



DETERMINANTS OF RESOURCE PLANNING ON IMPLEMENTATION OF WATER CONSTRUCTION PROJECTS IN BOMET COUNTY, KENYA

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ABSTRACT

Global demand for agricultural and energy production (mainly food and electricity), both water-intensive, is expected to rise by about 60% and 80% by 2025. At the same time, wetter regions generally becoming wetter and drier regions becoming even drier. These aspects of global change illustrate the need for swift planning and execution of strategic, reasonable and effective management and counter measures against deteriorating water security. It is a serious challenge to provide water and sanitation facilities in today's world to a population of 6 billion people. Water supply and sanitation in Bomet is characterized by poor levels supply. The main objective of this study was to examine the influence of resource planning on implementation of water projects in Bomet County, Kenya. Resource bases theory was used to guide this study. The study used descriptive survey design. Data was collected by use of self-administered Questionnaires. The study targeted 440 respondents and the sample size was 164 respondents. This study carried out a census on 88 initiated water projects in the county of Bomet. Pre-test study was administered to 18 respondents of Kajiado County to test the reliability and validity of the instruments. Data was collected through self-administered questionnaires. Regression analysis was used to measure the relationship between variables on influence of resource planning and implementation of water projects with the help of Statistical Package for Social Science (SPSS) and Analysis of Moment Structures (AMOS) software. Further analysis was done to test the significance of the model by use of Analysis of Variance (ANOVA) and R^2 so as to measure the extent of the goodness of fit of the regression model. Hypothesis was tested by use of t-test at 95% confidence level. The results showed that resource planning significantly influenced implementation of water project with the F statistics value 55.179 and P-value of 0.000. The coefficient determination of explanatory variable explains 52.7% of the variations. In conclusion, therefore resource planning influenced implementation of water projects with R of 0.726 . Based on the study findings, it is concluded that resources are well utilized while implementing water projects in the county of Bomet. The county government of Bomet should therefore lay down a clear plan to source and fund for resources before the project commences and how the resources will be utilized to the end of the project. The study recommends that Arid and Semi-Arid regions can replicate the findings of this study to improve on accessibility to safe and clean drinking water to the citizens.

Key words: Resource Planning, water projects, Implementation

BACKGROUND

Globally, there is need for environmental planners to protect the resources that humans and the wider biosphere depend upon for their long-term survival (Carter, 2017). Water is just one of a number of vital natural resources and water project managers, whether in government or private sectors; has to make difficult water allocation decisions. They have to increasingly allocate decreasing supplies among ever-increasing demands. The stress on water resources is further increase by drivers such as demographic and climatic changes. The traditional fragmented approach is no longer viable and it is essential to adopt a holistic approach to water management. According to UN-water (2015), this is the rationale for the Integrated Water Resources Management (IWRM) approach, which has now been internationally accepted as the way forward for the efficient, equitable and sustainable development and management of the world's limited water resources and to meet conflicting demands.

In Africa, water shortages are related to both under-development of potentially available water resources and their uneven distribution while conserving the catchments' sustainability. The study by Price Water Coopers which covered all major sectors in the global economy sampled from the organizations drawn from Africa, Asia, Australia, Europe, North America and South America, found out that 50% of business projects failed, and only 2% achieved 100% success (PWC, 2014).

Only 5% of Africa's cultivated land is irrigated and less than 10% of hydropower potential is utilized for electricity generation. Owing to rapid population growth and changes in socio-economic activities, urbanization and industrialization and the water- intensive lifestyles has greatly contributed to a global water crisis (UNEP, 2015).

The Kenya Vision 2030 aims to ensure that improved water and sanitation are available and accessible to all by 2030. One, among these strategies is the Water Act 2002 which relegated the Ministry of Water and Irrigation (MWI) to a policy and coordinating agency and vested the Water Resources Management Authority (WRMA) with the daily management of water resources, and the Water Service Regulatory Board (WASREB) with that of regulating water supply. In this framework, community water is supplied through the Water Service Providers (WSPs), thus excluding Water Resource Users' Associations (WRUAs) from supplying water services. The Act presents a number of changes in the water sector with the aim of improving services. This includes provision of regulation, management and development of water resources, water and sewerage services; and for other connected purposes (Chepyegon & Kamiya, 2018).

Little guidance is given in the legislation on how equitable distribution of water is applied to households and other sector demands. Furthermore, inequitable allocation of water is contributed by poor response to water rights, lack of transparency, lack of project finance and accountability in the Ministry of Water and Irrigation (MWI). Available Water Dams in the county does not have the ability to supply water continuously. The residents of this area are therefore in dire need of continuous supply of clean and safe water for their use.

The key elements of the national water and sanitation program include: a clear policy and legislative framework; an implementation program which has provided water infrastructure for over 9 million people in less than 10 years. Top-level political commitment to water and sanitation, sustained consistently over a long time period, is critically important to the success of national sector programs. Clear legislation is necessary to give guidance and confidence to all the agencies working in the sector. Devolution of authority from national to local government and communities improves the accountability of water and sanitation programs. The involvement of a wide range of local institutions, social, economic, civil society, and media empowers communities and stimulates development at the local scale. The sensitive, flexible, and country-specific support of external agencies can add significant momentum to progress in the water and sanitation sector (Chepyegon & Kamaiya, 2018).

Efforts by WSBS (the government's water infrastructure implementing agencies) to contribute towards this goal by increasing access to safe water and sanitation services in their areas of jurisdiction through infrastructure development remain a big challenge which calls for a concerted effort to address (WASREB Impact Report, 2016). Professional planning, implementation and monitoring of water projects would accelerate the achievement of this goal by ensuring that the projects are completed within the allocated time, cost, quality and scope. While WSBS have been able to implement several investment projects under the umbrella of vision 2030 their investment realization level is still below par (Wasreb Impact Report, 2011).

Some of the major projects ongoing in the county include the proposed Bosto dam project by National Water Conservation and Pipeline Corporation. Majority of the water supply schemes in the county are pumping systems and the cost of power is quite high. To cut down the cost of operation in the water schemes, it is important to develop gravity systems in order to eliminate most of the pumping. There is also need to improve on water storage through construction of dams and rain water harvesting by roof catchment especially by institutions such as schools and dispensaries.

Resource planning is key component in project management. Therefore, this study sought to fill this knowledge gap owing to the fact that not much studies on resource planning have been done in Bomet. Bomet County was chosen based on the fact that scanty information exists in relation to resource planning and improved implementation of water projects. The study sought to determine the influence of resource planning on implementation of water construction projects in the County of Bomet, Kenya. It was hypothesized that resource planning has a positive influence on implementation of water construction projects in the County of Bomet.

JUSTIFICATION OF THE STUDY

Household access, distribution and management of improved accessibility of water planning including rural water supply coverage and maintenance of water distribution systems still remains a grey area that require further investigation. Adequate information is still required on basic daily minimum and maximum household water requirement from improved water sources

and the effectiveness of the current rain water harvesting techniques among rural communities in Bomet County.

Currently, the greatest undoing owing to lack of financial resources is the inadequate monitoring of water resources because it hampers the planning and management of water resources which are yet to expand beyond national waters to trans boundary waters. Decision-making in the county is dominated by knowledgeable individuals and this excludes the vulnerable groups such as women and the poor in the community, who often lose out in the process of water resource formulation because they lack the resources (knowledge, time, travel and money required to obtain formal authorization (UNDP, 2016).

The fact that local regulations for environmental flows is lacking, monitoring and controlling of water resources has not been thoroughly implemented (KNBS, 2016). The different activities such as deforestation, water abstraction for livestock and agricultural irrigation among others are heavily affecting the ecosystem (Ndambiri et. al., 2011), but the major cause of deteriorating access of quality household water demand from improved sources remains unknown.

This study will provide useful information to water utility companies on the influence of resource planning on implementation of water construction projects and give recommendations on ways to improve on implementation of ongoing and future recommended projects. BOMWACO can utilize the findings from the study to improve on policy framework for policy formulation and regulation.

Scope of the Study

This study sought to determine the influence of resource planning on implementation of water construction projects. The study focused on water project in the county of Bomet which is the unit of analysis. This includes county government water projects, water supply schemes, rehabilitation pan, irrigation schemes, springs and plastic water tanks. The unit of observation were project managers, finance managers, project consultant, site engineers and ward representatives of both operational and ongoing water projects.

LITERATURE REVIEW

Theoretical Framework

Brouwer, Faramarzi and Hoogendoorn (2014) defines theoretical framework as a group of concepts that are systematically organized to provide a tool for interpretation of information. It is considered as a visual or written product, one that explains in a narrative form, the main things to be studied, the key factors, concepts, or variables and the presumed relationships among them (Mohan & Ganesh, 2012). Theoretical framework can also be described as a set of broad ideas and principles taken from relevant fields of enquiry and used to structure a subsequent presentation (Vasquez, 2011). Scholars in project management have used various theories to explain influence of resource planning on managing projects. Theory of resource-based was used.

Resource Based Theory

Resource based theory (RBT) was proposed by Grant (1991). Awino and Marendi-Getuno (2014), postulate that resource-based view of the organization was introduced by Wernerfelt (1984) and later supported by Barney (1991) in his works. The theory highlights the significance of organizational resources and their effect on firm's performance and its competitiveness in the market. The theory asserts that each firm has a set of unique resources which are critical in ensuring the firm not only survives but also grows within the industry in which it operates. These resources range from technical, financial, physical and human, and they all contribute to the success of the project. However, according to Awino and Marendi-Getuno (2014), critiques of the theory have argued that while some resources promote competitive advantage of the firm, others do not. It can also be argued that mere presence of resources does not contribute to success until such resources are coordinated and integrated (Awino & Marendi-Getuno, 2014).

In respect to water projects, the resources available include the staff hired by the national and county governments and water companies, the finances collected and/or disbursed to them, and also the facilities including the infrastructure and water to facilitate the execution of various tasks that the said water projects are required to supply to the public. Relative to resource - based theory, the bundle of productive resources includes staff, finances and infrastructure among others. On the other hand, capabilities include the expertise possessed by the water project staff. Therefore, the theory is relevant to this study in that it is cognizant of the aforementioned resources and capabilities in water utilities in Kenya.

The theory offers critical and fundamental insights into why firms with valuable, rare, inimitable, and well-organized resources may enjoy superior performance (Barney, 2016). The resource-based theory was found relevant when it comes to determining the resources available when implementing water projects. According to (Colbert, 2004) it brings into considerations, the profitability and the value factor associated with the firm. As per this theory, the competitive advantage can be delivered to an organization when the organization is able to utilize its resources in unique and valuable manner than the competitors of the firm (Colbert, 2004).

Resource based theory implies that the organization can determine the resources available within them at the stage of planning. The theory also brings the concept of competitive advantage which is applicable in the completion of water projects to help them be financially self-reliant. This brings the projects more success in the emerging economy of the world (Das & Teng, 2000). Resources develop organizational capabilities to have sustained competitive advantage that led to positive economic and financial performance.

Resource-based theory is of the view that owning of resources is important, not easy to imitate, rare, and cannot be substituted. The resource-based theory asserts that organizations can take advantage of the internal resources to gain competitive advantage, which is the organization brand. Any construction project requires resources. The resources listed in the Resource Based View Theory such as technical, financial, physical and human are all utilized in every construction project.

This theory is deemed relevant to variable in resource planning owing to the fact that it supports implementation of water projects with the available resources. Project planning is key activity in the organization of projects. Lack of resources leads to project delays leading to cost overruns, and therefore planning resources ensures availability of resources both on time and quality. It helps in analyzing the effective use of resources in implementation of water projects in Bomet County.

THE CONCEPTUAL FRAMEWORK

Conceptual framework explains the relationships between independent variable and dependent variable. Kothari (2014) explained that independent variable is presumed to be the cause of the changes and influences of the dependent variable. In the conceptual framework depicted in the Figure below, resource planning is hypothesized to influence implementation of water construction projects. Resource planning is defined as manpower, financial, material and equipment's. Implementation of water construction projects is defined as number of water connected, customer satisfaction and revenue collected.

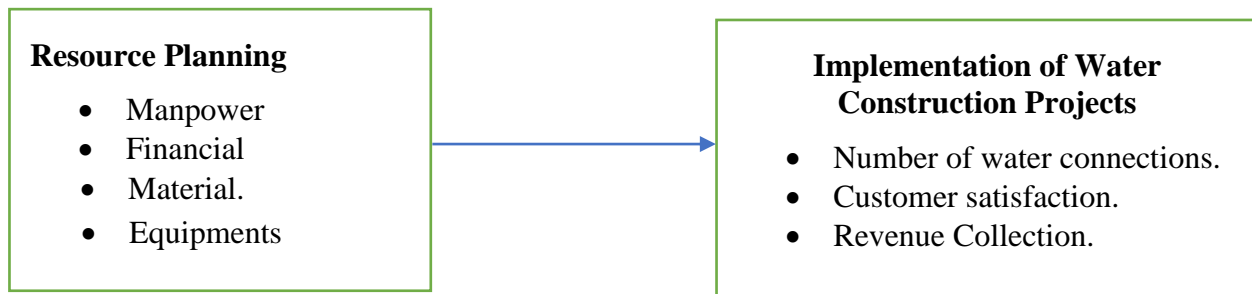


Fig 1 Conceptual Framework

Resource planning is quite important in the construction of projects due to the fact that lack or shortage of resources leads to stalled projects. The aim of water resources project planning may be use of constructed facilities, or structural measures, or by management and legal techniques that do not involve constructed facilities. The latter are called non-structural measures and may include rules to limit or control water and land use which complement or substitute for constructed facilities (Bubshait, 2014). A project may consist of one or more structural or non-structural resources. Water resources planning techniques are used to examine what measures should be adopted to resolve water needs and to take advantage of opportunities for water resources development, and also to preserve and enhance natural water resources and related land resources.

Resources are limited, and hence a project manager should plan for their use. Each person can be assigned to a duty in one place at a time, working on one task, matched to his or her unique skill set. Effective resource planning enhances delivery of projects on time regardless of shifting deadlines, changing priorities, and common project evolutions. Resource planning keeps utilization rates at a profitable level, reducing the non-billable time your resources spend on projects (Mutungi, 2018).

The scientific and technological development has been clearly evident during the twentieth century. But since water resources have been practiced for many centuries, the development in this field may not have been as spectacular as, say, for computer sciences. However, with the rapid development of substantial computational power resulting in lower computation costs, in the last century the planning strategies have seen new directions which using the best of the computer resources. Further, economic considerations used to be the guiding constraint for planning a water resources project. But during the last couple of decades of the twentieth century there has been a growing awareness for environmental sustainability. And now, environmental constraints find a significant place in the water resources project (or for that matter any developmental project) planning besides the usual economic and social constraints.

Water resource projects are constructed to develop or manage the available water resources for different purposes. According to the National Water Policy (2014), the water allocation priorities for planning and operation of water resource systems are for domestic consumption, irrigation, hydropower, industrial, ecology, navigation etc. The policy makers responsible for making comprehensive decisions of water resources planning are faced with various parameters.

EMPIRICAL REVIEW

According to Gebrehiwot and Gebrewahid, (2016), on the study of the need for agricultural water management in sub-Saharan Africa found out that water management policy focused on maximization of water use efficiency and water productivity should be prioritized in order to meet the food demand of the growing population and cope with water scarcity problems. According to (Muller & Tuner, 2014) the employment of agency can have a direct influence on decision-making effectiveness, it can compensate for organizational inadequacies of a process or political nature, and it can be constrained in the evidence of formal and effective organizational practices. Decision making for capacity expansion of water supply systems studies developed a systematic decision-making process for water supply capacity expansion using the analytic hierarchy process. The decision-making criteria were categorized into environmental, economic, technical and socio-cultural aspects Alhassan, et. al., (2015).

It is clear that challenges facing the water sector, ranging from water scarcity, water quality, population pressure, climate change, among others, are shared globally and the role of water sector management in confronting the challenges cannot be underestimated. In order for Kenya to meet its 2030 development agenda, the water problem is one of the issues that need to be addressed. (KNBS, 2014), observed that little research work has been done to uncover the challenges facing the Kenyan water sector.

Other studies have been conducted on the challenges faced by water projects in Kenya. Few studies have been carried out on the influence of resource planning being a core capability in the construction industry and project management processes. The majority of empirical studies have focused on project management practices, project performance and stakeholders' participation. This study sought to fill this knowledge research gap.

The literature also reviews that there are many underlying factors contributing to this phenomenon; among them financing, contract variations, poor construction management and inadequate control systems most of which occur during the construction phase. While it would be true to say that quite a number of authors have addressed the issue of resource planning for construction projects, the author feels that the subject of resource planning and implementation in the water sector is not well covered. This is due to a number of reasons which create a gap to be researched on.

RESEARCH DESIGN

A research design refers to the process that the investigator will follow from the inception to completion of the study (Cooper & Schindler, 2011; Kothari, 2014). A research design is an arrangement of conditions or collections (Neuman, 2011). The study adopted a descriptive survey design using both qualitative and quantitative approaches (Mugenda & Mugenda, 2003). Quantitative approach emphasizes measurement and data is analyzed in a numerical form to give precise description. According to (Mugenda & Mugenda, 2003), quantitative approach also known as the scientific method, has been considered as the traditional mode of inquiry in both research and evaluation. Quantitative approaches places emphasis on methodology, procedure and statistical measures to test hypothesis and make predictions.

TARGET POPULATION

A target population refers to the total of all possible elements fitting a given set of specification (Creswell, 2012). According to (Neuman, 2011), the primary purpose of sampling in research is to create a representative sample. The target population refers to the entire group of people, events or things of interest the researcher wishes to investigate (Bryman, 2012).

The target population of this study comprised of 440 respondents from each category involved in water projects in the county of Bomet. This included project managers, finance managers, project team leaders, project consultants and county administrators. Table 1 below presents the distribution of the projects. In total there are 88 projects and each represents the target category of respondent, which sum the total target population to 440 respondents.

Table 1 : Population of the Study

Serial No.	Population Category	Total
1.	Water Supply Scheme Projects	13
2.	CGB Water Projects	28
3.	Community Water Projects	23
4.	Proposed Water Projects	24
	TOTAL	88

SAMPLING FRAME

According to (Kothari, 2014), sampling frame is a list of members of the research population from which a random sample may be drawn. The sampling frame for this study was drawn from

both on going, completed and stalled water projects managed and funded by county government of Bomet, water supply schemes and community-based projects.

Table 2 : Respondents Sample Population

Serial No.	Population Category	Project Manager	Finance Managers	Project Consultant	Site Engineer	Ward Administrators	TOTAL
1.	Water Supply Scheme	13	13	13	13	13	65
2.	CGB Water Projects	28	28	28	28	28	140
3.	Community Water Projects	23	23	23	23	23	115
4.	Proposed Water Projects	24	24	24	24	24	120
	TOTAL	88	88	88	88	88	440

SAMPLE AND SAMPLING TECHNIQUE

A sample is a portion or part of the target population. According to (Mugenda & Mugenda, 2003), sampling enhances understanding about the characteristics of the entire population. This study used purposive sampling also known as deliberate sampling which involve deliberate selection of a particular unit of respondents. This technique ensured that each cluster is represented in the sample and is more accurate in reflecting the elements of the population (Kothari, 2014). The target respondents have been chosen because they are informative and have the required characteristics. In the determination of the of the sample size, the Slovia’s formula was used to calculate the sample size (at 95% confidence level and $\alpha = 0.05$) giving 164 respondents.

DATA COLLECTION INSTRUMENTS

According to (Saris, 2017) a questionnaire is self-report data collection research tool that each research participant fills out as part of research study. The researcher used this method because questionnaires are free from bias of the interviewee and at the same time the respondent has enough time to adequately give well thought out answers (Savin-Baden & Major, 2010).

RESEARCH FINDINGS

Distribution of respondent by Education

The findings in Table 3 indicate that majority of the respondents had a university degree represented by 54.2%. 40.5% had attained diploma level of education, 3.0% had attained master’s level of education, 2.3 % had attained PhD level of education. This showed that most of the respondents were knowledgeable and gave valid, reliable and more accurate response in regard to research question concerning the influence of resource planning on implementation of water construction projects in Bomet County, Kenya. The level of education therefore was very key in that the respondents were knowledgeable and highly skilled employees who improved productivity, enhanced quality of products and services, and are capable of effecting positive changes in processes of delivering quality service to customers.

Table 3 : Education of Respondents

	Frequency	Percent
PhD	3	13
Masters	4	28
Bachelor's Degree	71	23
Diploma	53	24
Total	131	100

FACTOR ANALYSIS

Resource Planning had eight items and from the original list of eight items put forward to measure the effect of Resource Planning, the principal component Analysis (PCA) method discarded no item. Factor loadings registered were ranging between 0.608 and 0.946 as shown in Table 4 There is sufficient trained personal in repairs and maintenance of water system had factor loading of .0 .769. There is enough technical & financial support from the NGOs, churches, in water system management, had factor loading of 0.758. Construction equipment's are available had factor loading of 0.946. The county government has put in place effective internal audit trails for all financial transactions within its purview had factor loading of 0.763. There is enough capacity within the locality on accessing and purchasing repair materials had a factor loading of 0.608. Materials for the construction of water projects are easily accessible had factor loading of 0.802, All employees have targets to achieve had factor loading of 0.874. The cost of constructions equipment's is affordable had factor loading of 0.834. From the finding, it was clear that all the items under consideration were valid.

Table 4: Factor loadings for Resource Planning **Factor Loadings**

There is sufficient trained personal in repairs and maintenance of water system.	.769
There is enough technical & financial support from the NGOs, churches, in water system management.	.758
Construction equipment's are available.	.946
The county government has put in place effective internal audit trails for all financial transactions within its purview.	.763
There is enough capacity within the locality on accessing and purchasing repair materials	.608
Materials for the construction of water projects are easily accessible	.802
All employees have targets to achieve	.874
The cost of constructions equipment's is affordable	.834
Total	.794

Instead of principle component analysis (PCA), Confirmatory factor analysis (CFA) was also employed to establish construct validity. In this case the study was conducted using fit indices. Lower values of fit indices indicate that the measurement model is a bad model because scales used to measure the dimensions of conceptual framework will always not be validated. For a good Confirmatory factor analysis (measurement model) model to be obtained, every factor loading of the CFA should be more than 0.50. Factor loading is simply described as the standardised value of each coefficient within the Confirmatory factor analysis model.

Table 5: Results of Confirmatory Factor Analysis (CFA)

RP1	<---		.541	1.000			
RP2	<---		.522	.924	.253	3.646	***
RP3	<---		.501	.620	.107	-.769	.442
RP4	<---	Resource Planning	.593	1.274	.301	4.229	***
RP5	<---		.635	1.417	.325	4.360	***
RP6	<---		.754	1.523	.328	4.648	***
RP7	←-		.549	1.208	.296	4.078	***
RP8	<---		.528	1.296	.324	3.998	***

DESCRIPTIVE STATISTICS OF STUDY VARIABLES

This section provides the research findings as presented in tables and the number of respondents per each test item for each variable. The main purpose of the study was to determine the influence of planning on implementation of water construction projects in Bomet County, Kenya. The study sought to establish if there is sufficient trained personal in repairs and maintenance of water system. The study found out that 20.1% of the respondents strongly disagreed. A further 27.2% of the respondents disagreed, 24.5% of the respondents were neutral, 25% of the respondents agreed while 3.3% of the respondents strongly agreed. Overall, 47.3% of the respondents generally disagreed that there is sufficient trained personal in repairs and maintenance of water system while 28.3% of the respondents generally agreed. It is important that there is sufficient trained personal in repairs and maintenance of water system.

The study also sought to establish if there is enough technical & financial support from the NGOs, churches, county government, in water system management. The study found that 16.3% of the respondents strongly disagreed that there is enough technical & financial support from the NGOs, churches, in water system management. A further 32.6% of the respondents disagreed, 37% of the respondents were neutral, 13% of the respondents agreed while, 1.1% of the respondents strongly agreed. Overall, 48.9% of the respondents disagreed that there is enough technical & financial support from the NGOs, churches, in water system management while 14.1% of the respondents generally agreed. A significant number of respondents (37%) were not sure whether or not there is enough technical & financial support from the NGOs, churches, in water system management.

The study further sought to establish if construction equipment's are available. The study found out that 14.1% of the respondents strongly disagreed. A further 26.6% of the respondents disagreed, 42.4% of the respondents were neutral, 13.6% of the respondents agreed while 3.3% of the respondents strongly agreed. Overall, 40.7% of the respondents generally disagreed while 16.9% of the respondents generally agreed. Another significant number of respondents (42.4%) of the respondents were not sure whether or not construction equipment's are available. This is in line with a study by Ogogo, Omwenga and Paul (2018) that concluded that resource planning enhances the performance of government construction projects in Kenya.

Table 6: Respondents opinion on Resource Planning

Statement	Strongly disagree	Disagree	Neutral	Agree (%)	Strongly agree	Totals
There is sufficient trained personal in repairs and maintenance of water system.	20.1	27.2	24.5	25	3.3	100
There is enough technical & financial support from the NGOs, churches, in water system management.	16.3	32.6	37	13	1.1	100
Construction equipment's are available.	14.1	26.6	42.4	13.6	3.3	100
The county government has put in place effective internal audit trails for all financial transactions within its purview.	11.4	28.8	39.7	17.9	2.2	100
There is enough capacity within the locality on accessing and purchasing repair materials	15.2	27.7	33.7	21.7	1.6	100
Materials for the construction of water projects are easily accessible	22.3	33.2	25	15.8	3.8	100
All employees have targets to achieve	37	42.9	15.2	1.6	3.3	100
The cost of constructions equipment's is affordable	26.1	30.4	35.9	6	1.6	100
Average	20.3	31.2	31.7	14.3	2.5	100

Implementation of Water Construction Projects

The study sought to establish whether resource planning of water projects has led to increased number of water connections in the county. The study found that 4.9% of the respondents strongly disagreed. A further 7.1% of the respondents disagreed, 11.4% of the respondents were neutral, 62% of the respondents agreed while 14.7% of the respondents strongly agreed. Overall, 12% of the respondents generally disagreed that planning of water projects has led to increased number of water connections in the county while 76.7% of the respondents generally agreed.

The study further sought to establish if the procedures of water connections have improved due to the role of resource planning in water construction projects. The study found that 6% of the respondents strongly disagreed. A further 11.4% of the respondents disagreed, 25% of the respondents were neutral, 48.9% of the respondents agreed while 8.7% of the respondents strongly agreed. Overall, 17.4% of the respondents generally disagreed while 57.6% of the respondents generally agreed.

The study further sought to establish if there is improved accessibility and availability of clean and safe water services in the county due to increased number of implemented water projects. The study found out that 5.4% of the respondents strongly disagreed. A further 15.8% of the respondents disagreed, 21.7% of the respondents were neutral, 43.5% of the respondents agreed while 13.6% of the respondents strongly agreed. Overall, 21.2% of the respondents generally disagreed that there is improved accessibility and availability of clean and safe water services in the county due to increased number of implemented water projects while 57.1% of the respondents generally agreed.

Table 7: Respondents Opinion on Implementation of Water Construction Projects

Statement	Strongly Disagree	Disagree	Neutral	Agree (%)	Strongly agree	Totals
Planning of water projects has led to increased number of water connections in the county	4.9	7.1	11.4	62	14.7	100
The procedures of water connections have improved due to the role of planning in water construction projects.	6	11.4	25	48.9	8.7	100
There is improved accessibility and availability of clean and safe water services in the county due to increased number of implemented water projects	5.4	15.8	21.7	43.5	13.6	100
Customers are satisfied with the implementation of water projects.	13.6	20.1	23.9	33.2	9.2	100
There is an increase in revenue collected due to increased number of implemented water projects in the county.	31	26.1	20.1	21.2	1.6	100
Average	13.8	18.3	21.1	38.6	8.2	100

DIAGNOSTIC TESTS

Sample Adequacy Test for the pilot study

To ascertain if the sample size was adequate enough to conduct principal component analysis Kaiser-Meyer-Olkin test was conducted. Kaiser-Meyer-Olkin test compares the values of the observed correlation coefficients with the values of the partial correlation coefficients thus confirming whether the sample size is adequate. The sampling adequacy value should always be more than 0.5 for acceptable or satisfactory factor analysis to be conducted. In this case a common criterion is that the researcher should have 10 – 15 participants per variable. According to (Field, 2009) factor analysis is only inappropriate when the sample size is less than 50. On the other hand, Saunder (2016), recommends a value 0.5 as minimum, values ranging between 0.7-0.8 are also acceptable, and values more than 0.9 are very good. The results shows that KMO values were ranging between 0.641 and 0.817 with the least value of 0.641 which was also good enough because it was above the minimum of 0.5 as indicated in Table 8.

Bartlett test of Sphericity other than Kaiser-Meyer-Olkin test was performed to establish how suitable the dataset is for principal component analysis (PCA) to be conducted. Should it happen that the null hypothesis is accepted based Bartlett test of Sphericity results then, the analysis should not proceed. Bartlett test of Sphericity normally detects whether the correlation matrix indicating the relationship among the indicator variables is an identity matrix. An identity matrix is also known as unit matrix and it is a matrix in which all the diagonal elements are ones and all off diagonal elements are zeros (Kothari,2009). The results suggest that the entire correlation matrix for all the variables indicators were unit matrices hence there was no multicollinearity amongst the indicators for all the variables.

REGRESSION ANALYSIS

The regression analysis was carried out to determine the relationship between the independent variables and the dependent variable. A simple regression was conducted involving running the least square regression model and interpreting the R² values to test the proportion of the variance in dependent variable from the independent variable and F values to measure coefficients and the suitability of the model confirm or reject the research hypotheses. The strength of the relationship was measured using correlation coefficient (R) or coefficient of determination R-square. The R-square is a value which shows how well the model fits the data and R-square value which is nearer to 1.0 suggest that the dependent variable entirely depends on the independent variables while a value nearer to 0 indicates no relationship at all between the explanatory variables and the dependent variable (King'oriah, 2004). The F test was used to determine the level of significance of the model by comparing the F value with the overall level of significance and P values.

Table 8: KMO and Bartlett's Test

Resource Planning (X4)		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.641
	Approx. Chi-Square	298.687
Bartlett's Test of Sphericity	Df	28
	Sig.	.000
Implementation of water constructions projects (Y)		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.817
	Approx. Chi-Square	218.813
Bartlett's Test of Sphericity	df	15
	Sig.	.000

RESOURCE PLANNING REGRESSION ANALYSIS

The study sought to determine whether there exists relationship between the Resource Planning and Implementation of water construction projects in Bomet County, Kenya. Regression analysis was performed. From the finding an R-square value of 0.300 was recorded indicating that 30.0% of implementation of water constructions projects was explained by the Resource Planning as shown on summary Table 9. The F-statistics presented in Table 9 indicated that the overall model was significant, that is, the independent variable, Resource Planning was a good joint explanatory for Implementation of water constructions projects with F-value of 47.018 with P-value of 0.000<0.05 showing that the model was fit when moderator is absent. Similarly, R-square value of 0.425 indicating that 42.4% of dependent variable was explained by resource planning. F-value presented was 55.179 with P-value of 0.000<0.05 showing that the model was fit in the presence of moderator.

The regression equations between resource planning and implementation of water constructions projects was; $Y = -3.054 + 0.264X_4$ and $Y = 2.222 + 0.282X_4 + 0.206X_4 * Z$ respectively. Based on these models formed it was clear that for every unit of resource planning, implementation of water constructions projects was increasing with 0.264. The finding is illustrated on Table 9 and

10 respectively. The findings further imply that there was a positive significant relationship between resource planning and implementation of water construction projects in Bomet County, Kenya. These findings collaborate with the findings by Akuno and Wanyoike (2020), whose study revealed that resource planning affected performance of elephant conservation projects to a large extent with a significant (value (p= 0.000)).

Table 9: Rregression Analysis for Resource Planning and Implementation of water constructions projects with no moderator.

Model	R	R Sq.	Adjusted R Sq.	Std. Error of the Estimate	Durbin-Watson
1	.547 ^a	.300	.294	.25830	1.642

a. Predictors: (Constant), Resource Planning

Analysis of Variance

Model		Sum of Sq.	Df.	Mean Sq.	F	Sig.
1	Reg	3.681	1	3.681	55.179	.000 ^b
	Residual.	8.607	129	.067		
	Total	12.288	130			

a. Dependent Variable: Implementation of water constructions projects

a. Predictors: (constant), Resource Planning.

Overall regression coefficients

	Un Std Coeff		Std Coeff	t	Sig.	Collinearity Statistics	
	B	Std. Er	Beta			Tolerance	VIF
(Constant)	3.054	.126		24.296	.000		
Resource Planning	.264	.035	.547	7.428	.000	1.000	1.000

Table 10 : Rregression Analysis for Resource Planning and Implementation of water constructions projects with moderator.

Model	R	R Sq.	Adjusted R Sq.	Std. Error of the Estimate	Durbin-Watson
1	.651 ^a	.424	.415	.23525	1.661

a. Predictors: (Constant), Resource Planning *Z and Implementation of water constructions projects.

Analysis of Variance

Model		Sum of Sq.	Df.	Mean Sq.	F	Sig.
1	Reg	5.204	2	2.602	47.018	.000 ^b
	Residual.	7.084	128	.055		
	Total	12.288	130			

a. Dependent Variable: Implementation of water constructions projects

b. Predictors: (constant), Resource Planning *Z.

Overall regression coefficients

	Un Std Coeff		Std Coeff	t	Sig.	Collinearity Statistics	
	B	Std. Er				Tolerance	VIF
(Constant)	2.222	.196		11.358	.000		
Resource Planning	.282	.033	.585	8.672	.000	.988	1.012
Resource Planning	.206	.039	.354	5.246	.000	.988	1.012

*Z

SUMMARY OF FINDINGS

This study investigated the relationship between resource planning and implementation of water construction projects in Bomet county, Kenya. In determining the influence of resource planning on implementation of water projects, the study sought to understand the extent to which manpower, materials, equipment’s and finance resources had on the implementation of water construction projects. Resource planning is quite important in the construction of projects due to the fact that lack or shortage of resources leads to stalled projects. Data analysis and interpretation of the interview and questionnaire responses for the project managers, finance managers, project consultants, site engineers and ward administrators in Bomet County revealed that resource planning influences implementation of water construction projects in Bomet County Kenya. This is because resource planning keeps utilization rates at a profitable level, reducing the non-billable time resources spend on projects.

Resource planning involves determining what resources (people, equipment, materials, etc.) are needed in what quantities to perform project activities. Findings from the study established that resource planning has its place in the implementation process hence highlighting the significance of organizational resources and their effect on firm’s performance and its competitiveness in the market. Bomet county has a set of unique resources which are critical in ensuring that county projects especially water projects not only survive but also grows to enable them achieve their mission and vision. These resources range from technical, financial, physical and human, and they all contributed to the success of the project. Resource planning is therefore seen to support implementation of water projects with the available resources.

CONCLUSIONS

Based on the study findings it can be concluded that manpower, materials, equipment’s and finance resources in the study influences implementation of water construction projects Water is an essential commodity and therefore. it is the mandate of every government to provide water to its citizens as recommended through the Millennium Development Goals (MDG).

Based on the study findings, it is concluded that resources are well utilized while implementing water projects in the county of Bomet. Owing to Resource planning; water projects have been successfully implemented. The county government of Bomet should therefore lay down a clear plan to source and fund for resources before the project commences and how the resources will be utilized to the end of the project. Project managers should also be keen in monitoring the project process to improve accessibility to water resources.

RECOMENDATIONS

In view of the conclusions drawn from the objective on resource planning, the study recommends that project managers need to develop project resource plan that should include aspect that pertains to every resource necessary for project from beginning to end.

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