COMMUNITY MEMBERS' SELF-HELP INITIATIVES IN SOLVING WATER PROBLEMS IN MOROGORO DISTRICT, TANZANIA

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Abstract

In response to poor performance of water schemes and for sustainable water resources management the government of Tanzania introduced new water policies of 1991 and 2002 which now leaves the management and operation of community water supply services in the hands of communities through self-help initiatives. However, despite community involvement through self-help actions the country has continued to experience serious water problems especially in rural areas. This study assessed community members' self-help initiatives in solving water problems in Morogoro District, Morogoro Region in Tanzania, focusing on: examining the extent of community water problems and assessing the level of community members' self-help initiatives. A total of 365 household heads from four wards were randomly selected for a household survey while 8 Focus Group Discussions were conducted in eight villages. Descriptive and inferential statistics were used for data analysis. The study found that the extent of existing water problems was high in terms of per capita water quantity, water quality, distance to water source, queuing and water source dry up or seasonality. Constrained by several factors, the level of community members' self-help initiatives was low. Further, the study found that there was significant negative relationship ($r=-0.162$ at $p<0.05$) between self-help initiatives and water problems, leading to rejection of the null hypothesis that there is no relationship between self-help and water problems. The study then recommends: (i) expansion of water infrastructure in the aspects of water source types that guarantee safe, sufficient and sustainable water supply and (ii) more effective community mobilization and greater support of private and community initiatives in water supply issues.

Key Words: Self-help, water problems, initiatives, community involvement, sustainability.

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1.1 Introduction

Although there are many bilateral and multi-lateral cooperation programmes focusing on reduction of water problems, hundreds of millions of people currently lack access to safe and sufficient water (Dombrowski, 2017). Because water associates with various aspects of life, its scarcity gravely affects health and exacerbates poverty (Guy and Haller, 2004; Ademu, 2009). Lack of access to safe and sufficient water is especially critical in developing countries where approximately 3.5 million deaths related to inadequate water supply and sanitation occur each year (UN, 2014). In Tanzania, though access to improved water sources can be said to have increased (Noel, 2012), some parts of the country are experiencing water stress (Theodory and Malipula, 2012). Several recent interventions have targeted improving water supply services in the country but millions of people still do not have access to safe water (WaterAid, 2017). Over half of the rural people do not have access to improved water sources (Maltha and Veldman, 2016). In Morogoro Region where there are various sources of water, the majority of the people have remained without access to safe, clean and sufficient water as utilization of the region's numerous and diverse water resources has been slow (URT, 2014).

In response to the poor performance of water schemes and for sustainable water resources management in Tanzania, the government introduced new Water Policies of 1991 and 2002, the Water Supply and Sanitation Act No. 12 of 2009 and the Water Resources Management Act No. 11 of 2009. These policies and Acts put ownership and management of rural water facilities in the hands of communities through self-help initiatives (Koppen, 2000). The policies aimed at ensuring that beneficiaries through self-help initiatives participate fully in planning, construction, operation, maintenance and management of community based domestic water supply schemes, with government's role changing from service provider to that of coordination, policy and guidelines formulation, and regulation (URT, 2002). Community involvement through self-help initiatives was considered necessary for solving water problems because government and donor organisations alone cannot solve water problems in Tanzania (Biswas, 2004).

Self-help initiatives act as a solution to community problems (Burns and Taylor, 1998; Seyfang, 2004), aiming at raising the quality of life of rural communities by harnessing voluntary private effort to supplement government's efforts (Akhimien and Ehisuoria, 2012; Tamuno and Iroh,

2012; Adetona and Oladeinde, 2013). Particularly in water supply services, self-help enhances incremental improvement of household and community water supply through user investments and other contributions towards provision of water schemes including: rainwater harvesting, digging and construction of shallow wells, borehole or valley tanks, transforming unprotected water source to protected source, payment of water user fee and improvement of household and community water source. Expressed through self-supply, self-help does not stand opposed to the conventional rural water supply funded by the government (Sutton, 2009; Kumamaru, 2011). It rather complements conventional rural water supply funded by government, facilitating improvement of water supply where there is lack of access to water supply, or where consumers feel they can support higher levels of service than are presently provided by the public sector. Smits and Sutton (2012) found that countries that encouraged self-help in water supply such as Uganda, Zimbabwe and Thailand have increased coverage and levels of service in rural areas. Since it establishes a strong sense of ownership and enabling sharing of supply among neighbours and community members, Sutton (2009) considered that the incentive for engaging in self-help improvement of household and community water source lies in its ability to ensure convenience, proximity of water source to home and providing large volume of water.

As a practice, self-help water supply is not something new in African countries including Tanzania, where citizen participation reached institutionalization level in post-colonial period (Njoh, 2011). Prevailing practices of household and community self-help initiatives in water supply services in Tanzania include: rainwater harvesting, digging and construction of shallow wells, borehole, valley tanks, transforming unprotected water source to protected source, payment of water user fee and improvement of household and community water source. However, despite its benefits and potentials towards solving water problems, perceptions among water sector professionals concerning self-help have not entirely been positive, barriers to adopting and supporting it consisting mainly in fears that self-help provides poor quality water supply which put people's health at risk (Sutton, 2011). On scholarly aspect, even though a number of studies have documented the importance of the community sector for solving water problems (Berner and Phillips, 2003; Njoh, 2006; Mandara *et al*., 2013), there is paucity in literature regarding self-help initiatives and its level of practice in community water supply services.

Few studies that have investigated self-help have also either been too general or too narrow. For instance, Akhimien and Ehiuoria (2012) and Tamuno and Iroh (2012) in different studies investigated community self-help initiatives in Nigeria but from multi-sectoral perspective namely, constructions, education, water, and industry. While the studies' economy-wide beneficial implications of self-help initiatives are recognized, its being a reliable base for policy decisions with respect to community self-help actions related to water supply remains its major shortfall.

On the other hand, Sutton (2011) investigated the potentials for self-supply in Sub-Saharan Africa *vis*-à-*vis* heavily subsidized communal model. Carter and Ssebalu (2003) too investigated self-help initiatives in Uganda from the aspect of self-supply. Similarly, comparing self-supply model and communal model, Kumamaru (2011) defended that self-supply model could deliver a higher per capita water than communal model. While these studies can be considered a good development in water management studies related to community members' self-help initiatives, discriminating between self-supply and communal models cripples the possibility for insight into the achievements or failures of community self-help actions. This is because the boundaries of these two models of water supply will collapse in the context of community's responsibility for operation and management of water supply through self-help initiatives. Further, in the case of rural water supply services in Africa, even private water sources are most often freely accessible to other community members who often equally partake in their maintenance (Wily, 2018). Therefore this study assessed community members' self-help initiatives towards solving water problems, focusing on: examining the extent of community water problems and assessing the level of community members' self-help initiatives towards solving water problems. Considering the limited data and information on issues of water problems, the 2012 National Water Policy document stressed the need for research while encouraging local researchers' initiatives on water management issues (URT, 2012). The study is pertinent in view of (1), the Tanzanian Development Vision which aspires to achieve universal access to water in urban areas and ensuring 90% water supply coverage in rural areas by 2025, and (2), the Sustainable Development Goal (SDG 6) of achieving universal and equitable access to safe and affordable drinking water by 2030.

1.2 Theoretical Framework

This study was based on the theory of community organization. The reason for adopting Community Organization theory is due to its principle of co-operative spirit, which enables the people to work together to address a common problem (Minkler, 2012). Rothman (1968) developed three models of Community Organization which are: Locality Development, Social Planning, and Social Action. This study adopted Locality Development model because it subscribes to self-help, which, according to Walsh and O'Shea (2008), is indispensable for community development. The basic change strategy of locality development is to involve a cross section of people in the process of identifying and solving community problems (Lindsey and Kurtz, 1987). Locality Development also emphasizes voluntary cooperation, self-help, development of indigenous leadership and educational objectives.

2.0 METHODOLOGY

2.1 Study Area

The study was conducted in Morogoro District of Morogoro Region, Tanzania. Morogoro District was chosen for the study because of its abounding water resources like rivers, ponds, dams, springs and traditional water sources, which offer opportunities for low cost water projects mainly implemented by government and donor organizations and then entrusted to local communities for operation and management. The district's location proximity to Dar es Salaam positioned it in a vintage point making it attract a good number of International donors and NGOs including: World Bank, World Vision International, TASAF, Rotary International, USAID, Tanganyika Christian Refugee Services (TCRS), the Islamic Foundation, Safe Water for Life and Dignity (SWLD) and others, leading to the development of water schemes, which now remain under the operation and management of the local community through self-help initiatives. However, despite these water development interventions as well as community members' self-help actions access to safe and sufficient water has remained a serious problem in Morogoro Region and Morogoro District in particular (URT, 2007a; URT, 2007b; URT, 2014).

2.2 Research Design

The study used cross-sectional design. The design entailed collection of data at a single point in time, providing a snapshot of ideas, opinions and information. Creasy (2006) and Miller (2006)

recommended the use of cross-sectional survey research as it has high degree of accuracy and precision in social science research. Hence the design was of importance in this study because it helped to create in-depth qualitative data about community members' self-help initiatives towards solving water problems.

2.3 Population of the study

The target population for the study consisted of community members because the aim of the study was to analyse community members' self-help initiatives in water supply services. Household heads were selected as the units of inquiry because it particularly pertains to them decisions on water management issues. Households appear to be the key unit when it comes to domestic water consumption (De Sherbin *et al*., 2007).

2.4 Sampling procedure and Sample Size

Sampling procedure for the study involved multistage sampling technique, whereby simple random sampling and purposive sampling which are probability and non-probability sampling methods respectively were used. Basing on the preliminary information gathered from the district water authority, two divisions (Ngerengere and Mikese) and four wards (Mkulazi, Tununguo, Mikese and Gwata) were purposively selected for the study. From the wards eight villages were selected and involved in the study namely, Chanyumbu, Usungura, Mlilingwa, Kisanga Stand, Fulwe, Newland, Gwataujembe and Kinonko. The criteria for their selection were: (i) availability of water resources which offer community members the opportunity to construct low cost water sources and (ii) areas where development agents implemented water projects and entrusted them to local communities for operation and management. The choice of these criteria was necessitated by the objective of the study as the aim was to assess community members' self-help initiatives both in construction of water sources and in operation and management aspects.

Finally, for the sampling of households, simple random sampling was used to select the households from the village registers of the eight selected villages. A total sample of 365 household heads was involved in the study. The sample size was determined using Yamane (Yamane, 1967) formula, thus:

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

Where; n = Sample size, N = Population size, e = level of significance (5%).

A summary of the distribution of household respondents according to the study villages is shown in Table I:

Table 1: Distribution of respondents (n = 362) in the proposed villages

Village	Total Number of Households (Village register)	Total Number of Respondents
Chanyumbu	341	33
Usungura	265	25
Mlilingwa	302	29
Kisanga Stand	437	42
Fulwe	1,353	129
Newland	306	29
Qwataujembe	515	49
Kinonko	301	29
Total	**3,820**	**365**

A sampling fraction of 365/3820 (0.0955497) was used to get the sub-samples and sample.

In addition, 15 Key informants were involved in the study, selected based on their being knowledgeable about water managements issues. Also, eight (8) Focus Groups (FGDs) sessions were held, each consisting of 10 members conducted in each of the study villages.

2.5 Data collection Methods and Instruments

Both Primary and Secondary data were collected and used in the study. For primary data, the methods that were employed included: household survey by means of structured questionnaire; Focus Group Discussions (FGDs); key informant interviews by means of Key Informant Checklist; and direct observation. On the other hand, Secondary data from documentary sources such as district and village files were also collected. Government water policies and Poverty and Human Development Reports were also explored in detail as sources. The review solicited information on water problems and community involvement in solving water problems. Combination of primary and secondary data was considered important due to the opportunity for cross verification which is necessary for credibility of data.

2.6 Data Analysis

2.6.1 Qualitative and quantitative data analysis

Qualitative data from key informant interviews and FGDs were analyzed using content analysis. On the other hand, quantitative data were processed and analyzed using the Statistical Package for Social Sciences (IBM SPSS Statistics 20) computer programme. Descriptive statistics were used in analysis of data obtained in examining community water problems and community members' self-help initiatives in solving water problems. An index was developed for the quantitative data on water problems and self-help initiatives. Seven items indicating presence or absence of water problems were measured, as follows: water quantity, water quality at source, water quality at point of use, queuing to fetch water, distance to water source, alternative water source and seasonality. A score of 1 was given for each statement of affirmation and a score of 0 for each statement of negation. The total score ranged from 0 to 7 capturing the indicative statements. Using median value as a cut-off point, high extent of water problem ranged from a score of 5 and above; moderate extent ranged between a score of 3 and 4 while low extent was a score below 3. Water problem index was then used to measure the extent of water problems into three levels of high, moderate and low.

On the other hand, six items indicating self-help initiatives were measured, as follows: rainwater harvesting, own household water source, payment to use water, contributions towards solving water problems, community constructed water source and community improved water source. A score of 1 was given for statement of affirmation and a score of 0 for statement of negation. The total score ranged from 0 to 6 capturing the indicative statements. Using median value, high level of self-help ranged from a score of 5 and above, moderate level ranged between a score of 3 and 4 while low level a score below 3. Consequently, self-help index was graded as high, moderate and low. Descriptive statistics were then applied to calculate frequencies and percentages. Spearman correlation analysis was used to establish the relationship between water problems and self-help initiatives and for testing of the null hypothesis that there is no relationship between community members' self-help initiatives and water problems.

3.0 RESULTS AND DISCUSSIONS

3.1 Nature of Community Water Problems

3.1.1 Sufficiency of water

Availability of water in sufficient quantity is required for improved livelihood (Hope and Gowing, 2003). The study findings in Table 2 show that about 73% of households did not get sufficient water for their daily use. This finding implies that with respect to water quantity, insufficiency of water is one of the problems affecting people in the study area. The finding is consistent with the study of Athuman (2014) who reported inadequacy of water for households in Handeni District in Tanzania. Sufficient water per capita not only accords to the requirement of water rights, it is also a necessary condition for healthy living and improved livelihood. In the same vein, the responses of households were sought on the number of 20 litre containers the household collected per day. As shown in Figure 1, while a little more than a quarter (28.0%) of households collected two to three twenty litre containers per day, a quarter (25.0%) collected three to four twenty litre containers per day. With the mean of 4.18 twenty-litre containers (equivalent of 83.6 litres), divide by 4.3 which is the average household size of Mikese and Ngerengere divisions (URT, 2013), per capita water availability is 19 litres. This amount is not only for drinking and cooking, but also includes washing, bathing and other domestic uses.

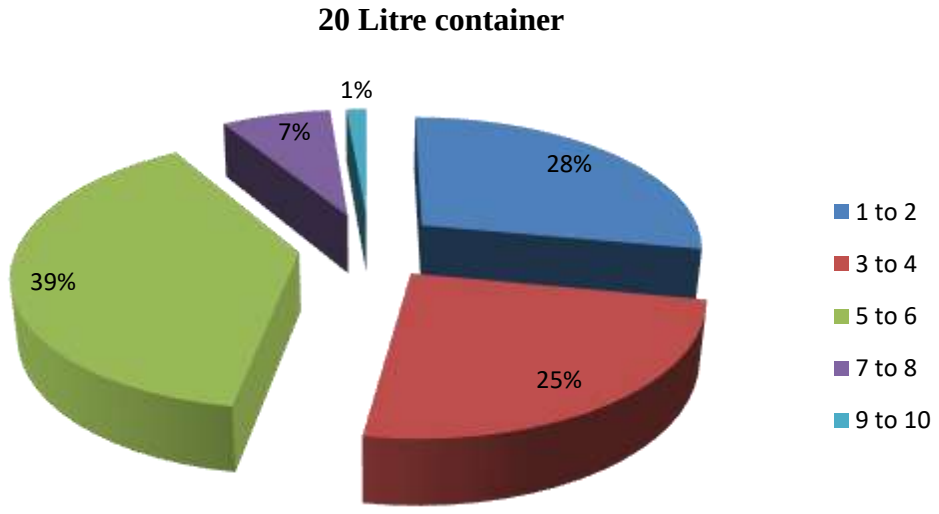

Figure 1: Number of 20L containers of water collected by households per day

The government minimum requirement is at least 25 litres per capita per day (URT, 2002). In the light of this, the amount of water used by the people in the study area is below the government minimum requirement. This finding suggests the need for measures that can enhance people's access to water supply.

Table 2: Household heads' responses on community water supply problems (n=365)

Water supply	Category	Frequency	Percent
Whether one obtained enough water for daily use	Yes	97	26.6
	No	268	73.4
Whether water source is far from home	Yes	312	85.5
	No	53	14.5
Whether there is queue to fetch water	Yes	284	77.8
	No	81	22.2
Whether there is water source dry up	Yes	306	83.8
	No	59	16.2
Whether there is alternative water source	Yes	65	17.8
	No	300	82.2
Whether water is safe at Source	Yes	9	2.5
	No	356	97.5
Whether water is safe at point of use	Yes	28	7.7
	No	337	92.3

3.1.2 Distance to water source

Concerning distance to water source, the findings in Table 2 show that majority (85.5%) of the households accessed water from location far from home while a small proportion (14.5%) had close proximate of water source location. On time to fetch water, which has been used in different studies as a measure of distance (Baggaley *et al*., 2006; Boone *et al.*, 2011) majority (83.6 %) of households spent 30 minutes and above walking to their water sources. Among them were those (51.8%) who spent one hour and above reaching their water sources. This finding is consistent with the finding by Kyamani (2013) who reported that in Rufiji District in Tanzania the shortest duration to fetch water was about 30 minutes while the longest duration was between 90 and 120 minutes. Athuman (2014) also found that households in Handeni District in Tanzania spent more than 30 minutes reaching their water sources. Reflecting the extent of water

problems, this finding implies negative effects on opportunities for income generating activities as productive time is wasted on fetching of water.

The standard set by the government is a water source location of not more than 400 metres from homestead (URT, 2002), which is supposedly covered in less than 13 minutes standard walk, according to the estimations of the United Nations (2010). This implies that the people in the study area are short of government requirement of 400 metres location of water source. Complaints about distance during sessions of FGDs lend support to the finding in Table 2, as reported in a session:

> *"We walk a long distance searching for water and sometimes we return home bringing little or no water with us, and in such occasions our children fail to go to school due to lateness and lack of water for preparations."*

Baggaley *et al.* (2006) reported distance to water sources as a problem of concern in Rombo District in Tanzania, with their finding that increasing distance to the nearest water source was significantly associated with rising trachoma prevalence. Long distance covered trekking to the water sources can hamper socio-economic growth as it can severe attention to other developmental activities, limiting also children's chances to achieve better education (Madulu, 2003; Biswas *et al.*, 2004). This implies that concerns about community development in the study area should also address the question of long distance to water sources.

3.1.3 Queuing at water source

On whether households queued to fetch water, the results in Table 2 show that almost 80% affirmed queuing to fetch water. About 52% queued for about one hour and above, while 32.3% of them queue for about thirty minutes. This implies that queuing at water sources is one of the problems facing many people in the study area. This is consistent with a study by Thompson *et al.* (2000) which found that queuing to fetch water was one of the main challenges facing people in East African countries including Tanzania, with an increasing trend. Kumamaru (2011) also found a long duration of queuing time in Luapula Zambia, which was associated with high proportion of users of a particular water source. Queuing was also decried during FGDs, with members of the group lamenting that the problem was worse during dry season when water table

had receded and most nearby shallow wells dried up. Queuing at water sources was as a result of different factors, including high number of users depending on water sources, insufficient water at the sources possibly due to shallow well depth or sluggish water recharge. Some members of FGDs stressed that the problem of queuing was worse during dry season when water table has receded and most nearby shallow wells dried up. Queuing, especially when protracted, has innumerable harmful consequences, including corrupt practices of promiscuity among the youth; loss of economically productive time in waiting time. Negative impacts of environmental and technical nature can also result, the former reflective in littering of dirty elements which can contaminate water source and the latter in water source lifting device vulnerability to breakdown as a result of heavy and consistent use. Apart from construction of more water sources, reduction of queuing time can be achieved through deepening of the depth of existing shallow wells.

3.1.4 Water source dry up

On whether water source went dry during dry season, the majority (83.8 %) of the respondents indicated experiencing water source dry up during dry season. Observations during the study also revealed that some of the water sources were dry, as the study was conducted during dry season. This finding is consistent with the study findings of Jiménez and Pérez-Foguet (2012) who reported that several of improved water points in Tanzanian districts were seasonal. Water source dry up is not uncommon in the present experience of dwindling rainfall, especially in the study area where observation revealed that most water sources in use were shallow wells of protected and unprotected nature. Lacking profound depth, the water aquifers fail to sustain the harsh weather conditions presented by protracted dry season resulting from dwindling rainfall due to climate change. In this situation, two possible difficult choices confront people: high financial spending to obtain water through water vendors; or, walking to distant places to fetch water. Any of these choices has grave effects on the already precarious and meagre income of the people. Consequently, measures guaranteeing year round water supply in the study area will improve the livelihood of the people.

3.1.5 Alternative water source

The findings in Table 2 show that about 82% of the households did not have an alternative water source. Alternative water source is important because it serves as a support water source in the

events of long queue or seasonality problem at the primary water source (Kumamaru, 2011). Non availability of alternative water sources for most of the people in the study area explains why queuing at water sources affects the majority of the people, as seen in 3.1.3. Because there is equally seasonality problem (3.1.4), non availability of alternative water source for most people suggests heavy financial spending on water as people would resort to water vendors for water supply. This does not only harm economic development potentials but also exposes people to health hazards mediated by unsafe water supply by vendors. One of the Key informants revealed that:

> *"The water supplied by some of these water vendors is unsafe but the people are left with no other choice than use it. What we do is sensitize them on the need to boil water before use."*

3.1.6 Water quality at source and water quality at point of use

Views of the household heads were sought on water quality at source and point of use, and as indicated in Table 2, almost all (97.5% and 92.3%) the household heads held that water is not safe neither at the source nor at the point of use, respectively. This implies that the quality of water available to the people is poor, the degree of the problem reflecting in the high proportion of the people affected by it. This is consistent with the findings of Jiménez and Pérez-Foguet (2010), who reported that the water delivered to people in Tanzania was of low quality due to contamination. Athuman (2014) also reported households' dissatisfaction with water quality in Handeni District Tanzania. Various reasons were provided for unsafe water at the source: salinity (68.2%); muddy (11.0%); bacteria (7.9%); odour, salty, muddy and colour (4.7%); salty and muddy (4.4%); people wash in it (1.4%). Implying that the people were aware of what constitutes safe water, it reveals that the most serious problem facing the people about water quality is salinity. This is consistent with the finding of Howard *et al*. (2003) who underlined salinity as one of the main issues in water quality issues in Serengeti, Tanzania. This finding is also given credence to by the information provided during FGDs, as one of the participants stated:

> *"The water available to us for use is salty, full of microbes, and coloured too. The water is red in colour due to excessive sand and salt."*

Referring to their river water one member of FGDs stated that:

> *"The water is not safe because people bath in it. And some animals are sometimes found dead in the water."*

These findings suggest the need to ensure intervention measures that can improve water quality in the study area, especially as unsafe water presents health risks.

3.2 Index of Extent of Water Problems

The extent of water problem was measured by an index consisting of seven items and was categorized as high, moderate and low extent of water problem, as indicated in 2.6.1.According to the results in Figure 2, with respect to the extent of water problems the majority (77.0%) of the households fell in high extent category. This implies that community members in the study area face severe water problems with respect to water quantity per capita, water quality at source, water quality at the point of use, distance to water source, queuing, having alternative water source and water source dry up or seasonality.

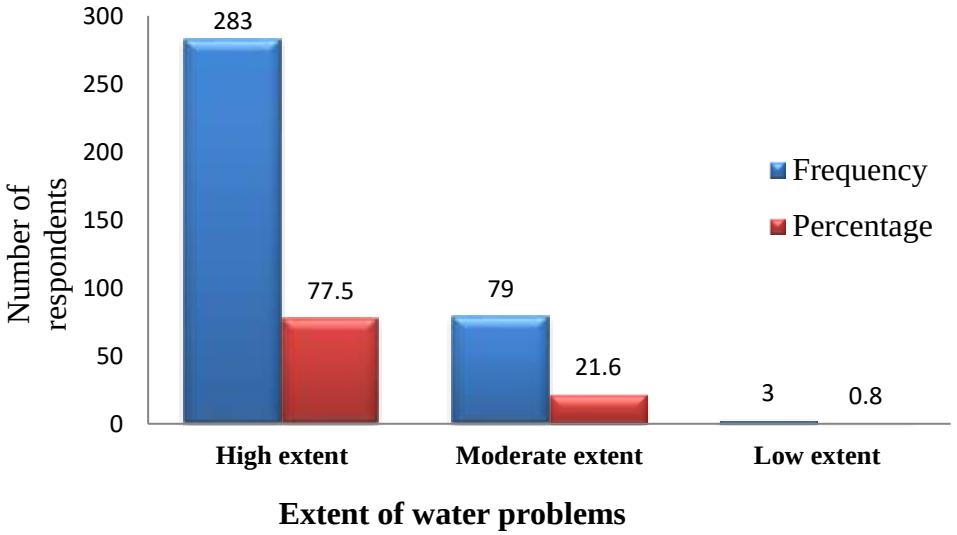

Figure 2: Extent of water problems

3.3 Community members' self-help initiatives

3.3.1 Rainwater harvesting

Being one of the self-help water supply initiatives by households, rainwater harvesting has the potential to supply water where conventional water supply cannot (Kahinda *et al*., 2007). The data in Table 3 show that only a small proportion (18.4%) of community members were engaged in self-help action of rainwater harvesting. The findings imply that rainwater harvesting in the study area is in a very low scale. This is consistent with the finding of Mchome (2010) who reported that rainwater harvesting is yet to be common in rural communities in Tanzania. On the reasons for not harvesting water, households reported insufficiency of funds and lack of skills as constraints against rainwater harvesting. Some others revealed that people do not consider rainwater water harvesting as being necessary for improved water supply. Some participants in FGDs as well as key informants also reported that poverty hinder households from harvesting rain water, pointing out that in most places the available household structures make rainwater harvesting impossible. Observations during the study revealed that thatched roofing pattern of most households primarily makes it quite unsuitable for rainwater harvesting. Nevertheless, the need for sensitizing the people on the importance of rainwater harvesting remains, especially as rainwater is classified as a safe water source (Abdulla and Al-Shareef, 2009; Jiménez and Pérez-Foguet, 2010), though in some cases treatment is required before use due to pollution (Helmreich and Horn, 2009).

Table 3: Household heads' self-help initiatives (N=365)

Self-help Initiatives	Category	Frequency	Percent
Rainwater harvesting	Yes	67	18.4
	No	298	81.6
Own water source	Yes	12	3.3
	No	353	96.7
Involvement in construction of community water sources	Yes	37	10.1
	No	328	89.9
Involvement in improvement of community water sources	Yes	68	18.6
	No	297	81.4
Payment to use water	Yes	134	36.7
	No	231	63.3
Contributions towards maintenance of community water sources	Yes	182	49.9
	No	183	50.1

In New Delhi and Chennai, India, it is mandatory to have a rainwater harvesting system for a building plan in order to secure approval (Aladenola and Adeboye, 2010). Increase in self-help practice of rainwater harvesting will contribute towards solving water problems through provision of safe water and reduction of time spent in fetching water. Rainwater harvesting can also reduce dependence on community water supply sources thereby decongesting water sources. It is also a viable alternative where water is saline, as in the case of the study area. In the current experience of dwindling rainfall, integrated system approach has been recommended for sustainable reduction of water problems (Kahinda *et al.*, 2007).

3.3.2 Households' own water sources

Households' own water sources constructed through self-help initiatives can guarantee access to sufficient water (Kumamaru, 2011). The data in Table 3 show that only a very small proportion (3.3%) of households constructed own water source. This implies that own water sources constructed by households through self-help initiatives is uncommon in the study area. Gazzinelli *et al.* (1998) found that households owning their own water sources obtained more water than those who did not own their water sources. Sutton (2011) also found that through self-supply households can achieve increased water quantity and improved water quality. In this present study, reasons given for constructing own water sources included: long distance to community water source; queuing time and insufficiency water in communal water sources. On the other hands, those who did not own household water source gave reasons for such as: lack of funds for source construction; lack of water source construction equipment; salty water and presence of hard rocks which prevents digging into the ground. This implies that environmental factors can also constrain self-help initiatives, hence the need for support of local efforts in addressing issues that are beyond their control.

Carter (2006) found that initiators of self-supply water improvements possess certain characteristics including: entrepreneurial spirit, sense of leadership, and financial ability to carry ideas into practice. Providing technical, moral and financial support to local communities can help unleash their potentials towards self-development. Support is especially necessary in the case of water supply services where self-supply is necessary to scale up rural water supply. Support can also be in form of exemplary actions of those in charge of water management issues

particularly in local and village levels. Maltha and Veldman (2016) advised that the best way to create demands for self-supply in Tanzania is through bottom up, by means of good-working examples and close relationships, clearly showing the socio-economic advantages to the users.

3.3.3 Construction of community water sources

Concerning community self-help activities related to construction of community water sources, the results in Table 3 shows that a small proportion (10.1%) of households affirmed having community water sources constructed by the community. As revealed during FGD, and also witnessed by observations in the course of the study, water source types constructed by community members included shallow water holes, unprotected shallow wells and dam. Reasons given for not engaging in water source construction included lack of funds; lack of the required water source construction skills, receding water table as a result of decreasing rainfall and salinity. Some key informants also pointed out that environmental factors like decreasing rainfall and salinity contribute to low availability of unprotected shallow wells in the study area. In a session of FGDs a participant made reference to the same issue:

> *"Some of us are debarred by salty water. Though you do not go much deep to find water, this water is so salty that you cannot use it for washing clothes, for drinking or for cooking, especially for cooking beans. Again it is very seasonal. This time you are here* (referring to the researcher) *many of the water sources we constructed by ourselves are already dry. We have to wait till raining season to start getting water from them. This is very discouraging."*

Indicating the interplay between local initiatives and environmental factors, the finding presents the crippling effects of environmental factors on self-help initiatives.

Conflicts among community members resulting from differences in political affiliations were also blamed as a hindrance to constructing community water sources through participation. One of those involved in FGD at Kisanga Stand revealed that:

> *"Our community would have made great advance in community water supply services if not divisions and politically based conflicts existing among community members. It keeps everyone apart."*

Hence, divisive issues based on differences in political affiliations are serious problems affecting community development. Following different political paths, political rivalries engage in bickering and consequently give less attention to issues of development. In a similar vein, promises by politicians were also indicated to be one of the constraints against community members' self-help initiatives. One key informant at Kisanga Stand lamented that:

> *"One of the main factors preventing the people from engaging in self-help activities towards solving water problems is the promises of politicians. During election campaigns they come promising to help the people solve their water problems and then the people wait doing nothing only hoping that the politicians will provide water. After being elected by the people, nothing happens, and people's water problems remain unsolved."*

These findings suggest that measures seeking solutions to community water problems through community self-help initiatives should also address political issues that negatively affect community development.

3.3.4 Improvement of community water source

Concerning community activities related to improvement of community water sources, the data in Table 3 show that a small proportion (18.6%) of households affirmed community engagement in improvement of water sources. This implies that collective action on improvement of water source is very minimal, whereas observations during the period of the study revealed that most water sources in use were in need of rehabilitation and improvement such as deepening of the existing shallow wells in order to increase water quantity; slab construction for well protection in order to improve water quality; repair of lifting device such as pump in order to address functionality problems and clearing of water source environment in order to improve sanitary conditions at water sources. By accelerating access to both safe and sufficient water, such improvement interventions can lead to improved health and livelihood.

It was gathered from key informants and during FGDs that some of the existing water sources were donor funded water projects which were left in the hands of communities for operation and management through self-help initiatives. However, despite community responsibility for operation and management of the water sources, it was revealed that some communities had remained donor dependent, as one key informant stated:

"Most of these communities still depend on the NGOs for source maintenance. When for instance there is pump breakdown they still approach the NGOs for repairs. Sometimes the NGOs respond positively and do the repairs while sometimes they fail to attend to the problems. In fact this moment there are a number of wells not functioning and nothing is being done about them."

The finding that the involvement of communities in water resources management is low conforms to the recent government findings that sustainable rural water supply is also impeded by poor response on the part of communities (URT, 2016). Consequently, there is the need to devise mechanisms for greater engagement of communities in water management issues.

3.3.5 Payment to use water

Water user fee payment is a community self-help arrangement serving as a mechanism to ensure sustainable water supply. On payment to use water, Table 3 shows that the majority (63.3%) did not pay to use water. Similarly, the responses of household heads were also sought on whether they wished that water user fee payment continue, and on this about 55% expressed their unwillingness against suggestion of continuing with water user fee payment. In some sessions of FDGs a general disgust with water user fee was noted. Different reasons were given for non-payment of water user fee on the part of the community members: lack of water user payment system; user fee not demanded; water source is a village water source and so payment is not necessary; the water is salty and unreliable and lack of accountability and misuse of funds. Ngoja (2015) also reported misuse of water funds in the Morogoro District. Some key informants confirmed that system of water user fee collection is absent in most areas, pointing out that there is normally resistance when such initiative is introduced. Though for some, resistance could be driven by being used to free water supply, but for some others it could be due to unreliability of water supply, as one of the respondents stated:

"I do not pay because apart from the water being salty, there is no reliable water supply. I cannot pay when I do not get service."

SNV (2010) also found that people who initially paid for water use later stopped paying when they did not service. Hunter *et al*. (2010) also reported that water consumers having no improved water supply and services do not pay water tariff. However, though water supply services may be

unreliable and of poor quality, it is through water user fee that provision of safe and reliable water supply can be achieved. Non-payment of water user fee affects sustainability in water supply because sustainable water supply requires water user fee (Rogers *et al.*, 2002). In their study at Kondoa and Mpwampwa in Tanzania Mandara *et al.* (2013) found that sustainable water supply was in jeopardy due to management problems which includes matters related to non payment of water user fee. SNV (2010) found that where water users paid monthly or per bucket, all water points were functional, but where people did not pay, only 60% were functioning.

Declared unwillingness by the majority to continue with water user fee suggests sustainability challenges in community water supply. Achieving sustainable access to safe water may be a dream without community involvement through consistent water user fee practice. Collection of water user fee can serve as a springboard for improving community water supply, because payment of water user fee serves as an incentive to conserve water and ensure efficient use of water (Koppen *et al.*, 2007). Though generally even a small water charges are normally not welcomed by water consumers (Hunter *et al.*, 2010), addressing problems hampering payment of water user fee and willingness to pay stands as one of the ways to improve community water supply services in the study area.

3.3.6 Contributions towards maintenance of community water source

Community members were required to make several forms of cash and in-kind contributions towards the maintenance of water sources. Table 3 shows that about 50% of the households did not make contributions while slightly less than half (49.9%) made contributions towards solving community water problems through water source maintenance, their contributions consisting mainly of: money, labour, local materials and advice. This is consistent with the finding of Njoh (2006) who also observed that contributions of the local people in Cameroon towards improving their water supply included labour. Consequently, self-help in public works entailed a lot more than financial contributions. Including advice as one of their contributions provides the suggestion that households were aware of the technicalities characterizing water supply. This implies their being aware of the need for, and being able to demand technical support from the government for sustainability of water infrastructure. However, poor response to contributions on the part of considerably high proportion of community members suggests the need to device

measures for enhancing local contributions towards solving own water problems. One of the ways through which contributions can be enhanced is by ensuring proper mobilization of local resources.

3.4 Level of Community members' self-help initiatives

The level of community members' self-help initiatives was assumed to have an impact on community water supply services. To this effect, an index was developed using seven items, as indicated in 2.6.1. The results in Table 4 show that great majority (83.3%) of the households have low level self-help initiatives, those with moderate level accounting for 16.2%. Low proportion (0.5%) of the households was found to possess high level self-help initiatives. This implies that community members' self-help initiatives towards solving water problems were generally low in terms of rainwater harvesting; having household water source; payment of water user fee; construction of community water sources; improvement of community water sources and contributions towards solving water problems. From the perspective of involvement of community members in community activities, this finding is consistent with the study result of Malangalila (2009) that showed the level of participation in Morogoro District to be low.

Observations during the study revealed that community members' involvement in community activities was generally low in most of the villages, mostly reflective in community meetings and community works. One of the reasons for low self-help efforts could be insufficient fund availability and skills which are necessary for improving water supply services. During FGDs there were complaints about low income and meager fund availability. Some others indicated that they did not involve themselves in community activities because they did not see any concrete results in past initiatives and efforts. This suggests the need for intervention to develop the capacities of community management in order to ensure sustainable improvement in water supply services. It is in this sense that it becomes glaring that capacity building and sustainability are closely related (Mandara *et al*., 2013). With the capacity to ensure proper mobilization of material and human resources, local communities can facilitate improvement of water supply through greater engagement in self-help initiatives.

Table 4: Index for household heads' self-help initiatives (N=365)

Level of Self-help	Frequency	Percentage
Low level	304	83.3
Moderate level	59	16.2
High level	2	0.5

3.5 Relationship between self-help Initiatives and Water problems

Using Spearman correlation analysis the relationship between self-help initiatives and water problems was determined. It was found that there is significant negative relationship ($r=-0.162$ at $p<0.05$) between self-help initiatives and water problems. Those with high self-help initiatives index have low water problem index. This implies that increase in self-help initiatives lessened the extent of existing water problems. Water problems related to water quantity per capita, water quality at source, water quality at point of use, distance to water source, number of users per water source, queuing and water source dry up or seasonality are reduced with increased self-help actions of rainwater harvesting, construction of own water source, involvement in construction and improving of community water source, payment of water user fee and contributions towards maintenance of community water facilities. This result is consistent with the finding of Kumamaru (2011) that self-supply improved water availability. Tamuno and Iroh (2012) also found that self-help availed a significant level of improvement in the quality of life. In the study conducted in Nigeria, Adedayo (1985) found that there is a general confirmation from the study that self-reliant effort of various communities is the only way out of rural neglect by the government. It was revealed in some sessions of FGDs that collective self-help activity of deepening traditional wells after heavy rains increased access to more water and *ipso facto*, reduced queuing at water sources. Efforts then should be intensified in encouraging and supporting private and collective initiatives of the community members in order to facilitate reduction of water problems in the area.

Based on the study findings above, and given the model's significance at $p<0.05$, the null hypothesis which states that there is no significant relationship between community members' self-help initiatives and water problems is rejected. Solving of water problems in terms of water quantity per capita, water quality at source, water quality at point of use, distance to water source, number of users per water source, queuing and water source dry up or seasonality is

effected by self-help actions of rainwater harvesting, construction of own water source, construction and improvement of community water source, payment of water user fee and contributions towards maintenance of community water facilities.

4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions

The study examined community members' self-help initiatives in solving water problems, and from the findings the following conclusions are drawn:

Not only widespread and intense, water problem in the study area is also multifaceted, affecting the people in different forms namely, insufficiency of water per capita, long distance to water source, queuing at water source, poor water quality and water source dry up or seasonality of water supply. The multifaceted nature of water problems confronting communities in the study area evidences health and economic predicaments of the people.

On the part of self-help, the identified multidimensional factors constraining community involvement present self-help as a complex reality that depends upon a set of interacting socio-economic, political and environmental processes. As such, the history of water problems in the study area is traceable to socio-economic, political and environmental realities of the community. Consequently, reductionist approach in the issue of community involvement in water supply services can be inefficacious in bringing about desired development outcome.

4.2 Recommendations

In the face of the prevailing water problems, communities require support in expansion of water infrastructure, priority requiring being given to those water source types that guarantee safe, sufficient and sustainable water supply. At the same time, measures targeting improvement of community members' self-help practices are required, including effective community mobilization and enhancement of the capacity of the people towards the adoption of the practice of step-by-step incremental water source construction and improvement even over an extended

period. This is especially necessary in the areas of rainwater harvesting, construction of household water sources, and construction and improvement of community water sources.

As self-help inclinations and practices also pertain to matters relating socio-economic, political and environmental realities of communities, incorporating mitigation measures and support mechanisms can augment community initiatives and efforts.

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