if the budget for water services increased by one unit, delivery of quality water services would increase by 0.46959 units. Also in an FGD in Misigiri Village, it was revealed that:

COWSO do not have a budget for water services in a village. We submitted one to the district council; it was not accepted, so we were asked to make correction and resubmit it but we didn't do that (FGD, 20th December, 2016).

This response indicates poor performance of the COWSO leadership who failed to resubmit the budget for consideration. Along the same line, in Nselembwe Village FGD, it was reported;
We do not have budget for water services because we have many debts for water services. Also, we do not have proper financial reporting and operation management for water scheme in our village (FGD, 21th December, 2016).

Absence of budget for water services in the village affects the performance of COWSOs as they operated without any guideline which affects negatively the delivery of quality water service to the community.
These findings emphasize on the importance of having budget for delivery of water services. The findings are in line with other observation [15] that failure to allocate adequate budget leads to failure in improving the quality of service rendered. On the contrary however, scholars[34] argue that adequate budget is not a guarantee for effective services delivery if there is no strong accountability and monitoring.

Table 6: Results of ordinal logistic regression model

Variables		**Coefficient (β)**	**Std. Error**	**z**	**P>|z|**
Marital status	X_1	1.78092***	0.364	4.882	0.000
Education level	X_2	1.38871***	0.514	7.283	0.007
Household size	X_3	0.97559**	0.412	5.605	0.018
Budget for water services	X_4	0.46959**	0.209	2.246	0.025
Performance monitoring	X_5	0.53571**	0.249	2.147	0.032
Rules & regulation	X_6	0.09675	0.167	0.584	0.563
Feedback of users	X_7	0.01889*	0.010	1.784	0.074
Participation	X_8	0.81413**	0.410	3.950	0.047

Note: Variables are significant at 0.01, 0.05 and 0.1 Test of model coefficient (Chi-square = 58.75; Pseudo R square = 0.5610; NB: *** sign at 1%; ** sign at 5% and * sign at 10%

4.3.2 Performance monitoring and delivery of quality water services

Performance monitoring for water services significantly influence the level of delivery of quality water services (p = 0.032) as shown in Table 6. This finding implies that performance monitoring was a significant predictor for delivery of quality water services. It was also shown that if performance monitoring increased by one unit, delivery of quality water increased by a 0.53571 units as indicated by the odds ratio that was 0.53571 times likely to contribute to deliver quality water services. This was also revealed during FGD at Nguvumali village where it was reported that:

*The COWSO leaders are not monitored for their performance on water services in the village. That is why water attendants and leaders operate the way they feel, and water is not available throughout the day (*Nguvumali Village FGD, 18th November, 2016*)*

Another participant in Nselembwe revealed that:

*No performance monitoring is conducted by district council or the WDC. However, a three months' report is prepared and submitted to the village government. (*Nselembwe VillageFGD, 21th November, 2016).

The findings are in line with those of a study conducted by [49] who found that one of the governance constraints is lack of performance monitoring system and oversight in water service delivery. According to [5] and, [18] performance monitoring can, therefore, come from top down (from monitoring authority) or from the bottom up (from users and communities), and they may be most effective where they combine elements from both approaches.

4.3.3 Water users' participation in decision making and delivery of quality water services

Water users' participation in decision making services was found to significantly influence (p = 0.047) delivery of quality water services. This implies that water users' participation in decision making was a predictor of delivery of quality water services. It was also indicated that if users' participation increased by one unit, delivery of quality water services increased by a 0.81413 unit. As emphasised by [6] if citizens participates in decision-making, it helps them to know their rights. Although community participation, according to [11] is a way in which communities

exercise influence and control over the decisions that affect them, it was a different experience from the study area. For instance, it was reported from FGDs at Misigiri Village that:

Water users' participation in decision making was low as no meetings were conducted to discuss issues related to water service in the village since when the COWSO was formed (Misigiri Village FGD 16th December, 2016).

Participation of water users in decision making is very important as it helps them to have a sense of ownership of water service infrastructure and the whole system in general. Lack of users' participation can lead to insecurity of water services equipment and sources.

4.3.4 Marital status and delivery of quality water services

Marital status was found to significantly influence delivery of quality water services ($p = 0.000$), as presented in Table 6. It was also indicated that married marital status increased delivery of quality water services by 1.78092 units. Married couples take the advantage of synergy between spouses; hence they have likelihoods to engage in productive activities and finance delivery of quality water services compared to singles [33]. Married people are in a better position of influencing delivery of quality water services in comparison to singles because of high demand for water service at the family level.

4.3.5 Household sizes and delivery of quality water services

Household size was found to have statistically significant influence ($p = 0.018$) on delivery of quality water services as presented in Table 6. If household size increased by one unit, delivery of quality water services increased by a 0.97559 unit. This finding is in line with findings of a study by [30] and [2] showed that the larger the household, the higher the likelihood of more domestic water use.

4.3.6 Education levels of the respondents and delivery of quality water services

Education level of household was found to have statistically significant influence ($p = 0.007$) on delivery of quality water services as presented in Table 6. It was illustrated that if the education level of water users increased by one unit, delivery of quality water services increased by 1.38871 units. Basing on these results, it is evident that may be low level of education affect bargaining and decision making power as well as the relationship between service providers and

water users. This agrees with [31] contention that, to hold the service provider accountable, the beneficiary must possess the necessary capability in terms of educational attainment.

5.0 Conclusion and Recommendations

It is concluded that the delivery of quality water services depends on availability and implementation of water budget, performance monitoring of water services in COWSOs and participation of water users in designing and implementation of water projects. Generally, there is significant relationship between accountability and quality of water service delivery.

For increasing accountability, it is therefore recommended that, there should be institutional improvement of COWSOs in ensuring budget availability and proper financial management. Also, water users should be involved in decision making and performance monitoring by village, ward leaders and district council authorities.

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