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Professional Staff Competency on Domestic Water Supply Projects Sustainability in Tanzania

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ABSTRACT

This study aimed to assess the influence of professional staff competency on domestic water supply projects sustainability in Tanzania: A case of Singida District. Survey research design was adopted whereby a simple random sampling was used to collect information from 56 officials who are the part of the management. Questionnaire and documentary review were used as data collection methods whereas descriptive and inferential statistics were used in analyzing the collected data by using SPSS. Finding of this study show that groups with good and average managerial skills had 2.256 and 1.75 respectively times-more likely their domestic water to be sustainable compared to those groups with poor managerial skills. The finding also revealed that those groups with good and average management knowledge had 1.613 and 1.209 times-more likely their domestic water to be sustainable compared to those with poor management knowledge and managerial skills respectively. Based on the findings, this study recommended that, the government should comprehensively employ people with water management knowledge, and by taking into consideration the experience and technical efficiency as it holds positive influence on sustainability of water projects. Also, regular training of the water management staff for capacity building is enormously essential for sustainability and development of projects. This can be done through setting proper budget in the particular water project area.

Keywords: Personal Competency, Sustainability, Staff, Domestic Water Supply, Tanzania.

INTRODUCTION

In ensuring management capability in water systems the demand for competent staff in water management is inevitable in order to sustain domestic water supply especially in rural areas (Mturi, 2023). Initiatives have passed different phases through establishment of regulations in order to ensure sustainability of water resources and meet the requirements. For example, according to Water Supply and Sanitation Act - WSSA, (2009), the Ministry of Water shifted the regulation to the local government to operate in rural areas though Community Owned Water Supply Organizations (COWSO) in which after its establishment the board is responsible for the water supply system in the village. According to National Rural Water Supply Strategy (Bitesigirwe and Ndede, 2023).) noticed that there are limitations in COWSO registration on its formation process as there is a gap existing in Local Government Authority between policies and its practice. That means LGA is unable to meet their responsibility in the facilitation of COWSO. Thus under WSSA Act No. 5 of 2019 the Ministry of Water established RUWASA an autonomy Agency in Regional, District point and formed CBWSO at a village level to replace COWSO.

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That means Local Government Authority (LGA) is unable to meet their responsibility in the facilitation of COWSO. Thus under WSSA Act No. 5 of 2019 the Ministry of Water established Rural Water Supply and Sanitation Agency

(RUWASA) an autonomy Agency in Regional, District point and formed Community Based Water Supply Organizations (CBWSO) at a village level to replace COWSO.

Due to limited of time of short term projects implemented in rural areas, the process of COWSO establishment was very quick, the team had not enough time for community contact leaving people not that familiar which may influence their sustainability, particularly for communities with projects in place. Therefore, District Water Engineer requested to conduct close follow up support to newly developed COWSOs to ensure they take their course properly (SAWA Tanzania, 2018).

So, in spite of all the efforts made by the government to ensure clean and health water supply in rural areas, but clean and safe water supply is neither globally nor sustainable for the generations to come and the present one (Nkambule & Peter, 2012). In Tanzania the main objective of the National Water Policy, (2002) is to ensure community access drinking water within 400 meters. Anders Arvidson & Mattias Nordström (2006) study indicated that over 30% rural water schemes are not operating properly. Though informal water suppliers are socially capable of providing water supply services but it was realized that there is unsustainable in accessing water in the households for domestic activities (Dakyaga & Kyesi, 2018). On the other side World Bank (2018) reported that rural water supply regularly fails to convene national standards and 57% of rural households are drinking water infected with E. coli bacteria, whereas in the same cases 56% was due to infected water points and 44% was due to poor hygiene in households.). It's required that community and the management team of particular water projects its important and necessary to be empowered with necessary personal and professional competencies in order to attain sustainable water management (Akankunda, 2024). Accordingly, it's reported that to ensure management competencies the entire supply chain must ensure utilities moved more quickly toward best practices (Ferla et al., 2023).

So, in spite of all the efforts made by the government to ensure clean and health water supply in rural areas, but clean and safe water supply is neither globally nor sustainable for the generations to come and the present one (Rono andYusuf, 2023). In Tanzania the main objective of the National Water Policy, (2002) is to ensure community access drinking water within 400 meters. Rono and Yusuf (2023), study indicated that over 30% rural water schemes are not operating properly. Though informal water suppliers are socially capable of providing water supply services but it was realized that there is unsustainable in accessing water in the households for domestic activities (Rono andYusuf, 2023). On the other side Rono and Yusuf (2023), reported that rural water supply regularly fails to convene national standards and 57% of rural households are drinking water infected with E. coli bacteria, whereas in the same cases 56% was due to infected water points and 44% was due to poor hygiene in households. Various efforts made by different studies have ignored the issue of management competency on sustainability of domestic water projects; also little has been mentioned on the study of personal and professional managerial competency on domestic water supply (Deus, 2024).

According to management Akankunda, (2024), seeing that a competent manager and staff in domestic water resources are necessary in project success in order to make them sustainable. Thus, having clear objectives for management competencies on water projects will increase its sustainability and thus aid policy and decision makers in handing over effectively the issue of sustainability of water projects. Therefore, this study examined the competency level, professional competency and personal competency to the perspective of sustainability of rural domestic water supply projects. The study had various important significant which include contribution to the body of knowledge, the importance of managerial competency on sustainability of domestic water supply in rural areas to the community soundings the water projects in Tanzania, researchers and authorities of domestic water projects. Also the study intends to inform domestic water managerial staffs with their level of competency, professional and personal competency for the purpose of attaining sustainability when dealing with the recommendations of the study. Also the study expected to help and inform policy makers and planners to consider managerial competency when improving water policies and plans for sustainability of domestic water projects.

LITERATURE REVIEW

Competency model explain that, there are collection of skills, qualities and abilities of servant/staff while delivering their duties in the organization (Skorkova, 2016). Through competency model, the organizations and companies shall put major emphasize in managerial competencies hence the quality of work in the management is facilitated by organization performance. In measuring competency in the management; knowledge, skills and other performance attributes are considered to be major factors behind competency based management. Also according to Porvaznik (2013) who describe the holistic model of competency management he suggested that competency is the function of application skills and knowledge ability. This model lacks some other key attributes a part from knowledge and skills; however, these are key variables that determine management competency. Therefore, this study used competency model in professional and personal attributes which comprises of elements of knowledge and skills to support the findings on the management competency on social sustainability of domestic water supply.

Salgado et al. (2018) conducted the study about dimensions of professional competences for interventions towards sustainability. Knowledge, skills and attitudes were used as the key variables to explain the influence towards the sustainability success of professional and businesses. The study revealed that strategic thinking; scientific knowledge, ability to goal-oriented and communication were significant in influencing sustainability in various professions. Therefore, this study used problem solving and supervision as the professional competencies to explain the sustainability of domestic water projects.

The study conducted by Mounce et al. (2007) about knowledge management for more sustainable water systems. The study sort out that there are tools to be used in the management for instance text2onto which are used to stakeholders in order to enhance sustainable water cycle management. Therefore, if decision makers adopted this tool they will be in a position to use a high knowledge to ensure sustainability.

Sokile & Kadigi (2003) conducted the study about management of water resources in Tanzania. The study started to indicate that due to an increase in human population still the world lacks an appropriate integrated management approach. The study then noted that in Tanzania there is poor coordination of institutions that are responsible in managing water sources. Therefore, the isolated institutions will continue to delay national ambitions to manage water.

The study conducted in Tanzania about sustaining water supply through management and regulation in rural communities (Nkongo, 2009). Purposive sampling technique was used to gather respondents. The study used semi structured meetings, FGDs and observation as the data collection methods. The study found that lack of finance, lack of technical personnel, inaccessibility of spare parts, regulatory framework and lack of awareness are the big challenges that hinder sustainability of water supply projects.

Conceptual Framework

A conceptual framework gives a broader understanding of the phenomenon of interest, in which the study guessing that social sustainability is influenced by different aspects of management competencies. Therefore, management competencies are independent variable and social sustainability dependent variable. A management competency comprises of personal competency which includes self-confidence, self-control, personal responsibility, awareness of ethics and self-management. Connectedly, dependent variables such are social sustainability of water supply projects tend to be influenced by the actions made in management capability.

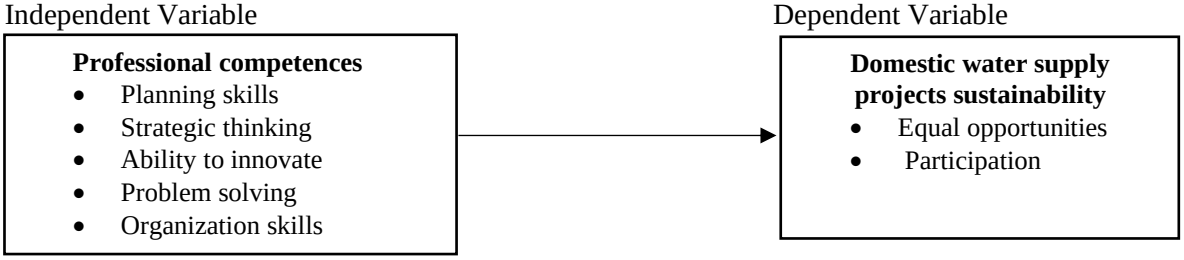

Figure 1: Conceptual Framework
Source: Adopted from Literature Review

RESEARCH METHODOLOGY

Survey research design was adopted whereby a simple random sampling was used to collect information from 100 officials who are the part of the management. Questionnaire and documentary review were used as data collection methods whereas descriptive and inferential statistics were used in analyzing the collected data by using SPSS.

Model Specification

A binary logistic regression model to investigate the influence of management knowledge and skills on sustainability. Therefore, the following equations of regression were used;

$$Y - 1 = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \mathcal{E} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots .\ (i)$$

Where:

Y = Domestic water projects Sustainability
X_1 = Poor knowledge
X_2 = Average knowledge
X_3 = Good knowledge
$\mathcal{E}$ = Error term

RESULTS AND DISCUSSION

This part explained the findings and discussion of this research. This include depth discussion on the study.

Actual Sample

The study collected data from a total of 66 respondents who are management team of rural water supply projects in Singed District. Though the expectation was not reached as the actual data collected from 56 staff, this is a small variation of the data as it is displayed in the Table. Lack of knowledge from the respondents, time factor and distance from one village and another to meet management staffs were the major factors that hindered to collect all expected data from the generated sample size.

Internal Consistency of the Data

The reliability statistics in this study was measured by using cronbach’s alpha. The analysis indicated an alpha of 0.782 which is 78.2% of the internal consistency of the data. This analysis implies that the internal consistency of the likert scale data of 22 items used in this study was good to be used in presenting this study. Therefore, the internal consistency of the data used in this study is good and the information out from this study is reliable to be used.

Table 1. Reliability statistics (n = 56)

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.782	0.787	22

Source: Field work (2025)

Demographic Information

The study used common demographic information to describe the profile of the management such are sex of respondents, working position (occupation) and experience of the respondents. This information was used to identify the characteristics of the respondents whereby it’s relevant to check for their importance in the study.

Sex of the respondents

The respondents were asked to indicate the age of category that they fall in. A total number of 29 (55.8%) and 23 (44.2%) of male and female respectively were involved in this study. These results imply that the management team in the study area more covered by male than female. From this study male are more involved in dealing with

management of water projects in Singida District however female involvement is not equally as 50 to 50. Table 5 summarizes sex profile of respondents at the study area from the sample of 56.

Table 2. Sex of respondents (n = 56)

Cattegory	Frequency	Percent
Male	31	55.8
Female	25	44.2
Total	56	100.0

Source: Field work survey (2025)

Working position

The management team involved in this study were represented by assistant technicians, head technicians, accountants, other members, private operators and a village messenger. It was indicated that 51.9% were majority of management team assed were other members involved in water committees and meetings of water projects in the study area. Also 23.1% assistant technicians were involved in this study as the part of management team. Others in statistical order were head technicians, accountants, private operators or service providers and village messenger who possess 15.4%, 3.8%, 3.8% and 1.9% respectively (See Table 3).

Table 3. Working position of respondent (n = 56)

	Frequency	Percent
Assistant technician	12	23.1
Head technician	8	15.4
Accountant	2	3.8
Member	27	51.9
Private operator	2	3.8
Village messenger	5	1.9
Total	56	100.0

Source: Field work (2025)

Experience

The research looks at number of years of respondents' working experience whereas they asked to point out the duration they have been working with their respective position. It was indicated that the maximum working experience of the management team in Singida District was 6 years while in the minimum the study found out that there are some workers who possess an experience of less than 1 year. In average workers in the study area had an experience of 1.87 years. Then it was found that the years of experience from one worker/member and another differ in a large context, which means the gap between experiences from one worker to another is big as the Standard Deviation equals to 2.059 which is big difference to the mean data.

Table 4. Working experience of respondents (n= 56)

	N	Minimum	Maximum	Mean	Std. Deviation
Working years	56	0	6	1.87	2.059
Valid N (list wise)	56				

Source: Field work (2025)

The Level of Managerial Competency in Managing Domestic Water Supply

This part explains the experience, training, time management, supervision and physical and material resources.

Experience

The study findings in Table 9 revealed that, about 45% of respondents had good knowledge in experience when solving domestic water issues, 32% had poor knowledge and only 23% had average knowledge. On the other

side, as presented in Table 7, majority of respondents (workers in the management team) about 67.3% had an experience below 1 year. Further, 15.4% of the total workers in the management team they have got an experience above 5 years. Others were found to be between 1 up to 3 years and 4 up to 5 years which are 9.6% and 7.7% respectively.

These results imply that, the experience of management team in Singida District that is responsible in managing water resources in the district is poor but the availability of big experience among workers can be adopted by other workers who lack experience. These results were supported by the behavioral theory which explains how managers use their past experience to behave and act within the organization (Rono andYusuf, 2023). Therefore, the adoption of experience between workers within the management is one of the characters of internal ability of the management in exercising its duties.

Table 5. Years of Experience in the field

	Frequency	**Percent (%)**
Below 1 Year	35	67.3
1-3 Years	5	9.6
4-5 Years	6	7.7
More than 5 Years	10	15.4
Total	56	100.0

Source: Field work (2025)

Training

Trainings are very important especially to the organization which demanding to achieve its goals and objectives. As presented in Table 9, about 40% of respondents have poor knowledge on trainings provided for the management of domestic water sources in Singed district whereas 37% and 23% had average and good knowledge respectively. Likewise, it was found that (Table 8) in this study there are some sorts of trainings that workers in management team have been acquiring but are inadequate. About 48.1% of management workers possess more than 1 training but 51.9% had practiced with below 1 training. These results entails that incase of worker's development there is incompetency management in dealing with sustainability of domestic water projects, since they acquire few number of trainings in handling domestic water problem. These results concur to those of (Rono andYusuf, 2023), which stated that training in any field is very important in facilitating its performance but as long as does not build up the requirements of the industry it would be no value for the development of the economy.

Table 6. Number of training attended in capacity building of water project management

	Frequency	**Percent**
Below 1 Training	27	51.9
1-2 Trainings	11	32.7
3-6 Trainings	6	7.7
More than 6 Trainings	1	7.7
Total	56	100.0

Source: Field work (2020)

Time management

From the sample of 56 of management team the results findings as shown in Table 9 revealed that most of the workers (36%) had poor knowledge in managing their time when solving water problems in Singida district. Others 34% had an average knowledge in application of time management when delivering service, only 30% had a good knowledge. These results imply that the management of Singida district has knowledge in managing time hence the combination of average and good knowledge percent exceed poor knowledge assessed. Therefore, time

management of management team considered to be ineffective in dealing with water projects sustainability or problems of water supply services especially in the study area.

Supervision

The study findings as presented in Table 9 indicate that 56% of management team possesses average knowledge in dealing with water matters in Singida District. Others 38% and 6% possess poor and good knowledge respectively. These results entail that workers in the management team in Singida District implement their duties regarding water issues with an average supervision, which means they can work with minimal supervision and still they can reach the organization goals and objectives.

Physical and material resources

About 54 % of respondents had an average knowledge on physical and material resource in exercising water problem in the study area. Further, 25% of respondents they are in good knowledge on physical and material resources in exercising water problems in Singida District. These results entail that water problems in the district they have been taking seriously with the management in such a way that they had been solved with a massive solution as the management team is physical and material resources in all areas of water issues in the district.

Table 7. The level of management competency in Singida district

	Knowledge		
Specification	Poor knowledge	Average knowledge	Good knowledge
Teamwork	20%	30%	50%
Communication	32%	44%	24%
Training	40%	37%	23%
Experience	32%	23%	45%
Time management	36%	34%	30%
Human/physical and material resources	21%	54%	25%
Supervision	38%	56%	6%

	Skills		
Specification	Poor knowledge	Average knowledge	Good knowledge
Communication	27%	45%	28%
Problem solving	50%	44%	6%
Emotional Intelligence	44%	35%	21%
Audit	46%	32%	22%

Condition of domestic water supply equipment in the Singida District

Management complained that there are lack of equipment's and spare parts for maintenance. Also, other water projects failed due to its life span are too old which causes operation and maintenance increase. Moreover, the distance from Headquarter to villages is very high thus are difficult to get equipments and spare parts in time. Equipment and spare parts are unavailable in near areas until they go to Singida and takes it takes long, this causes delay and unnecessary costs. However, authorization to buy spare parts comes from District Headquarter; but in the side of private operators buy themselves this enhance no delay of solving water problems. In major maintenance the management relies on Engineers from the Headquarter of District. The study revealed that this hinder sustainability of water projects when the case of leakage happens even if the management are competent.

Distribution of income with Private Operators

The percentage of distribution of income are 39% to Village Water Committee, Private Operator are 41% and Operation and Maintenance is 20%: The study noted that percentage of O & M when are insufficient the amount is taken from VWC and the percentage of Private Operator remain constant. This grounds the management loose

morally in performing their duties effectively thus can affect sustainability of water projects. The Ministry of Water through the Agency should amend the regulation in order to increase the percentage O & M and reduce the percentage of Private Operators through contracts.

The Influence of Management Knowledge on Sustainability of Domestic Water Supply

The binary logistic regression employed to assess the association between management knowledge and sustainability of domestics' water supply. The finding from table 2 show that for those groups with average management knowledge they had 1.209 times more likely their domestic water to be sustainable compared to those with poor management knowledge and lastly for those with good management knowledge they had 1.613 times more likely their domestic water to be sustainable compared to those with poor managerial skills

Table 8. To assess the influence of management knowledge on sustainability of domestic water supply (Binary logistic regression)

Variable	OR	95% C.I		Sig.	AOR	95% C.I.		Sig.
		Lower	Upper			Lower	Upper	
Poor knowledge(reference)	1				1			
Average knowledge	1.209	0.252	3.281	0.002	2.346	0.424	12.979	0.032
Good knowledge	1.613	0.115	3.267	0.007	1.27	0.024	2.995	0.028

Source: Field work (2025)

The Influence of Management Skills on Sustainability of Domestic Water Supply

The binary logistic regression employed to assess the association between managerial skills and sustainability of domestics' water supply. The finding from table 3 show that for those groups with average managerial skills they had 1.75 times their domestic water to be sustainable compared to those with poor managerial skills and lastly for those with good managerial skills they had 2.256 times more likely their domestic water to be sustainable compared to those with poor managerial skills.

Table 9. To assess the influence of management skills on sustainability of domestic water supply (Binary logistic regression)

Variable	OR	95% C.I		Sig.	AOR	95% C.I.		Sig.
		Lower	Upper			Lower	Upper	
Poor skill (reference)	1				1			
Average skill	1.75	0.183	3.066	0.689	1.745	0.133	4.176	0.738
Good skills	2.256	0.379	4.163	0.009	1.409	0.41	4.843	0.586

Source: Field work (2025)

CONCLUSION AND RECOMMENDATIONS

Based on the findings, this study recommended that, the government should comprehensively employ people with water management knowledge, and by taking into consideration the experience and technical efficiency as it holds positive influence on sustainability of water projects. Also, regular training of the water management staff for capacity building is enormously essential for sustainability and development of projects. This can be done through setting proper budget in the particular water project area.

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