DETERMINANTS OF COMMUNITY PARTICIPATION IN WATER PROJECTS: A CASE OF SEMI ARID AREAS OF DODOMA, TANZANIA

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ABSTRACT

Factors determining community participation in water projects were investigated. Data was collected from 126 respondents who were selected from a sample population of 4,683 households using simple random sampling technique. Data were collected using a household questionnaire survey, focus group discussions and key informant interviews. Multiple regression model was used to establish the relationship between community participation (dependent variable) and socio-demographic and governance factors (independent variables). The study recorded a number of factors that determined community participation in water projects. However, a number of them appeared to be insignificant but this is likely to be due to the relatively small sample size involved. Regardless of statistical significance, these factors will likely influence community participation on water projects, hence sustainability. Therefore, these factors should be incorporated and/or considered during redesigning, planning and implementation of water projects in order to enhance community participation, hence sustainability of water projects.

Key words: water projects, community participation, socio economic factors, governance factors

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Introduction

Recently, there has been a paradigm shift from a centralized, supply-driven approach toward demand-oriented strategy (Briscoe and Ferranti, 1988; Garn, 1997) which demands community participation in the planning, implementation and operation and maintenance (O&M) of water projects (Davis *et al.*, 2008). This shift was a result a failure of the supply-driven approach to manage water infrastructure sustainably (Therkildsen, 1988). By contrast, demand-oriented planning which targets communities that want and need water supply improvements requires water users' participation throughout the project management (i.e. design, implementation, maintenance). Consequently, state, non-state, local and international have invested in promotion of safe water supply and sanitation programmes through community involvement (Prokopy, 2005). Community participation was assumed to build sense of ownership, commitment in water project's management hence their sustainability. Despite of this effort, access to safe water supplies and sanitation services in most developing countries continues to be extremely low. For example, about 1.2 billion people worldwide (Klawitter and Qazzaz, 2005) still do not have access to clean water facilities, the majority living in developing nations, particularly in Sub-Saharan Africa (Prokopy, 2005).

Access to clean and safe water in most SSA countries is constrained by the lack of sustainability of the water supply infrastructures (Harvey and Reed, 2007; Nyarko *et al*., 2006). For example, 30 – 60% of water projects in African countries are not functional (Sutton, 2005; Baumann, 2005; Haysom, 2006). In Tanzania, almost 40% of water projects are not functional (WaterAid Tanzania, 2009). The key factors for low sustainability were reported as perceived lack of ownership, lack of education on water supply and sanitation, poor management system and limited demand (Harvey and Reed, 2007). According to Admassu *et al.* (2002) an important factor for the sustainability of projects is the genuine involvement of local people as active participants and equal partners whose concerns and experience are intrinsic to the project's success. However, this has not been the case in most water projects in developing countries including Tanzania (Daudi, 2015). In addition, poor community participation in development projects including water projects could be attributed by a number of factors ranging from socio economic to governance (Kuta *et al.*, 2014). Community participation takes place in a socio-economic context (Kumar, 2002). Therefore, participation is influenced by the overall

circumstances and the unique social context in which action is being taken. Variable such as population size and density, economic conditions, religious, traditions, literacy, health status, land arrangements, government structures and effectiveness that differ from community to community (Dayal and Mukherjee, 2000) are important for both sustainability of community participation and water projects. Therefore, community participation and its sustainability and effectiveness to sustain water projects can well be understood in the socio economic context in which it takes place. Understanding factors determining community participation in water projects is important for redesigning, planning and implementation of sustainable water projects. While a number of studies has documented several forms of community participation in water projects (see Marks and Davis, 2012; Marks *et al.*, 2014; Masayanyiwa, 2014a; b; Daudi, 2015), studies on how these socio economic and governance factors influencing community participation in water project is scanty, especially in semi arid areas of Dodoma, Tanzania. Drawing from above background, this paper aims at assessing factors influencing community participation in water projects.

Materials and Methods

Study Area

Dodoma Municipal is located at the centre of the country, lies between Latitudes 6.00^0 and 6.30^0 South, and Longitude 35.30^0 and 36.02^0 East. The Municipality covers an area of 2,769 square km. The climate of Dodoma is semi-arid, characterized by a marked seasonal rainfall distribution with a long dry season. Average rainfall ranges from 550 to 600mm per annum, while minimum average temperatures vary from 20ºC in July to 30ºC in November (MDC, 2014). The current population of Dodoma Municipality is 4 410 956 based on the Population and Housing census of 2012 with the total number of households of 76 112 and an average population growth rate of 2.4%. A total number of 238 383 people live in the rural areas, of which 166 868 (70%) people have access to unclean and unsafe water (MDC, 2014). Dodoma Municipality is administratively divided into 4 divisions, 37 wards, 39 villages, 100 streets and 222 hamlets. The study was conducted at Mkonze ward, located about 10 km from Dodoma Municipality on main road to Iringa Region.

Data collection methods

A cross sectional research design was adopted as it allows the use of a combination of several methods in data collection hence increases reliability and accuracy of data (Creswell, 2003; Axinn and Pearce, 2006). The population for this study was all communities in the Municipal. Out of 37 wards, one ward, Mkonze was selected randomly for the study. Household questionnaire survey, key informant's interview and focus group discussion were used as methods for data collection. A total of 126 respondents were randomly selected among 4683 households, which makes a 2.7% sample size intensity. Household question survey was conducted to the head of households selected randomly by using village registers as a sample frame. A purposeful sampling was used in the selection of the key informants for key informant's interview and members for focus group discussion.

Data analysis

Statistical Package for Social Sciences (SPSS) programme version 16 performed analysis. Descriptive statistical analysis was used to explore the data for distribution of response, central tendencies and dispersion. In addition, in order to determine factors that affecting community participation on water projects, general multiple regression model was employed:

$$\mathbf{Yi = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + b_6x_6 + b_7x_7 + b_8x_8 + ei}$$

Whereby: y = community participation (mean score) ranges 0 to 5; X_i = the i^{th} explanatory variables which are parameters to be estimated. Table 1 showed description and measurement of variables employed in the multiple regression model estimation.

Results and Discussion

Descriptive statistics of socio demographic and governance variables

Gender of households, age, level of education, household size, family user fee affordability, water supply reliability, good leadership and project ownership were considered as the socio-demographic and governance factors affecting community participation in water projects (Table 2). Of the survey respondents 59.5% were male and 40.5% female, while the majority of

respondents had age below 45 years with average age of 41.9 years (Table 2). Tanzanian average life expectancy is 62.7 by 2013.

Table 1: Measurement of variables and *a prior* expectation

Variables	Description a prior expectations
Community participation (mean score)	*Dependent variable*: Estimated in three stages of water project: planning, implementation and operational and maintenance stages. In each stage, level of participation was measured by five likert scale. Mean score was calculated as average of individual score in all stages.
X_1 = Age of respondent	Age of head of households in years; positive sign (+β).
X_2 = Sex	(1 = male; 2 = female): It was assumed that women are likely to participate in water projects than men, as water constitutes part of their daily activities; positive (+β).
X_3 = Education level of the respondents	(1 = no education; 2 = primary; 3 = secondary; 4 = tertiary): It is assumed that increased educational level of local people enhance their awareness on development issues; hence motivate their participation in development activities, positive sign (+β).
X_4 = Household size	Family size determines per capita water consumption, income and labour availability. The number of members in the household has an important implication on household's participation through cash and/or labour contribution; positive sign of (+β).
X_5 = Family affordability to pay for water services (user fee)	(1 = Yes; 2 = No): It is assumed that when the family can and able to pay for water services will be willing and ready to participate in water projects; negative (-β).
X_6 = Reliability of water supply	(1 = very poor to 5 = very good): Reliability of water supply motivates community to participate in water projects; positive sign (+β).
X_7 = Good leadership	Good leadership was measured by using the following

(mean score):	indicators: *Trust*; *Transparency*; *Accountability*; and *Flow of information* related to water projects; in 5 likert scale form (1=very poor to 5=very good). Mean score was calculated as average of individual score on all indicators. Hypothesised that increasing/improvement on good leadership will increase the likelihood of the community to participate in water projects; positive (+β).
X_8 = Ownership (mean score):	Ownership was measured by three statements: I feel I am one of the owners of the project; My family is one of the owners of project; and the water project is owned by the community; in 5 likert scale (1=strongly disagree to 5=strongly agree). Mean score was calculated as average of individual score on all statements. Hypothesized that sense of ownership of water projects will motivate community participation; positive (+β).

The educational level showed that majority (86.8%) had attained formal education (Primary 80.2%; secondary 2.4%; tertiary 3.2%). The educational status is important for technology uptake and community participation in development. The average number of people living in the same household was 5.7 with majority of households (51.6%) had member between 0 and 5 members. In Tanzania average household size is 4.8 by 2012. Majority (74%) of the households claimed to afford paying for user fees. In terms of reliability of water supply, 74.6% perceived reliability as very poor with mean score of 1.5.

Table 2: Descriptive statistics of socio demographic and governance variables (n = 126)

Variables	Dominant indicators	Min	Max	Mean
Sex	59.5% were male	-	-	-
Age	64.3% had age below 45 years	19	75	41.9
Level of education	86.8% had formal education	-	-	-
Marital Status	91.3% were married	-	-	-
Household size	51.6% had 0 – 5 members	1	15	5.7

Occupation	65.9% were farmers	-	-	-
Family Affordability	74% afforded payment	-	-	-
Reliability of water supply	74.6% perceived very poor	-	-	1.5
Good leadership	61.1% perceived as good	0	5	2.5
Project's Ownership	68% perceived sense of ownership	0	4	2.9
Community Participation	61.9% perceived very poor	0	5	2.3

Majority of respondents perceived that, good leadership and sense of ownership of the projects to be moderate with a mean score of 2.5 and 2.9, respectively (cutting point being 2.5). Lastly, majority of respondents (61.9%) claimed to participate in water projects while 38.1% claimed not to participate with a mean score of 2.3. The descriptive statistics of household's socio-economic characteristics generally showed that the surveyed households are composed of average family size, with access to formal education. It also showed that families had ability to pay for the user fee and had moderately sense of ownership of the projects. Such socio-economic characteristics were expected to influence households' decisions about participating in water projects in the study area.

Factors determining community participation in water projects

Results from multiple linear regression model (Table 3) support the validity of using such a simple approach to analyse the determinants of households' decisions for participation in water projects. The goodness of fit of the models was found to fit moderately well with coefficient of determination (R^2) of 0.470 implied that independent variables explained about 47% of variation in dependent variable.

Table 3: Factors influencing community participation in water projects

Socio economic and governance factors (X_i)	**Coefficients (a)**			
	β	**SE**	**t**	**p**
(Constant)	0.678	0.989	0.685	0.495ns
Sex of respondents	-0.320	0.240	-1.331	0.186ns
Age of respondents	0.012	0.011	1.079	0.283ns

Level of education of the respondents	0.083	0.235	0.355	0.724ns
Household size	0.050	0.054	0.917	0.361ns
Family affordability to pay for water services	-0.258	0.252	-1.022	0.309ns
Reliability of water supply	0.141	0.119	1.181	0.240ns
Good leadership	0.220	0.104	2.109	0.037*
Ownership of the projects	0.307	0.176	1.746	0.084ns
F = 3.608	p = 0.0001	R = 0.686	R^2 = 0.470	

a Dependent Variable: Community participation (Y_i). SE =Standard error of the estimate. *Statistically significant at 0.05 level of significance, ns = not statistically significant at 0.05 level of significance, β = Beta weight

The analysis further confirmed that, the signs of most of the coefficients were consistent with the hypothesised relationships, and some were statistically significant. A number of variables appeared to be insignificant but this is likely to be due to the relatively small sample size involved. This study came up with the following socio-economic factors: age, sex, education level and household size, and affordability of the household to pay for water services (user fee) of respondents, while governance factors were good leadership, sense of ownership and reliability of water supply, influenced community participation in water projects (Table 3).

Positive correlation was observed between community participation and age, education level and household size of respondents, good leadership, sense of ownership of the water projects and reliability of water supply implied that increase or enhancement of these variables will likely improve community participation. On the other hand, sex and affordability of the household to pay for water services (charge or use fees) were found to be negatively correlated with community participation, meaning that these factors constrains community participation on water projects.

Socio demographic factors influencing community participation on water projects

Age of respondents

Table 3 showed that age of respondents has positive correlation (β = 0.678), however not statistically significant (p = 0.283) with community participation in water projects. Although the relationship was not significant, increase in age is likely to enhance their participation in water projects. Almost 74% of respondents had age greater than 49 years. This is because older people have experience of the water problems in the area, have bigger families that require large amount of water, and less mobile such as migration to other places, hence their participation is likely to be higher than young ones. In addition, in some cases older people have power and ability to persuade the community to participate in community development projects including water projects. Maskey *et al.* (2003) urged that older people tend to participate more in development activities such as meetings because of being retired hence have more time to participate.

Sex of respondents

Sex of respondents was found to be negatively correlated (β = -0.320), but not statistically significant (p = 0.186) with community participation in water projects (Table 3). This implied that male is likely to participate in water projects than women, which was contrary to the expectation. The plausible explanation could be that since male are head of household, has control of over household's resources such as income, and also some activities related to water projects were masculine in nature such as digging trenches, hence male were likely to participate in both cash and labour contribution to water projects.

Level of education of respondents

Level of education of respondents were found to be positively correlated (β = 0.083) but statistically insignificantly (p = 0.724) with community participation in water projects (Table 3). Although the relationship was insignificant, increase in level of education of respondents will likely motivate to participate in water projects activities. This is because education tends to increase level of understanding and daring ability to attempt new things including participation in development activities such as in water projects. Similar findings were reported by Kamuiru & Mbwisa (2014) who found that community awareness (a proxy measure of education) has positively correlated with community participation in water projects in Kenya. In this study, majority of respondents (83.4%) had attained some form of formal education (80.2% primary

education; 3.2% secondary education). Lower level of education is likely a reason of non significant relationship between community participation and level of education; and poor to moderate community participation as observed by this study.

Household size of respondents

The study revealed that household size has positive correlation (β = 0.050) with community participation, but not statistically significant (p = 0.361) (Table 3). This implied that, although the relationship was not significant, but increase in household size will likely increase household participation in water projects. Household size determines both labour force availability and diversification of source of income. Therefore, large families are likely to participate in activities of water projects either by providing labour or cash or both. Majority of respondents had family size ranging from 0 to 5 (51.6%), followed by 46% with family size of between 6 and 10.

Family affordability to pay for water services

Family affordability is important for the community to participate in water projects especially through user fee contribution. The study showed that family affordability was negatively correlated (β = -0.258) to community participation, though not statistically significant (p = 0.309) (Table 3). Despite of the fact that the relationship was not significant, negative correlation implied that affordability will likely motivate household to participate in water projects. Qualitative data from focus group discussion revealed that community had to pay 100/= per water basket of 20Litres (1 USD = 2060 TAS). It was also revealed that more that 60% of respondents were able to pay for water charge. Therefore, setting water charges that are within the ability of the user to pay is important not only for enhancing access to water to the community but also for sustainability of water projects, as the user fees (charges) are the sources of funds for O & M of water projects, hence sustainability.

Governance factors influencing community participation on water projects

Reliability of water services

Reliability of water services has influence in community participation in water projects as an indication of water project sustainability. Table 3 showed that though not statistically significant (p = 0.240), reliability of water had positive correlation (β = 0.141) with community

participation, implied that increase or improvement of reliability of water services will likely promote community participation in water projects. On the other hand, majority of respondents (74.6%) perceived water reliability as very poor and 13.1% as poor with a mean score of 1.5. This might a reason of lack of significant relationship between reliability of water and community participation. From focus group discussions, it was learnt that current water project sponsored by World Bank is not working as a result of breakdown (damaged) of water pump. Also people complained that usually there were frequent breakdown which lead to poor water reliability. Marks and Davis (2012) in Kenya found a positive correlation between community participation and reliability of water services (as a proxy measure of sustainability). Break down and frequent interruption of water supply system is one of the major problems facing many water projects after completion of water projects (see Oloruntade *et al.*, 2014; WaterAid Tanzania, 2009).

Good leadership

Good leadership is also an important factor for enhancing community participation. Table 3 showed that good leadership had significant ($p = 0.037$) and positive correlation ($\beta = 0.220$) with community participation, implied that increase or improving good leadership in water project management will likely promote community participation in water projects. Table 4 showed respondent's perception on indicators of good leadership. Aspects such as transparency, accountability and responsibility are part of leadership (Community Development Society, 2000). Respondents perceived that trust, transparency, flow of information as generally poor, while accountability and fund management as poor to moderate with overall good leadership of means score of 2.5. This implied that community perceived good leadership as moderate (Table 4).

Table 4: Respondents perception good leadership of water committees (n = 126)

Variables	VP	P	M	G	VG	Mean
Trust	17[1] (13.5[2])	42 (33.3)	12 (15.1)	16 (12.7)	3 (2.4)	2.4
Transparency	22 (17.5)	44 (34.9)	14 (11.1)	15 (11.9)	3 (2.4)	2.3
Accountability	10 (7.9)	36 (28.6)	22 (17.5)	24 (19.0)	6 (4.8)	3.0

Funds management	15 (11.9)	42 (33.3)	14 (11.1)	22 (17.5)	4 (3.2)	2.6
Flow of information	27 (21.4)	33 (26.2)	20 (15.1)	15 (11.9)	3 (2.4)	2.3
Overall good leadership						2.5

Note: VP = Very poor; P = Poor; M = Moderate; G = Good; VP = Very good

[1]number of respondents [2]percentage of respondents

Sense of project ownership

Sense of ownership on water project is an important factor for determining community participation in development project such as water projects. Correlation between sense of project ownership and community participation were found to be positive (β = 0.307), though not statistically significant (p = 0.084) (Table 3). This means sense of ownership of water project will likely to promote community participation on water projects. The respondents perceived that ownership at individual and family levels to be relative low compared to perception that water project is owned by the whole community which was generally high (mean score of 2.9) with overall ownership score to be above moderate (2.6) implied that people perceived the water projects to be owned by the community (Table 5).

Table 5: Respondent's perception on sense of ownership of water projects (n = 126)

Variables	SD	D	A	SA	Mean
I feel I am one of the owner of the water project	23[1](20.9[2])	37 (33.6)	38 (34.5)	12 (10.9)	2.4
My family is one of the owner of the project	7 (6.4)	52 (47.7)	42 (38.5)	8 (7.3)	2.5
The water project is owned by the community	2 (1.8)	21 (19.1)	75 (68.2)	12 (10.9)	2.9
Overall ownership					2.6

Note: SD = Strongly Disagree; D = Disagree; A = Agree; SD = Strongly Agree

[1]number of respondents [2]percentage of respondents

A study in Kenya found ownership with mean score 3 (Marks and Davis, 2012). Furthermore, Marks and Davis (2012) found that community participation tends to enhance community ownership of water project, while this study demonstrated that ownership can enhance community participation. This study suggests that ownership and community participation are intertwined such that while community participation create sense of project's ownership; ownership tends to enhance community participation. It is urged that community participation in planning is important for creation of community's' sense of ownership of water projects, which in turn ensures community's commitment to long term operation and maintenance (Whittington *et al.*, 2009), hence sustainability.

Conclusion and recommendations

Community participation in development projects including water projects could be affected by a number of factors ranging from socio economic to governance. The study recorded a number of factors that determining community participation in water projects. Age, education level and household size of respondents, good leadership, sense of ownership and reliability of water supply were found to be positively correlated with community participation, hence enabling factors. Likewise, sex and affordability of the household to pay for water services (charge or use fees) were found to be negatively correlated to community participation, hence constraining factors. Regardless of their statistical significance, these factors will likely influence community participation on water projects, hence their sustainability. Understanding factors determining community participation in water projects is important for redesigning, planning and implementation of sustainable water projects. Community mobilization in participation in water projects and training on management of water projects are among of issues that need more emphasise for sustainability of water projects. Furthermore, studies related to how (types of) community participation in water projects and their relationship to sustainability are desired in order to have comprehensive understanding on community participation in water projects.

References

- Admassu *et.al*, (2002). Identifying key characteristics of technical project leadership. *Leadership & Organization Development Journ*al, 20(5), 253-261.
- Axinn, W. and Pearce, L.D. (2006). *Mixed method data collection strategies*. New York:

Cambridge University Press.

- Baumann, E. (2005). Common RWSN Context. *Discussion Paper*. SKAT, St. Gallen, Switzerland.
- Briscoe, J. and Ferranti, D. (1988). *Water for rural communities, helping people help themselves.*
- World Bank: Wahington, DC.Community Development Society. (2000). "Principles of Good Practice. Vanguard. *The Newsletter of the Community Development Society*, 32(3), 1.
- Creswell, J.W. (2003). *Research design: qualitative, quantitative and mixed methods approaches*. 2nd Edition. SAGE Publications. London. 26 p.
- Dayal, R., van Wijk, C. and Mukherjee, N. (2000), "*Methodology for participatory assessments with communities, institutions and policy makers, linking sustainability with demand", Gender and Poverty*, The World Bank, Water and Sanitation Program. World Bank: Washington, DC. *Discussion Papers Series* No. 183
- Daudi, F.K. (2015). The contribution of community participation in water projects in peri-urbarn Tanzania: A case of Dodoma municipality. MA dissertation. 133 pp.
- Dodoma Municipal Council (DMC), (2014). *Comprehensive Socio-economic profile*. Dodoma: DMC, PMO-LGA. 96 p.
- Garn, H. (1997). Lessons from large-scale rural water and sanitation projects: transition and innovation. *Urban Environemtal Sanitation Working papers.* World Bank: Washington DC.
- Harvey, A. and Reed, A. (2007). Community-Managed Water Supplies in Africa: Sustainable or Dispensable? *Community Development Journal*, 42(3), 365–378.
- Haysom, A. (2006). A Study of the Factors Affecting Sustainability of Rural Water Supplies in Tanzania. Available at: http://www.wateraid.org/documents.
- Kamuiru, J.K. and Mbwisa, H. (2014). Factors influencing community participation in project planning in Kenya. A case study of Mbucana water dam project, Kiambu county. *The Strategic Journal of Business and Change Management*, 2(29), 560 – 582.
- Klawitter, S. and Qazzaz, H. (2005). Water as a Human Right: The Understanding of Water in the Arab Countries of the Middle East, *International Journal of Water Resources Development*, 21(2), 253-271.

- Kumar, S. (2002). *Methods for Community Participation. A Complete Guide for Practitioners.* London: ITDG Publishers
- Kuta, G.I. Emigilati, M.A., Hassan, A.B. and Ibrahim, I. (2014). Domestic water sources and its health implication in Lapai Local Government area, Niger State, Nigeria. *Ethiopian Journal of Environmental Studies and Management*, 7(6), 686 – 694.
- Maskey, V, Gebremedhin, T.G. and Dalton, T.J. (2003). A survey analysis of participation in a community forest management in Nepal. *Res. Paper* 8.
- Marks, S.J. and Davis, J. (2012). Does user participation lead to sense of ownership for rural water system? Evidence from Kenya. *World Development*, 40(8), 1569 – 1576.
- Marks, S. J.; Komives, K. and Davis, J. (2014). Community Participation and Water Supply Sustainability: Evidence from Hand pump Projects in Rural Ghana. *Journal of Planning Education and Research*, 1–11.
- Masanyiwa, Z.S., Niehof, A. and Termeer, C.J.A.M. (2014a). Gender perspectives on decentralization and services users' participation in rural Tanzania. *The Journal of Modern African Studies*, 52(1), 95 – 122.
- Masanyiwa, Z.S., Niehof, A. and Termeer, C.J.A.M. (2014b). Cooperation and trust in the context of decentralization reforms in rural Tanzania. The *International Journal of Social Sciences and Human Studies*, 6(1), 139 – 156.
- Nyarko, B., Oduro-Kwarteng, S. and Adama, I. (2006). Cost recovery of Community-managed Piped Water Systems in Ashanti region, Ghana. *Water and Environment Journal*, 21, 92–99.
- Oloruntade, A.J., Konyeha, S. and Alao, F. (2014). Assessing the sustainability of borehole for potable water supply in selected communities in Akoko Area of Ondo State, Nigeria. *Ethiopian Journal of Environmental Studies and Management*, 7, 881 – 889.
- Prokopy, S. (2005). The Relationship between Participation and Project Outcomes Projects in India: Evidence from Rural Water Supply, *World Development*, 33(11), 1801–1819.
- Sutton, S. (2005). The Sub-Saharan Potential for Household Level Water Supply Improvement: Maximizing the Benefits from Water and Environmental Sanitation, 31st WEDC Conference, Kampala, Uganda.

- Therkildsen, O. (1988). *Watering white elephants? Lessons from donor funded planning and implementation of rural water supplies in Tanzania*. Uppsala, NJ. Scandinavian Institute of African studied.
- WaterAid Tanzania, (2009). *Practical lessons from three studies on the management of rural water supply scheme.* Dar Es Salaam: WaterAid Tanzania. 32p.
- Whittington, D., Davis, J., Prokopy, L., Komives, K. Thorsten, R., Lukacs, H., Bakaliang, A. and
- Wakeman, W. (2009). "How well is the demand-driven, community management model for rural water supply systems doing? Evidence from Bolivia, Peru and Ghana." *Water Policy*, 11(6), 696 – 718.