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Influence of Resource Mobilization Strategies on Promotion of Sustainable Water Projects in Tana Catchment Area, Kenya

By

Lilian Mukiri Mworia, 1 Ph.D. Candidate Chuka University, P. O. Box, 109-60400, Chuka,Kenya
Dr. Anne Sande, Chuka University, P. O. Box, 109-60400, Chuka, Kenya
Dr. Christopher Kiboro, Chuka University, P. O. Box, 109-60400, Chuka, Kenya
*Correspondence email: lmworia@must.ac.ke

Abstract

Water management initiatives have been launched around the world with the aim to conserve and safeguard the water resources for future generations. In Kenya, Water Resource Users Associations (WRUAs) are involved in water management at the local level. The Associations were created by the Water Act 2002 and their roles revised in Water Act 2016. Although the WRUAs have been in existence for more than a decade, water flow in the river basins is decreasing. This study examined WRUAs resource mobilization strategies on the promotion of sustainable water projects. Institutional support was used as a moderating variable. The study was anchored on the theory of Common Pool Resource Management. The convergent research design was used in the study. A sample of 377 respondents comprising of 5 officers of the Water Resource Authority, 48 WRUA committee members, 324 water users were selected using cluster, purposive and random sampling techniques. Questionnaires and interview guide were used in data collection. Cronbach's Alpha Co-efficient test of reliability was 0.730. The data obtained was analyzed using descriptive and inferential statistics using Statistical Package for Social Sciences (SPSS) version 20.0. Hierarchical Regression model was constructed at 5% level of significance. The study established a significant relationship between resource mobilization and sustainability of water projects for users, executive committee members and combined data. The findings also showed statistically insignificant moderation effect of institutional support on the relationship between resource mobilization and sustainability of water projects with the interaction terms for users, executive committee members and combined data respectively. In conclusion, WRUAs had inadequate resources to implement their strategies. The study recommends that WRUAs should leverage on mobilizing support from all stakeholders to mobilize resources in order to promote sustainable water projects.

Keywords: Resources mobilization, sustainable water projects, Water Users Associations, Tana Catchment, Area, Kenya

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Influence of Resource Mobilization Strategies on Promotion of Sustainable Water Project in Tana Catchment Area, Kenya

By

Lilian Mukiri Mworia, Dr. Anne Sande and Dr. Christopher Kiboro

1.0 Introduction

Water management initiatives have been launched around the world with the aim to conserve and safeguard the resources for future generations. In Kenya, the enactment of the Water Act 2002 and its subsequent revision in 2016, introduced the involvement of Water Resource Users Associations (WRUAs) in water management at the local level. The WRUAs are community based associations for collective management of water resources within a river basin. Although WRUAs have been in existence for a long time, water flow in the river basins shows decreasing trends. Hagen (2002) argued that in order to realize sustainable development, design and implementation of viable interventions is vital. One way to measure and achieve the desired outcomes of a project is the formulation of effective strategies. Resource mobilization is a basic requirement without which water projects would have challenges in operation and maintenance of water systems.

Statement of the Problem

Vision 2030, one of Kenya's main developmental social pillars, recognizes that Kenya's Availability of Fresh Water Resources Index was estimated to be 1093 m3/capita/year in 2010 and could decline to 586 m3/capita/year by 2025 unless effective strategies to address the issue are implemented. Diverse water use activities could either lead to drying up of water sources or increase soil erosion in the uplands and siltation in the lowlands which could reduce water flows in rivers and cause competition for water among users. Although various initiatives have been launched to enhance public participation and management of water resources through WRUAs, the effectiveness of WRUA resource mobilization strategy has not been assessed in the Tana catchment area. This study sought to examine strategies used by WRUAs to mobilize resources in order to promote sustainable water projects in Tana Catchment Area.

2.0 Literature Review

The World Commission on Environment and Development (WCED, 1987) define sustainable development as development which meets the needs of the present without compromising the ability of future generations to meet their own needs**.** Water Resource Management refers to institutionalized activities of water resource development, utilization, allocation and conservation of natural environment (Hutton & Batram, 2008). Water mangement systems aim at attaining equitable distribution and allocation of water resources among users while protecting them from diminishing supplies and governing the sharing of limited water supplies to meet users' needs. As the population increases, water resource management needs to be conserved and shared to meet human needs while conserving the environment. However, Harvey & Reeds, (2004) posits that insufficient resource planning, insufficient knowledge on resource mobilization, unwillingness to contribute required resources may cause underestimation of the recurrent and future costs of a project resulting in poor performance

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According to Baker (2000), resource planning involves setting objectives, assessing assets, forecasting future financial needs and making plans to achieve a monetary goal. Harvey & Reed (2004) noted that a financial plan should calculate and determine sources of funding for direct operation costs, maintenance, institutional training costs, monitoring, and costs of user mobilization. Without comprehensive project Cost Benefit Analysis determination, it would not be possible to inform water users of the true cost of service sustainability or to determine the level of external financial support that would be required to promote sustainable projects. Hutton & Bartram, (2008) and Baker (2000) argue that determination of the real costs of projects affects development of sustainable financing strategies. Although emphasis was laid on accounting and financial administration of project, financial management skills among WRUAs was not well developed in Africa (Mumma, 2005). It was therefore, necessary to establish the financial administration capacity of WRUAs in planning, mobilizing of project resources to ensure financial and non-financial contributions for maintenance of water projects in the Tana Catchment Area of Kenya.

Uysal & Atis (2010) reported that in Gezira irrigation scheme in Sudan, quality of project maintenance improved because users participated physically in terms of hours of labor which reduced the cost of maintenance and improved the quality of water supply. However, the study established that it was difficult to mobilize cash in time from farmers all the time. In addition, farmers were allowed to pay the dues in kind which could be sold and money raised used for maintenance of water supply systems (Uysal, & Atis 2010). Although such flexibility improved the rate of fee collection, users were left with the risk of marketing the produce collected which would lead to prolonged inadequate funds for project management and cost recovery (Adam 2003).

Braimah (2011), observed that although users in Ghana, made contributions in cash, the monthly levies were inadequate to ensure effective operation and maintenance of water projects. Interviews with the Committees revealed that funds required to carry out maintenance activities were sometimes lacking or inadequate decision made on required resources (Al-Mohannad, 2003; Fadul Bashir, 2012). Engaging stakeholders in decision making to raise required resources for projects needed new techniques to break social barriers that hinder active participation when formulating resource mobilization strategies. Participant's views on how much resource they were willing to provide and at affordable rate would break social barriers and encourage active participation.

Cornish, Boswarth, Perry, Burke (2004) and Berkoff (2008), revealed that WRUAs in Morocco, Tunisia and Turkey faced financial shortfalls because the fees set was too low to cover actual costs, and the rate of recovery payment was low. The study established that in Tunisia, the shortfall in resources occurred because users were unwillingness to pay while in Morocco, shortfall in resources occurred during drought periods when users had poor crop yields Yakubov, (2011). However in Turkey, the strategy of resource mobilization was based on irrigation service, but dysfunctional infrastructure led to the users' unwillingness to pay for a service that was more of a constraint than on asset *per se* (Cornish *et al.,* 2004). From the above studies in Morocco, Tunisia and Turkey, some projects had faced financial shortfalls because decisions to charge user fees was set either too low to cover actual costs or WRUAs failed to take appropriate collection decisions. However, Yakubov, (2011) argued that user participation in planning of activities of resource mobilization could generate a sense of ownership, break dependency patterns and give decision making power to the contributors

In Kenya, the Water Resource Authority (WRA) may support WRUAs to raise resources, offer conditional or unconditional grants through Water Services Trust Fund to

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implement their intervention plans. However, WRUAs may not qualify for funding (GoK, 2016). Disqualification for financial support may be associated with limited capacity for proposal writing, inadequate capacity to handle finances or poor identification of priories. In that view, it was necessary to explore strategies used by WRUAs in Tana Catchment Area to raise resources to sustain water projects.

3.0 Research Methodology

The study adopted a convergent research design that allowed use of mixed methods approach. The approach allowed the researcher to use both qualitative and quantitative data from different sets of respondents (Creswell, 2015). The study was carried out in Tana Catchment Area which is one of the regions created under the Water Resource Authority as enactment of the Kenya Water Act (GoK, 2016). This study targeted 56 WRUAs which have been in operation for three years because they were in the second level of the development cycle and were funded by the WSTF during the 2017/2018 financial year. A sample of 377 respondents comprising of 48 WRUAs was selected from each (cluster) sub region proportionately. Five (5) Sub -Region officers were purposively selected and 324 water users were randomly selected from the sampled WRUAs.

Data collection instruments used in the study included face to face interview with WRA officers. Data was collected from executive committee members and water users using open and closed ended questionnaires. The reliability of instruments was ascertained by determining the internal consistency of the tools which was computed using Cronbach's Alpha Co-efficient that gave a value of 0.730 .The quantitative data obtained was analyzed using descriptive statistics mainly the mean, percentages and frequencies. Hierarchical linear regression was used to analyze data by use of Statistical Package for Social Sciences (SPSS) Version 20.0. Qualitative data was analyzed in themes. Data was presented in tables and graphs.

4.0 Results and Discussions

4.1 Response Rate

Water users were issued with 324 questionnaires out of which 257 and 31 questionnaires were returned from users and executive committee members respectively forming 77.8% response rate. Face to face interviews were conducted to 5 WRA Sub-region Officers. According to Babbie (2011), a return rate of 50% is adequate, 60% good and 70% very good, for analysis. This implies that 77.8% response rate was very good for data analysis. Table 1 shows the response rate.

Table 1: Response Rate

Respondents	Sample Size	Return size	Response rate (%)
Water Users	324	257	76.2
Executive committee members	48	31	64.6
WRA officers	5	5	100.0
Overall	**377**	**293**	**77.8**

Source: Field data.

4.2 Descriptive Statistics

Data collected was analyzed using frequencies, percentages and means where strongly agree (5); Agree (4); Undecided (3); Disagree (2); Strongly Disagree (1); were used. Any score

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below three was considered as disagreement while scores above 3 were considered to be agreement. The statements and committee members' responses are presented in Table 2

Table 2: Responses from Executive Committee Members on Resource Mobilization Strategy

Questions	**1**		**2**	**3**	**4**	**5**	**Mean**
Members agreed to contribute labor, materials and time towards construction of water intake points, infrastructure and rehabilitation of the river basin.	F	0	6	0	18	7	3.84
	%	0.0	19.4	0.0	58.1	22.6	
Members contribute labor and finances in time as required.	F	7	15	2	5	2	2.35
	%	22.6	48.4	6.5	16.1	6.5	
There are graduated penalties for non-payments of user contributions	F	1	8	2	16	4	3.45
	%	3.2	25.8	6.5	51.6	12.9	
There is availability of reserve fund for our WRUAs	F	5	21	1	3	1	2.16
	%	16.1	67.7	3.2	9.7	3.2	
WRUAs have reserve fund for repairs and rehabilitation.	F	3	17	4	7	0	2.48
	%	9.7	54.8	12.9	22.6	0.0	
Resources collected from users are adequate to run the activities of WRUAs	F	11	18	0	1	1	1.80
	%	35.5	58.1	0.0	3.2	3.2	
Our WRUA has an internal audit team in place	F	2	11	1	12	5	3.23
	%	6.5	35.5	3.2	38.7	16.1	
Average (%)		**11.5**	**45.2**	**5.5**	**29.5**	**8.3**	**2.76**
Summary		**62.2 (disagreement)**			**37.8 (Agreement)**		

Source: Field data.

From the findings presented in Table 2, it was established that committee members (mean of 3.84) involved users in setting contributions to support WRUA activities. Involvement of users in setting contributions to be provided by each member can raise satisfaction levels of members and enhance project ownership. On average 85% of committee members confirmed that users had agreed to contribute ksh.6000 per year in support of WRUA activities. This means that consultation of users on the amount of contribution required to run the activities of WRUAs is an important aspect in the management of water resources. However, when committee members were asked how much they had received from the users and the government for WRUA operations in 2017/2018 financial year, majority of committee members (80%) indicated that they had received an average of Ksh. 5,000,000 in support of WRUA activities. Although WRUA committee members indicated that they had received contributions for the financial year, the budgeted finances of WRUAs ranged from Ksh. 5,000,000 to Ksh. 10,000,000. This shows a variance in the average of finances received and the budget targets to finance planned activities during the 2017/2018 financial year. Indeed, this was confirmed by all WRA officers who confirmed that.

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> That WRUAs had signed Level 11 funding contracts and they had received funding from Water Services Trust Fund (WSTF). WRUAs had presented many activities for funding however due to limited resources, all needs identified could not be met, instead WRUAs rationalized the activities for funding in order of priorities. Therefore, the documents analysis revealed that the released funds were to facilitate the implementation of approved activities.

Further, the committee members were asked whether the WRUAs had reserve fund for repairs and rehabilitation. Majority (a mean of 2.42) disagreed that WRUAs had reserve fund. Lack of reserve fund could be attributed to the inability of users to provide the required resources or inability to collect the agreed contributions. However, when the committee members were asked whether the mobilized resources were adequate (mean of 1.80) agreed that the resources raised were inadequate .The study findings agree with the study carried out in Ghana by Braimah, (2011) which observed that although WRUAs raised resources, levies and finances provided were inadequate to ensure effective operation and maintenance of water projects. Although WRUAs set resources required to run activities, inadequate resources could negatively impact on the implementation of the set strategies. However, study by Barakat, (2007) stated that when WRUAs members were involved in annual inspections, cleaning works, rehabilitation of canals, and government subsidy given, the users rated their projects as 70 to 100 percent successful. Government subsidy when combined with member's contribution can alleviate the challenges associated with inadequate resources.

In addition, committee members were asked whether they had graduated penalties for nonpayment of user contributions. A mean of (3.45) agreed that WRUAs had graduated penalties to deter members who failed to meet their contribution obligations. However, the committee members identified the challenges faced by WRUAs in resource mobilization as delayed contributions, irregular participation in meetings and lack of understanding on the need to conserve natural resources.

Committee members were asked whether they had an audit team in place. At a (mean of 3.23) it was established that WRUAs did not have an audit team in place. However, when WRUAs were asked whether they announced financial audit reports to the members every year (87 %) agreed that they announced financial audit report to members. For users who willingly contribute resources to support WRUA activities, financial audit reports are very vital. Where financial reports are not shared with contributors, their morale for further contributions can be affected. Financial controls can create harmony and lead to revenues being spent on prioritized activities of water resource management (Hirji, 2006). Users Statement and responses on resource mobilization strategy were provide as shown in Table 4.3

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Table 3: Responses from Users on Resource Mobilization Strategy

Questions	**1**		**2**	**3**	**4**	**5**	**Mean**
I contribute (labor and finances) as set by our WRUA towards construction of water intake points, infrastructure and rehabilitation	F	10	20	13	125	89	4.02
	%	3.9	7.8	5.1	48.6	34.6	
I make my contribution in labor or finances to the WRUAs in a time as required by our WRUA	F	6	15	10	124	102	4.17
	%	2.3	5.8	3.9	48.2	39.7	
I am willing to give additional resources to the WRUA	F	5	13	11	136	92	4.16
	%	1.9	5.1	4.3	52.9	35.8	
There are graduated penalties for non-payments of fees or other contributions set by our WRUA	F	21	25	40	118	53	3.61
	%	8.2	9.7	15.6	45.9	20.6	
Financial audit results of our WRUA are announced to members every year	F	64	92	52	27	22	2.42
	%	24.9	35.8	20.2	10.5	8.6	
The finances paid to WRUA are frequently used to repair leaking pipes tanks repair water source put bullets	F	61	51	60	61	24	2.75
	%	23.7	19.8	23.3	23.7	9.5	
Fees and resources collected from users are adequate to run the activities of WRUA	F	86	54	20	54	43	2.67
	%	33.5	21.0	7.8	21.0	16.7	
Average (%)		**14.1**	**15.0**	**11.5**	**35.8**	**23.6**	**3.40**
Summary		**40.5 (disagreement)**			**59.5 (Agreement)**		

Source: Field data.

From the findings, it was established that majority of users (mean of 4.02,) agreed that members contribute towards construction of water intake points, infrastructure and rehabilitation of the river basin. When users were asked how they made their contributions, (70%) agreed that they made monthly contributions while (20%) made contributions yearly and (10%) gave contributions when need arose. User's mode of contribution on monthly, yearly or on need bases, may arise due to user income generation patterns. On average users contributed ksh.6000 to the WRUAs in 2017/2018 financial year. Confirmation of user's contribution in support of WRUA activities is an indication that users are involved in decision making regarding resource mobilization. The findings of the study are in line with recommendations of Harvey and Reads (2004) that stakeholder should be engaged in financial planning, determining sources of funding for direct operation costs, maintenance, and cost of resource mobilization. In Kenya, Water management structure was reformed to include WRUAs in the management of water at the grassroots root level a task which would be impossible to perform without resources. User participation in planning of activities of resource mobilization can generate a sense of ownership, break dependency patterns and give decision making power to the contributors (Yakubov, 2011)

Users were further asked whether they contributed labor and finances in time to WRUAs towards construction of water intake points, infrastructure and rehabilitation. The study established that majority of users (mean of 4.7) disagreed with the statement .The negative indication on timely contribution can be attributed to the level of income or other

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factors that affect availability of resources. The study finding agree with the study in Sudan by Adam, (2003) that reported in Gezira irrigation scheme, it was difficult to mobilize cash in time from farmers and they were allowed to pay the dues in kind which were sold to raise money for maintenance of water supply systems. These findings however differ with the results of Reis, (2009) who established that in Vietnam, users were unwilling to contribute to water management because they felt that a monthly income of 500,000-5,000,000 VND was low earnings for the rural community. Involvement of users in determining the source of required resources create a sense of ownership and reduce reliance on external sources. The findings imply that it is necessary for users to provide timely payment of agreed resources whether in kind or in cash. This will enable the WRUA management to implement strategies on schedule.

The respondents were asked whether their WRUA had graduated penalties for non-payment of user contribution as a resource mobilization strategy. The study established that majority of user (a mean of 3.61) agreed that WRUAs had graduated penalties. The findings agree with study by Kolaralli and Brewer, (1999) in Sudan, which reported that users had rules and regulations however, they did not have sufficient punitive punishments for defaulters. However, for WRUAs to raise required resources, reduce conflicts and operate their activities, internal structures need to be established, regulated and implemented (Asante, 2010). The findings imply that WRUAs have the capacity to manage, control and prevent noncompliance, improve fee collection, and financial sustainability of water projects if the regulations are adhered to.

The users were further asked whether the finances raised were used to repair leaking pipes and rehabilitate water point sources. Majority (a mean of 2.75) agreed that repair and rehabilitation works were frequently done by the WRUAs. However, when they were asked whether there were visible pipes leaking (77%) of the users agreed that there were burst pipes from time to time. Although WRUAs do not supply water to households, they monitor abstraction points and assess the condition of the intakes. However, inadequate funding base to cater for repairs and maintenance of old infrastructure can delay repairs. The study finding concurs with case study in Morocco, Tunisia and Turkey by Gunchinmea and Yakubar, (2010) which revealed that although members made contributions, some projects had faced financial shortfalls because decisions to charge user fees were set either too low to cover actual costs.

Both committee members and users agreed on the required contributions to run WRUAs. However, both committee members and users at agreed that amount of resources contributed were inadequate to run WRUA activities. WRUAs lacked reserve fund for repairs and rehabilitations as confirmed by water users and committee members' .Reserve fund can be used to carry out emergency infrastructure repairs to maintain the water system. Availability of resources to run WRUA activities whether in cash or kind can be used to implement set activities as per schedule.

4.3 Regression Analysis and Hypothesis Testing

4.3.1 Sustainable Water Projects and Resource Mobilization Strategy for WRUA Users

Table 4 shows the results for the significance of the relationship between resource mobilization and sustainability of water projects for users. It also presents hierarchical

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regression results for the moderating effect of institutional support on the latter relationship. There are three models starting with resource mobilization as the sole predictor. Institutional support and the interaction term (product of institutional support and resource mobilization) are added to the first model sequentially to cumulatively form model 2 and 3 respectively.

Table 4: Hierarchical Regression Results for Sustainable Water Projects against Resource Mobilization for User Data

Users Data	**Model 1**			**Model 2**			**Model 3**		
	Beta[a]	t	p	Beta[a]	t	p	Beta[a]	t	p
Predictors									
(Constant)	11.183	8.941	0.000	7.520	6.575	0.000	7.454	6.328	0.000
Resource Mobilization (RM)	0.464	8.987	0.000	0.183	3.430	0.001	0.183	3.419	0.001
Institutional Support (IS)				0.569	9.490	0.000	0.572	9.362	0.000
RM* IS (“mean-centered”)							0.002	0.244	0.807

[a] Dependent variable: sustainability of water projects

Source: Field data.

Figures A.2 and A.3 in the appendices show the scatter plot of sustainability of water projects against resource mobilization and institutional support respectively, for users. Both scatter plots indicate inherent linear trend between the respective plotted pair of variables hence confirming linearity in the variables. Furthermore, Visual inspection of Figure A.1 shows that the standardized residuals spread evenly about the zero mark horizontal level on the y-axis without any visible increasing pattern. The absence of an extreme outlying residual also indicated that the observed values were close to the predicted values of the linear regression. This is evidence of linearity of the initial observed values because their plot does not differ much from the linear predicted plot.

Regression model 1 in Table 4 shows that a unit increase in resource mobilization (RM) was associated to an increase of 0.464 in sustainability of water projects while holding other factors constant. There was test of significance of resource mobilization at 5 percent significant level, showed a p-value of 0.000 ($p<0.05$). Accordingly, resource mobilization (RM) has a significant effect on sustainability of water projects

Regression model 2 had two parameters, resource mobilization (RM) and institutional support (IS) each with a regression coefficient of 0.183 ($p=0.001$) and 0.569 (p-0.000) respectively. The second model therefore has two significant main effects but no moderation accounted for yet. In the second model, marginal increase in resource mobilization (RM) is associated to an increase of 0.183 in sustainability of water projects while holding institutional support constant. A marginal increase in institutional support leads to 0.569 increase in sustainability of water projects while holding resource mobilization constant. The second model therefore shows diminishing effect of resource mobilization in the presence of institutional support showed by the reduction in regression coefficient (that is, from 0.464 to 0.183) although remaining significant ($p<0.05$).

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The third regression model shows the interaction effect of resource mobilization and institutional support (RM*IS) as the third predictor. This interaction term had a regression coefficient of 0.002 (p=0.807, > 0.05) which indicates statistically insignificant positive moderation effect. Therefore, the statistical inference is that institutional support does not moderate the relationship between resource mobilization and sustainability of water projects. Figure 1 shows the diagrammatic representation of the moderation effect of institutional support at 16th, 50th and 84th percentiles representing low, moderate and high moderation respectively.

4.3.2 Sustainable Water Projects and Resource Mobilization Strategy for Executive Committee Members

Table 5 shows the results for the significance of the relationship between resource mobilization and sustainability of water projects for executive committee members. Regression models 1, 2 and 3 represents hierarchical regression results for testing the moderating effect of institutional support. The first regression model in the hierarchical series includes resource mobilization as the sole predictor. Addition of Institutional support to the first regression model formed the second regression model in the hierarchical series. Addition of the interaction term (product of institutional support and resource mobilization) to the second model eventually formed the third regression equation in the hierarchical series.

Table 5: Hierarchical Regression Results for Sustainable Water Projects against Resource Mobilization for Executive committee member Data

Users Data	**Model 1**			**Model 2**			**Model 3**		
	Beta[a]	t	P	Beta[a]	t	p	Beta[a]	t	p
Predictors									
(Constant)	13.639	3.665	0.001	0.558	0.129	0.898	0.532	0.122	0.903
Resource Mobilization (RM)	0.715	3.336	0.002	0.483	2.679	0.012	0.465	2.550	0.017
Institutional Support (IS)				0.722	4.170	0.000	0.742	4.224	0.000
RM* IS (“mean-centered”)							-0.037	0.836	0.410

[a] Dependent variable: sustainability of water projects
Source: Field data.

The figures A.5 and A.6 in the appendices show the scatter plot of sustainability of water projects against resource mobilization and institutional support respectively for executive committee members. Both scatter plots indicate inherent linear trend between the respective plotted pair of variables hence confirming linearity in the variables. Visual inspection of Figure A.4 also shows that the standardized residuals spread evenly about the zero mark horizontal level on the y-axis without any visible increasing pattern. The absence of an extreme outlying residual also indicated that the observed values were close to the predicted values of the linear regression.

Regression model 1 in Table 5 shows that a unit increase in resource mobilization (RM) was associated to an increase of 0.715 in sustainability of water projects while holding

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other factors constant. This was significant at 5 percent significant level because the corresponding p-value was 0.002 ($p<0.05$). Regression model 2 had two main effects of resource mobilization (RM) and institutional support (IS) each with a regression coefficient of 0.483 ($p=0.012$) and 0.722 (p-0.000) respectively. The second model therefore has two significant main effects but no moderation accounted for yet. In the second model, marginal increase in resource mobilization (RM) is associated to an increase of 0.483 in sustainability of water projects while holding institutional support constant. A marginal increase in intuitional support leads to 0.722 increase in sustainability of water projects while holding resource mobilization constant. The second model shows diminished effect of resource mobilization in the presence of institutional support showed by the reduction in regression coefficient (that is, from 0.715 to 0.483) although remaining significant ($p<0.05$).

The third regression model shows the interaction effect of resource mobilization and institutional support (RM*IS) as the third predictor. This interaction term had a regression coefficient of -0.037 ($p=0.410$, > 0.05) which indicates statistically insignificant negative moderation effect. The statistical inference is that institutional support does not moderate the relationship between resource mobilization and sustainability of water projects. Figure 2 shows the diagrammatic representation of the moderation effect of institutional support at 16^{th}, 50^{th} and 84^{th} percentiles representing low, moderate and high moderation respectively.

4.3.3 Sustainable Water Projects and Resource Mobilization Strategy for combined WRUA Users and Executive Committee Members

Table 4.6 shows the results for the significance of the relationship between resource mobilization and sustainability of water projects for combined users and executive committee members. Regression models 1, 2 and 3 represents hierarchical regression results for testing the moderating effect of institutional support. The first regression model in the hierarchical series includes resource mobilization as the sole predictor. Addition of Institutional support to the first regression model formed the second regression model in the hierarchical series. Addition of the interaction term (product of institutional support and resource mobilization) to the second model eventually formed the third regression equation in the hierarchical series.

Table 6: Hierarchical Regression Results for Sustainable Water Projects against Resource Mobilization for combined user and executive committee member data

Users Data	**Model 1**			**Model 2**			**Model 3**		
	Beta[a]	t	p	Beta[a]	T	p	Beta[a]	t	p
Predictors									
(Constant)	11.845	10.387	0.000	7.033	6.545	0.000	7.001	6.381	0.000
Resource Mobilization (RM)	0.443	9.267	0.000	0.202	4.315	0.000	0.202	4.295	0.000
Institutional Support (IS)				0.570	10.464	0.000	0.572	10.293	0.000
RM* IS ("mean-centered")							0.001	0.147	0.883

Dependent variable: sustainability of water projects
Source: Field data.

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The figures A.8 and A.9 in the appendices show the scatter plot of sustainability of water projects against resource mobilization and institutional support respectively for combined users and executive committee members. Both scatter plots indicate inherent linear trend between the 8respective plotted pair of variables hence confirming linearity in the variables. Visual inspection of Figure A.7 also shows that the standardized residuals spread evenly about the zero mark horizontal level on the y-axis without any visible increasing pattern. The absence of an extreme outlying residual also indicated that the observed values were close to the predicted values of the linear regression.

Regression model 1 in Table 6 shows that a marginal increase in resource mobilization (RM) was associated to an increase of 0.443 in sustainability of water projects while holding other factors constant. This was significant at 5 percent significant level because the corresponding p-value was 0.000 ($p<0.05$). Regression model 2 had two main effects of resource mobilization (RM) and institutional support (IS) each with a regression coefficient of 0.202 ($p = 0.000$) and 0.570 ($p = 0.000$) respectively. In the second model, marginal increase in resource mobilization (RM) is associated to an increase of 0.202 in sustainability of water projects while holding institutional support constant. A marginal increase in institutional support leads to 0.570 increase in sustainability of water projects while holding resource mobilization constant. The second model shows diminishing effect of resource mobilization in the presence of institutional support showed by the reduction in regression coefficient (that is, from 0.443 to 0.202) although remaining significant ($p<0.05$).

The third regression model shows the interaction effect of resource mobilization and institutional support (RM*IS) as the third predictor. This interaction term had a regression coefficient of 0.001 ($p=0.883$, > 0.05) which indicates statistically insignificant positive moderation effect. The statistical inference is that institutional support does not moderate the relationship between resource mobilization and sustainability of water projects. Figure 3 shows the diagrammatic representation of the moderation effect of institutional support at 16^{th}, 50^{th} and 84^{th} percentiles representing low, moderate and high moderation respectively for combined users and executive committee members.

4.4 Conclusion on Sustainable Water Projects and Resource Mobilization Strategy

The study has established that there exists a significant relationship between resource mobilization and sustainability of water projects at 5 percent significance level with observed p-values of 0.000 ($p<0.05$), 0.002 ($p<0.05$) and 0.000 ($p<0.05$) for users, executive committee members and combined data respectively. There was no statistical significant moderation effect of institutional support on the relationship between resource mobilization and sustainability of water projects with the interaction terms having observed p-values of 0.807 ($p>0.05$), 0.410 ($p>0.05$) and 0.883 ($p>0.05$) for users, executive committee members and combined data respectively. However, the study established positive moderation effect of institutional support (albeit insignificantly) for user and combined data with regression coefficients for interaction terms being 0.002 and 0.001 respectively. The moderation was however negative for executive committee members with regression coefficient of interaction term being - 0.037.It is therefore evident from the research that both resource mobilization strategy and institutional support independently promote sustainable water projects. However, institutional support, has a positive moderation effect on resource moderation although insignificant.

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5.0 Conclusion

The findings indicated that WRUAs formulate and implement strategies in water management that create an advantage in promoting sustainable water projects. Continuous user participation and engagement in WRUA planned activities are instrumental to the survival of all actors in water resource management. Despite use of WRUA resource mobilization strategies to promote sustainable water projects, water resources which are most required by living things to survive are on decline and there is low water flow in rivers. Yet, WRUAs have inadequate resources to enable implementation of their strategies to promote water conservation activities that ensure water flow in rivers. Adequate water flow in rivers would provide adequate water for both upstream and downstream users to support livelihood activities. It was concluded that all stakeholders should put concerted effort to raise resource base of WRUAs to enable the implementation of planned strategies.

There was an agreement that effective resource mobilization strategy, require continuous sensitization of all stakeholders to raise awareness of the benefits of catchment protection in order to motivate them provide more resources. WRUA members would be encouraged to willingly provide resources, labor, material, knowledge and time required to promote sustainable projects. Further, mobilized resources from donors, development partners would be combined with those received locally and used to implement planned strategies hence breaking dependency on external sources and promoting sustainable water projects.

6.0 Recommendation based on Resource Mobilization strategy

The study recommends that WRUAs should leverage on mobilizing support from all stakeholders to mobilize resources to implement the formulated strategies. Mobilized resources should include finances, labor, material, skills and time. Proposals for funding should be written to explore collaborations and mobilize support from donors and industrialists who rely on water resource for production. Further users can be trained on modern methods of farming by use of little water for farming and in turn get money to finance WRUA activities.

The government should provide more resources to enable implementation of WRUA activities as planned in the sub catchment plans. Available resources can be used to train WRUAs on appropriate farming methods to support intense agricultural activities while conserving the water catchment. The mobilized resources can further be used to control water abstraction, check encroachment of protected riparian land, monitor infrastructure conditions increase afforestation on wetlands and protect spring heads from pollution.

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References

Al-Mohannad, H. I. (2003). Controlling Water Demand in Qatar: An Assessment. *In: AMBIO, (32),* 362-366.

Asante, K. (2010). *Opportunities and Challenges of Community-Based Rural Drinking Water Supplies -An Analysis of Water and Sanitation Committees in Ghana.* Accra: International Food Policy Research Institute.

Babbie, E. R. (2011). *The basics of social research, (5th Ed.).* Belmonte: Cengage Learning.

Baker, J. L. (2000). *Evaluating the impact of development projects on poverty: A handbook for practitioners.* Washington (D. C.): World Bank.

Barakat, E. (2009). *IWRM I branch canal water user association Assessment Report no. 5.* Integrated Water Resource Management I.

Braimah I., F. N. (2011). Community ownership and management of water and sanitation facilities: issues and prospects in the Nadowli district of the of the upper west region of Ghana. *Journal of Sustainable Development in Africa, 13*(2), 74–87.

Cornish, G., Bosworth, B., Perry, C. J., Burke, J. J., & Nations, F. and A. O. of the U. (2004). Water Charging in Irrigated Agriculture: An Analysis of International Experience. Food & Agriculture Org.

Creswell, J. (2015). *Educational Research: Planning, Conducting and Evaluationg Quantitative and Qualitative Research* (5th ed.). Boston, MA: Pearson.

Fadul Bashir, E. M. (2012). *Sharing the experiences among water users associations in spate irrigated schemes* . Kassala: Hydraulics Research Centre.

Government of Kenya. (2016). *Water Act 2016.* Retrieved 04 01, 2016, from Water Services Regulatory Board: https://wasreb.go.ke/downloads/Water Act 2016.pdf

Hagen, J. M. (2002). *Causes and Consequences of Food Retailing Innovation in Developing Countries:Supermarkets in Vietnam.* New York: Cornell University.

Harvey, P., & Reed, R. (2004). *Rural Water Supply in Africa: Building Blocks for Sustainability.* Loughborough, UK: Water, Engineering, and Development Centre (WEDC).

Hirji, R., & Grey, D. (1997). Managing International Waters in Africa: Process and Progress. *5th Nile Conference on Comprehensive Water Resources Development of the Nile Basin: Basis for Cooperation.* Addis Ababa, Ethiopia.

Hutton, G., & Batram, J. (2008). *Regional and Global Costs of Attaining the Water Supply and Sanitation Target (Target 10) of the Millennium Development Goals.* Geneva:

Kolavalli, S., & Brewer, J. D. (1999). Facilitating user participation in irrigation management. *Irrigation and Drainage Systems (13),* 249–273. doi:10.1023/A:1006211725291

Mumma, A. (2005). *New Water Law: An Analysis of the Implications for the Rural Poor* . London: African Centre for Technology Studies.

Reis, N., & Mollinga, P. (2009). *Microcredit for Rural Water Supply and Sanitation in the Mekong Delta; ZEF Working Paper Series.* Bonn: Department of Political and Cultural Change Center for Development Research, University of Bonn.

Uysal, O. K., & Atis, E. (2010). Assessing the performance of participatory irrigation management over time: A case study from Turkey. Agricultural Water Management. *Agricultural Water Management,* 1017 - 1025. doi:10.1016/j.agwat.2010.02.007

WCED. (1987). *Our Common Future.* Oxford: Oxford University Press.

Yakubov, M. (2011). Assesing Irrigation Performance from the farmers perspectives: A qualitative study: Irrigation and Drainage (Published online) doi:10.1002/ird.649.