

Decisions, Labor Contribution and Sustainability of Water Projects in Narok, Kenya



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ABSTRACT: In Kenya, most community-based water projects face sustainability challenges, thus prompting a need to examine the extent to which participation by beneficiaries' influence sustainability of community water projects. If this is successfully addressed, then sustainable development of community water projects is likely to be achieved. The purpose of this study was to establish the influence of participation on the sustainability of community water projects in Narok County, Kenya. The study was anchored on Asset Based Community Development (ABCD) model. Quantitative research approach was used while the study adopted descriptive research design and explanatory research design. A sample of 384 subjects was through simple random sampling from a sampling frame of 15,500 elements using Cochran's sample size determination formula in a population spread across the ten community water projects in Narok County, Kenya. Quantitative data was gathered by use of a questionnaire. Data was analyzed descriptively and inferentially. Inferential data was analyzed using mean scores and standard deviation. Data was also analyzed inferentially using correlation, regression and finally hypothesis testing was undertaken. Analysis showed $r = -0.019$, $F(1,383) = 70.349$, $R^2 = -0.019$ at $p = 0.01 < 0.05$, H_{01} was rejected and it was concluded that there is a significant relationship between decision making and sustainability of community water projects. With $r = 0.458$, $F(1,383) = 113.30$, $R^2 = 0.10$ at $p = 0.01 < 0.05$, H_{02} was rejected and it was concluded that there is a significant relationship between labour contributions and sustainability of community water projects. It was therefore recommended that community members who are such project beneficiaries be involved in decision making and where possible contribute towards project implementation right from inception to termination in order to create a sense of ownership and hence sustainability of community water projects upon completion.

KEYWORDS: Community participation, Decision making, Labor contribution, Sustainability of community water projects.

1. INTRODUCTION

Sustainability refers to the capacity of a system to be healthy and endure over a long period of time. The issue of sustainability in community water projects can be traced back to a sustainable development debate that shifted the community development focus from top-down to a bottom-up approach which ensured that community development agenda are people based (Fuimaono, 2012). World Bank sectoral policy paper of 1975 highlighted the importance of community participation in rural development projects (Mundial, 1975).

Despite the formulation of Millennium Development Goal (MDG) in the year 2000 to reduce the percentage of people lacking access to sustainable, safe drinking water, by 2015, most regions worldwide had not achieved these goals (World Bank 2017; World Economic Forum, (2015). Most water projects fail to operate optimally or even collapses immediately donor funds are withdrawn upon project termination (UNICEF & WHO, 2012). In addition, the World Health Organization (WHO) revealed that limited or lack of access to WASH services negatively affects communities' health, education, work efficiency, and labor productivity, to name but a few (Harlin & Kjellén, 2015; Water, 2015). The water shortage especially in semi-arid developing countries such as Narok, Kenya has been further witnessed during the Covid-19 pandemic that has left communities lacking

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enough water supply more vulnerable. World Bank report of 2013 attributed water shortage to lack of sustainability among community water projects (World Bank, 2013).

African countries face the most significant challenge in ensuring sustainability of community water projects. A joint monitoring program by WHO/UNICEF indicates that SDGs are unlikely to be achieved due to a high failure rate among community water projects in Africa (UNICEF/WHO, 2015). The report further reveals that only about 52% of the rural communities in Africa can access clean, reliable drinking water. Additionally, there is high water project failure rate among the Arid and Semi-Arid Lands (ASALs) of Africa (ENSDA, 2016). Regarding MDGs on water supply, a report by WHO in 2015 indicated that only 19 countries in Sub-Saharan Africa were on good cause towards meeting MDGs' on drinking-water and sanitation target (UNICEF & WHO, 2012).

Water scarcity has been the single greatest challenge among the Arid and Semi-Arid Lands (ASALs) in Kenya. One such area is Narok County, Kenya which is frequently faced with extreme water scarcity despite having several water projects (Achieno & Mwangangi, 2018). The county is endowed with several water projects, including water pans, dams, boreholes, and water springs that once supplied the households in Narok county, but have since become dilapidated because local communities were not involved in the entire project management life cycle (ENSDA, 2017).

The purpose of this study was to determine how decision making and beneficiary labour contributions influence community water projects.

The objectives of the study were;

- i. To determine the influence of decision-making on sustainability of community water projects in Narok County, Kenya.
- ii. To assess the the extent to which labour contribution influence sustainability of community water projects in Narok county, Kenya

The following hypotheses were tested:

- i. H_{01} : Decision-making has no significant influence on the sustainability of community water projects.
- ii. H_{02} : Labour contribution has no significant influence on the sustainability of community water projects.

2. LITERATURE REVIEW

Literature was reviewed in relation to sustainability of community water projects decision making and labour contributions.

Sustainability of Community Water Projects

UN General assembly is of the view that sustainability is best explained by the resilience concept, which means that flexibility of a system to dynamic conditions with the features such as the ability to overcome any harsh situations (Barkemeyer, Holt, Preuss, & Tsang, 2014). The theory of sustainability came about as a result of the work of Thomas Malthus (1766-1834) and David Ricardo (1772-1823) whose scholarly work on environmental limit concepts was based on an economic viewpoint of how humankind can conduct economically beneficial activities while protecting the natural resources, needs, and quality of life of future generations. In water projects, sustainability entails supplying the same quantity and quality of water throughout weather conditions and with a capacity of self- reorganizing (Brown & Williams, 2015).

Participation in decision making and sustainability of community water projects

Decision making is one of the critical drivers of sustainable community development, because it utilizes local knowledge and experience. Citizens must be given an initiative to make strategic decisions concerning the project stages, from design phase to long term operation and maintains upon termination of the water projects (Olajuyigbe, Nlekerem, and Ogunyewo, 2016). According to participation process (CP), communities should be involved in deciding types of projects to be installed, location, number of water sources, and ways of maintaining the operations (Madajewicz, Tompsett, & Habib, 2017). The project staff on their part have the responsibility of ensuring that decisions made are feasible, and they only play an advisory role. Information regarding project progress can be shared using communication means such as frequent correspondence and meetings, and mid-term/end-point monitoring (Muniu, Gakuu, and Rambo, 2017). This information is not limited to objectives, progress reports, plans and monitoring and evaluation feedback. According to Kathpalia and Kapoor (2002), constantly sharing information regarding the project progress is important in ensuring sustainability of community water project upon termination.

Related studies conducted by (Al-Sa'ed, Mohammed, & Lechner, 2012; Kisumbi, Omboto, & Nassiuma, 2017; Muniu et al., 2017) used mixed research designs and found that community participation in various aspects of decision-making influence sustainability of community water projects. To the contrary however, Marks, Komives nd Davis (2014) used cross-sectional design and established that community involvement in management related decisions have influence on sustainability of community water projects, while community involvement in technical decisions negatively influences sustainability of water projects. The indicators of community participation identified by this study includes level of; information sharing, consultation, and action initiation.

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Information occurs when project beneficiaries are informed about the project objectives and its importance on their lives; consultation means that people are asked to give views on key issues and their views are implemented.

Participation in labor contribution and sustainability of community water projects

Own labor is one key significant local resources readily available at the disposal of the community. Labor contribution refers to the provision of either paid or unpaid toil by community members for project work and can broadly be divided into skilled and unskilled labor (Ananga, 2015). Usually community members provide labor for clearing project site, excavating trenches to lay pipes, building water tanks, transporting construction materials to the sites, removing silts in dams reservoirs and water pans and repairing and maintaining water transport lines in post project period (Muniu et al., 2017).

Chesire (2018) while undertaking a study in Elgeyo Marakwet county and established that citizen participation is crucial in utilizing local labor and expertise to identify, design, and manage community projects in rural areas. Marks et al. (2014) also showed that the depth and not breadth of labor contribution is what enhances sustainability of community water projects. The indicators of labor contribution adopted by this study include; clearing project sites, transport of project materials, constructions and repairing of the project structures. However, Kaliba (2002) undertook a study on participatory evaluation of community-based water projects, and established that community provision of labor negatively influenced the economic efficiency of water projects.

3. Research Methodology

The study adopted descriptive survey research design and explanatory research design to establish the extent to which decision making and labour contributions influence sustainability of community water projects. The Study had a target population of 15,500 spread out in 10 (ten) community water projects in Narok County, Kenya namely; Emagutian, Enkosamai, Leshuta, Lekanga, Morijo Loita, Maji Moto, Narosura Ntuka, Ole Mesutie, ololooitikoshi, and Ololunga. Cochran's (1977) sample size determination formula was used to get the desired sample size.

$$n_o = \frac{(Z)^2 * (p)(q)}{(d)^2}$$

Where:-

n_o - The desired sample size

z - The standard normal deviation, set at 1.96, which corresponds to 95% confidence level

p - The proportion in the target population estimated to have a particular characteristic. If there is no reasonable estimate, then use 50 percent (the study used 0.50).

$q = 1.0 - p$

d = The degree of accuracy desired, here set at 0.05 corresponding to the 1.96.

In substitution, $n = (1.962 \times 0.5 \times (1-0.5)) / 0.0025 = 384$

The sampling design of beneficiaries in the (10) ten community water projects from where the desired sample was drawn is as shown in the table 1.

Table 1: Sampling Design

S/no	Name of water project	Number of beneficiaries project	of per	Proportion of the beneficiaries in the study population	No. of respondents picked for the study population as proportion desired sample
1.	Emagutian	1,000		0.065	25
2.	Enkosamai	500		0.032	12
3.	Leshuta	1,200		0.077	30
4.	Lekanga	1,000		0.065	25
5.	MorijoLoita	1,500		0.097	37
6.	Maji Moto	1500		0.097	37
7.	NarosuraNtuka	2,000		0.129	49
8.	OleMesutie	1,000		0.065	25
9.	Ololooitikoshi	800		0.052	20
10.	Ololunga	5,000		0.323	124
Total		15,500		1.000	384

Source: Narok Water Service Board (2019)

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Based on this sample size determination formula a sample size of 384 subjects was desired. Questionnaires were used to collect data from the respondents regarding on how decision making and labour contribution influence sustainability of community water projects in Narok County, Kenya. Cronbach alpha reliability coefficient was used to test the stability of items in the research instrument and a coefficient of 0.874 was obtained. This was considered high enough to render the instrument reliable for collection of dependable data.

4. DISCUSSIONS AND ANALYSIS

Out of 384 questionnaires distributed, 322 were duly administered giving the study 83.85% questionnaire return rate. The return rate was found to be high enough for generalization of the analyzed data. Objective one, was analyzed descriptively and the composite for decision making had a mean score of 3.66 with standard of 1.09 while sustainability of community water projects had a composite mean of 3.834 with standard deviation of 1.001. These results showed that majority of the respondents agreed that decision making have influence on sustainability of community water projects. While undertaking correlation analysis, assumption of homoscedasticity could not be upheld while test for collinearity for the regression residuals wasn't encountered. Therefore, regression model was found to exist and it established the strength and dependence of dependent variables on the independent variables R^2 values. A summary of correlation of the dependent variable and independent variables are summarized in table 2.

Table 2: Multi-collinearity Test

	Sustainability of community water projects	Decision making	Labour contribution
Sustainability of community water projects	1	-.019**	.458*
Decision making	-.019**	1	.224
Labour contribution	.458*	.224	1

Inferential statistical analysis was undertaken to determine dependence and direction of predictor and dependent variables. Analysis showed that a weak negative correlation of -0.019 existed between decision making and sustainability of community water projects. Regression model for decision making and sustainability of community water projects was developed as follows; ANOVA Statistics for decision making on sustainability of community water projects is shown in table 3.

Table 3: ANOVA Statistics of decision making on sustainability of community water projects

Model	Sum of Squares	df.	Mean Square	F	Sig.
Regression	15.004	1	15.004	F(1,383)	0.00
Residual	4207.690	383	0.326	= 70.349	
Total	105	384	0,380		
R-squared = 0.04		Adj. R-squared = -0.10		Root MSE = .571	

The statistic, $F(1, 383) = 70.349$ at $p < 0.05$, shows that the regression model is statistically significant in predicting the dependent variable. The $R^2 = 0.10$ indicate that 10.00 per cent in sustainability of community water projects was explained by decision making. Regression analysis result for the influence of decision making on sustainability of community water projects is shown in table 4.

Table 4: Coefficient of decision making on sustainability of community water projects

Performance of water projects	Unstandardized Coefficient	Standardized beta	Std. Err	t	P>t
Constant	3.902		.194	20.145	0.000
Decision making	-.020	0.47	-.022	-.433	0.665

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$$Y = \beta_0 + \beta_1 X_1 + \varepsilon$$

Where; Y = indicators of sustainability of community water projects (Dependent Variable),

β_0 = beta coefficient or the y - intercept,

β_1 = beta coefficient of sustainability of community water projects,

X_1 = indicators of decision making,

ε = error term.

The regression equation indicates that predicted sustainability of community water projects = $3.902 + 0.47$ (decision making). The results indicate that a unit increase in decision making results in 0.47-unit increase in sustainability of community water projects.

Null hypothesis that decision-making has no significant influence on the sustainability of community water projects was rejected and it was concluded that decision making by community members has a significant influence on sustainability of community water projects. These results show that decision making by project beneficiaries significantly influence sustainability of community water projects. These results are consistent with what Muniu, Gakuu and Rambo, (2017) established when they used descriptive research design while seeking to determine influence of decision making on sustainability of community water projects in Nyeri County. Similarly, Kisumbi and Nassiuma, (2017): Mohammad, (2010), established that project decision making positively influenced sustainability of water projects.

These results are therefore confirmatory.

In objective two, data was analyzed and composite mean score of labour contribution was 3.81 with standard deviation of 0.972 while composite sustainability of community water projects had mean score of 3.834 and standard deviation of 1.001. from decision point of view results showed that majority of the respondents agreed that labour contribution members of the community have influence on sustainability of community water projects.

ANOVA Statistics for labour contributions on sustainability of community water projects is shown in table 5.

Table 5: ANOVA Statistics on labour contribution on sustainability of community water projects

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	11.061	1	11.061	F(1, 383) = 113.30	0.01
Residual	92.487	383	.340		
Total	103.549	384	.379		
R-squared = .234		Adj R-squared = .222		Root MSE= .543	

The statistic, $F(1, 383) = 70.349$, $p < 0.05$, shows that the regression model is statistically significant in predicting the dependent variable. The $R^2 = 0.222$ indicate that 22.22 per cent in sustainability of community water projects was explained by labour contribution as shown in table 5.

Regression analysis result for the influence of decision making on sustainability of community water projects is shown in table 6.

Table 6: Coefficient of labour contribution on sustainability of community water projects

Performance of water projects	Unstandardized Coefficient	Standardized beta	Std. Err	T	P > t
Constant	2.027		.209	8.276	0.000
Labour contribution	.595	.056	.060	10.644	0.000

$$Y = \beta_0 + \beta_2 X_2 + \varepsilon$$

Where; Y = indicators of sustainability of community water projects (Dependent Variable),

β_0 = beta coefficient or the y - intercept,

β_2 = beta coefficient of sustainability of community water projects,

X_2 = indicators of labour contribution,

ε = error term.

The regression equation indicates that the predicted sustainability of community water projects = $2.027 + 0.056$ (labour contribution).

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Null hypothesis 2: that labour contribution by community members has no significant influence on the sustainability of water was rejected and it was concluded that labour contribution has a significant influence on sustainability of community water projects. These results indicate that labour contributed by project beneficiaries significantly influenced the level of sustainability of community water projects. These findings are consistent with study finding by Nyakwaka, Muronga, and Muvumbi, (2018) in which they established that community labour contribution enhances ownership and ultimately sustainability of the water projects. Marks, Komives and Davis, (2014) similarly confirmed that depth and not breadth of labor contributions influence sustainability of water projects. However, Kaliba, (2002) disagreed with these findings when he undertook a study on participatory evaluation of community-based water projects, and observed that community provision of labour negatively influenced the economic efficiency of water projects. Despite divergence in finding, however, the study results confirmatory.

CONCLUSIONS

This study examined how decision making and labour contributions influence sustainability of community water projects. For objective one the concludes that sustained involvement of community members in decision making during the project management life cycle gives them legitimacy to participate an act which eventually translates into sustainability of community water projects. This therefore implies that decision-making by community members has no significant influence on the sustainability of water projects. For objective two, the study concludes that labour contributions by members of the community during water project implementation offers them a sense of ownership an attribute that ensures sustainability of the water project. This study therefore concludes that both decision making and labour contributions by project beneficiaries is critical in enhancing sustainability of community water projects. It is therefore recommended that community members should be given an opportunity to make decisions and also offer labour whether skilled or unskilled in order to secure their involvement even after the project funding ends, because involvement guarantees sense of ownership which ensures sustainability upon project termination.

REFERENCES

- 1) Achieno, G. O., & Mwangangi, P. (2018). Determinants of Sustainability of Rural Community Based Water Projects in Narok County, Kenya. *International Journal of Entrepreneurship and Project Management*, 3(1), 41-57.
- 2) Al-Sa'ed, R., Mohammed, A., & Lechner, M. (2012). Community participation and local regulations for sustainable sanitation and water reuse in Anza village, Palestine.
- 3) Ananga, E. O. (2015). *The role of community participation in water production and management: Lessons from sustainable aid in Africa international sponsored water schemes in Kisumu, Kenya*: University of South Florida.
- 4) Bank, W. (2017). *Atlas of Sustainable Development Goals 2017: From World Development Indicators*: The World Bank.
- 5) Barkemeyer, R., Holt, D., Preuss, L., & Tsang, S. (2014). What happened to the 'development' in sustainable development? Business guidelines two decades after Brundtland. *Sustainable development*, 22(1), 15-32.
- 6) Brown, E. D., & Williams, B. K. (2015). Resilience and resource management. *Environmental management*, 56(6), 1416-1427.
- 7) CHESIRE, M. A. (2018). *Impacts Of Water Users Participation On The Outcomes Of Rural Water Development Projects In Elgeyo–Marakwet County, Kenya*. School Of Arts And Social Sciences In Partial Fulfilment Of The Requirements.
- 8) Creswell, J. W. (2014). *A concise introduction to mixed methods research*: SAGE publications.
- 9) ENSDA (2016). End of year Monitoring and Evaluation report implemented projects in Narok
- 10) ENSDA (2017). An assessment of status of water project implementation, Narok County, Kenya
- 11) Fuimaono, R. S. (2012). *The asset-based community development (ABCD) approach in action: an analysis of the work of two NGOs in Samoa*: Unpublished thesis. Massey University, Palmerston North, New Zealand. Massey University.
- 12) George, D., & Mallery, P. (2019). *IBM SPSS statistics 26 step by step: A simple guide and reference*: Routledge.
- 13) Harlin, J., & Kjellén, M. (2015). Water and development: from MDGs towards SDGs. *Water for development—charting a water wise path, SIWI report*, 35, 8-14.
- 14) Kaliba, A. R. (2002). *Participatory evaluation of community-based water and sanitation programs: the case of central Tanzania*: Kansas State University.
- 15) Kathpalia, G., & Kapoor, R. (2002). Water policy and action plan for India 2020: An alternative. *Alternative Future*, 1-33.
- 16) Kisumbi, C. K., Omboto, P. I., & Nassiuma, B. (2017). Role of Citizen Participation in Sustainability of Water Projects in Makueni County, Kenya. *International Journal of Innovative Research and Development*, 6(11), 1-15.
- 17) Kisumbi, C., & Nassiuma, B. (2017). Effects of Stakeholders' Non-participation on sustainability of Water Projects in Kenya. *International Journal of Innovative Research and Development*, 6. doi: 10.24940/ijird/2017/v6/i11/NOV17039

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- 18) Madajewicz, M., Tompsett, A., & Habib, A. (2017). Community Participation in Decision-Making—Evidence from an Experiment in Safe Drinking Water Provision in Bangladesh: Working Paper.
- 19) Marks, S. J., Komives, K., & Davis, J. (2014). Community participation and water supply sustainability: evidence from handpump projects in rural Ghana. *Journal of Planning Education and Research*, 34(3), 276-286.
- 20) Mundial, B. (1975). *Health: Sector Policy Paper*.
- 21) Muniu, F. N., Gakuu, C. M., & Rambo, C. M. (2017). Community Participation in Project Decision Making and Sustainability of Community Water Projects in Kenya. *IOSR Journal of Humanities and Social Science (IOSR-JHSS)*, 22(7), 10-24.
- 22) Nyakwaka, S., & Benard, M. K. (2019). Factors Influencing Sustainability of Community Operated Water Projects in Central Nyakach Sub-County, Kisumu County, Kenya. *International Journal Of Academic Research In Business And Social Sciences*, 9(7).
- 23) Risks, G. (2015). World economic forum. *Insight Report. 10th Edition. Retrived from: http://www3.weforum.org/docs/WEF_Global_Risks_2015_Report15.pdf*.
- 24) Water, U. (2015). Consolidated technical input from UN agencies on water and sanitation related indicators.
- 25) Wong, C. C., & Hiew, P. L. (2005). *Diffusion of mobile entertainment in Malaysia: Drivers and barriers*. Paper presented at the WEC (5).
- 26) World Bank (2013). Africa Development Indicators 2012/2013: The World Bank.
- 27) World Economic Forum (2015). Global Risks 2015, 10th Edition. Geneva: World Economic Forum.