

# EFFECT OF PROJECT MANAGEMENT PRACTICES ON PERFORMANCE OF SOLID WASTE PROJECTS: A CASE OF KERICHO COUNTY

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**Abstract:** Solid waste management is the collection, treatment and disposal of solid materials that are discarded by purpose or no longer useful. Inadequate collection, recycling or treatment and uncontrolled disposal of waste in dumps can lead to severe hazards, such as health risks and environmental pollution. This study examined the effect of project management practices on performance of solid wastes in Kericho County. Specifically the study sought to; analyze the effect of project: planning, risk, stakeholders, policies on performance of solid wastes projects in Kericho County; using the theories of: theory of waste management, stakeholder theory, prospect theory and zero waste theory, all which relate to solid wastes management. The study adopted descriptive research design and the target population was 200 staffs. The study specifically sought information from county SWM heads and workers as the main respondents, since they directly managed SWM projects. The research study also adopted, a simple random sampling technique, so as to ensure that results were not unbiased. The study found that project planning had a significant, direct relationship with performance of SW projects. Project stakeholders also had a significant strong direct relationship with performance of SW projects. As for project risk, the study found a significant moderate relationship with performance of SW projects in Kereicho County. And finally project policy had a significant but weak correlation with performance of SW projects in Kenya. All the Predictors were significant and explained 52.6% change in performance.

**Keywords:** Project Management Practices, Solid Waste Projects, Project Policy, Performance of projects.

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## 1. INTRODUCTION

[1] defined solid waste as any unwanted materials or objects', discarded after use; generally known as, trash, garbage, rubbish, or junks and are either organic or inorganic. In addition, characteristics of wastes in general are in the form of, solid, liquid or gas. Following the onset of industrialization and sustained urbanization, large population growths sprouted in major city centres of Europe [2]. Consequently waste started to build up in the cities with rapid deterioration of the general quality of life. This triggered waste collections and separation before it was taken to dumpsites; a process that ratified solid waste management (SWM).

However, early organized solid waste management projects, according to [3] were started in London in the 18th century, as means of recovering dust from coal ash; projects that were 100% effective. They were therefore, the early organized solid waste management projects, which were successful till mid1850s, when the value of dust recovery collapsed. In United States of America (USA) according to [2] solid waste management projects were first witnessed in the19th century in public health sector. However, to date as [4] argued, solid waste generation in United States is quite alarming, due to industrialization and change of human life style. As a result, 289 million tons of solid wastes generated annually, are dumped in landfills, without control. In addition, [5] argued that, 3.8 million tons of solid waste generated in New York City, 76% alone, is randomly dumped openly. [6] stated that, solid waste in Asian Cities is burned openly at landfills and

dumpsites, contributing heavily to global warming. In addition, this makes Asia to be among the leading greenhouse gases (GHG) emitters, in the world; predicated to double in the next 20 years [7]. It therefore implies that, quality and sustainable SWM projects implementation, will take a long time, before it fits seamlessly into human nature globally. In Africa, [8] argued that, 36% of the people live in urban centres, a share that is expected to reach 65 per cent by 2050. As a result, [9] solid waste valuation report predicted that, Africa will therefore generate twice as much, with consequent repercussions' to human health and environment.

In Kenya, [10] evaluation report claims that, on average 45 per cent of solid waste generated remains uncollected. Further as NECC report stated, this waste increases at the rate of 6000 tons per day, in the major towns of Nairobi, Kisumu, Thika, Nakuru, Mombasa and Eldoret. Among them, Nairobi the Kenya's largest city, generates 1700 tons solid wastes daily, being followed closely by Mombasa the second largest city with 770 tons of waste generation, per day [11] With so many donor funded SWM projects, as [12] argued, only 25% of solid wastes are recycled, with the remaining share being dumped in open landfills. [13] argued that, Kenyans should change their perception and attitude to stop distancing themselves from solid waste management projects, as this could change the whole concept into income and energy generations. Generation of solid waste in Kenya according to [14] is estimated to be 6,000 tons per day mostly in the major towns. However, only 3,962 tons are collected with over 2,000 tons remaining uncollected. At the same time the country is experiencing rapid urbanization, accompanied by solid waste generation increase, which stands at 4 million tons per year, predicted to double by 2030 [13]. Solid wastes management in Kenya counties as [14] argued remains a challenge, with heaps of garbage witnessed in almost all urban centres. Nevertheless, solid wastes projects are always undertaken in Kenya with various stakeholders, geared at managing this menace. Logically therefore, the concept of solid waste management projects is a global challenge, even in the developed world [15].

## **2. STATEMENT OF THE PROBLEM**

The complexity and dynamism of Solid wastes globally presents to urban centres great challenges, however with much untapped opportunities [16], [17]. Nevertheless, their fast pile ups, poses threats, to public and environment, with more than half of the world's population lacking access to regular and sustainable quality collection to the extent that, illegal dump sites serves more than 4 billion people and holds 40% of the world's wastes garbage [18]. In addition, costs inactions (hidden costs), related to, health care costs, lost productivity, flood damages, and business damage, combined, costs societies globally, 5 to 10 times higher than financial costs, for ensuring proper solid wastes management [19].

As a result of this global challenge, [20] reports claimed that, solid wastes related infectious diseases, cause up to 9 million deaths annually, where 94% are from lower and middle income countries. However, this continues to increase, despite World Bank undertaking 534 solid wastes intervening projects globally, at the cost of US\$43 billion, almost every year. In addition, according to [21] study, 12.6 million people of the age ranging from 7 to 35 years are estimated to die from wastes related environmental health infections every year, making wastes infections to be the fourth highest, contributor of premature deaths, worldwide. In Kenya, on the other hand, despite government's major initiatives on SWM projects, as stipulated in Sessional Paper No.13 of 2014 which, developed National Solid Waste Management Strategy (NWMS) 2015 to monitor its implementation in the 47 counties, SWs projects unsustainability challenges still exists, contributing to child's mortality deaths in slums of 10% , 2.5 times higher than non-slum areas. In addition, Kenya county governments, allocates a quarter of their budget to SWM projects, however, 75% of the solid wastes generated daily, are still dumped on illegal dumpsites, due to lack of sustainable solid waste projects [22].

[23] Kenya solid waste management report revealed that, current generation stands at 4 million tons per year, which is left uncollected, due to lack of sustainable solid waste projects in Kenya county urban centres. In Mombasa, a county in the coastal region, [24] argued that, 85% of solid wastes generated daily, are burned openly at illegal open dumpsites with smoke and smell of rotten garbage engulfing city island entrance, due to lack organized solid wastes projects. This scenario shows the extent of unsustainable solid wastes projects and their related hazards in Kenya. In Kericho, on the other hand, it generates approximately 1,200 tons of wastes garbage daily, where only 35 percent are collected, with the remaining 65 percent left uncollected, posing health risk to residents according to Kericho county report of 2017). To help fill this gap, the study sought to attain the following objectives:

### **1) General Objective**

The general objective for this research study was to examine the effect of project management practices on performance of solid wastes projects in Kericho County.

## 2) Specific Objectives

The study specifically addressed the following outlined objectives;

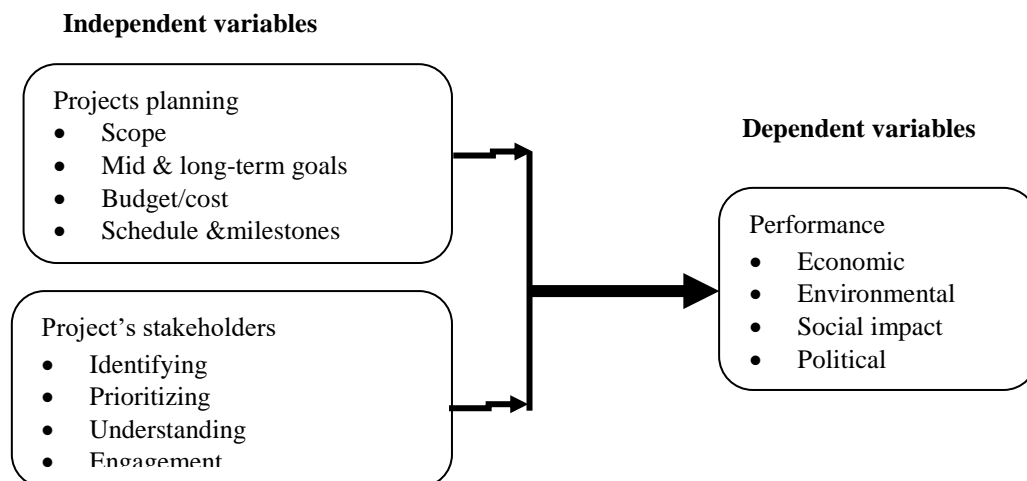
- a) To analyze the effect of project planning on performance of solid wastes projects in Kericho County.
- b) To investigate the effect of project stakeholders management on performance of solid wastes projects in Kericho County.
- c) To examine the effect of project risk on performance of solid wastes projects in Kericho County.
- d) To determine the effect of project policy on performance of solid wastes projects in Kericho County.

## 3. THEORETICAL REVIEW

This research was rooted on concepts and principles, of three SWM projects, relevant theories and as such unveil the basis of knowledge behind the study. These are: Theory of Waste Management (TWM), Zero Waste (ZW) theory and Theory of Change (ToC). Their principles and concepts was used to support the research study. Theory of Wastes Management (TWM), ensures wastes projects, are designed to achieve sustainability. The concept was used as to guide the research study analyze the effect of project planning on performance of solid wastes projects in Kericho County. Stakeholder's Theory explain how organizations, institutes or projects should be and how it should be conceptualized [25]. The management of the projects or organizations operating within a particular community must act as the stockholder's agent to ensure the survival of the projects, or organization.to safeguard the long term stakes of each group [26]. The concept of Zero Waste (ZW) theory relates to the concept of products life cycle, in that, solid wastes undergoes different life cycle stages, from useful products through source wastes separation, coordinated collection, to recycling centres and back to useful recycled products [27] . The principle of this theory is thus rooted on elimination of solid wastes/waste, based on voluntary participation and cooperation of different people and organizations, allowing participants to improve their own environmental circumstances [28]. The concept of Zero Waste was used to guide this research to determine the effect of Project management practice on performance of solid wastes projects in Kericho County.

## 4. CONCEPTUAL FRAMEWORK

Conceptual framework is a structure of concepts and theories that directs research study [29].



**Figure I: The Conceptual Framework**

## 5. RESEARCH METHODOLOGY

This study, adopted descriptive research design. According to [30], a descriptive study finds out, who, what, where, and how of a phenomenon which is the aim of this study. The targeted respondents was 200 staffs comprising of departmental heads (24) and (176) workers in solid waste management in the County since these are the people involved in the day to day running and managing of the project. The research study adopted Yamane 1967 formula to calculated, the

sample size where a sample size of 133 was obtained comprising of 16 departmental heads and 117 workers. This research study adopted, simple random sampling technique, as it statistically ensured unbiased study resulting to a realistic conclusion, since the research subject being studied had equal chance of participating in the research study. Further, with simple random sampling each unit of the population had an equal probability of inclusion in the sample [31] This study however used primary and secondary data collection methods to ensure all relevant study information was availed. Questionnaires was the main data collection instruments, and was used to collect both qualitative and quantitative data, using either open or closed structured questions so as such avail, in-depth information about solid wastes management projects in Kericho County.

Analysis of variance (ANOVA), was used to confirm variance of means among variables and thus ensure changes of the independent variables have statistical significant effects on dependent variables and thus confirm interactions of dependent variable and independent variables. Regression analysis was used to model the relationship between response variable and one or more predictor variables and as such come up with graphical and practical relationship between independent variables and the dependent variable [32]. In this research study hypotheses analysis, a 95% confidence level was applied. This indicated a significance level of 0.05, implying that for an independent variable to have a significant influence on the dependent variable, the p-value ought to be below the significance level of 0.05. A multiple regression model was therefore used to quantify relationships between dependent response variable Y and multiple predictor independent variables  $X_1, X_2, X_3$  and  $X_4$ , such that,  $Y = f(X_1, X_2, X_3, X_4)$ . Thus, the multiple regression model function took the form,  $\gamma = \beta_0 + \beta_1X_1 + \beta_2X_2 + \epsilon$ ,

Where,  $\gamma$ = Projects performance

$X_1$ = Project planning

$X_2$ = Project stakeholders

$\beta_0$  =Y intercept

$\epsilon$  = Error term or stochastic term

## 6. RESULTS AND DISCUSSION

### 6.1. Response Rate

A total of 133 questionnaires were administered to respondents, and 105 were returned representing a return rate of 78.95% while the unreturned questionnaires were 28 representing 21.05%. According to [33] a response rate of 50% and above is significant to give reliable results.

### 6.2. Pilot Test

A pilot study was done in Bomet County were 13 respondents who did not form part of the final study were given questionnaires. The average Alpha coefficient for the study was 0.808 which was recommended by [34] that indicates a high level of reliability of an instrument.

### 6.3. Descriptive Statistics of Variables

#### a) Project Planning

The first objective was to examine the effect of Project Planning on Performance of SW projects in Kericho County. Table I below captured the statistics.

TABLE I: PROJECT PLANNING

Indicator	Mean	Std Dev
Scope SWM designed for long term performance	3.85	0.77
SWM plans are done in line with PMP	3.84	0.84
SWM projects achieve desired mid and long term anticipated goals.	3.88	0.95
SWM projects experience cost overruns	3.94	0.97
SWM projects run according to schedules and meet anticipated milestones.	3.41	1.06
<b>Average</b>	<b>3.78</b>	<b>0.92</b>

There was a majority agreement that the scope of SWM were designed for long term performance as supported by a mean of 3.85. [12] reiterated that the project plan which is the major output of the project planning is useful in defining the scope of the project for the basis of brining anticipated long term change. Respondents also agreed that SWM plans were done in line with Project management Practices.[35]further affirmed that project planning comes with organized project management procedures that are crucial in ensuring customer satisfaction in terms of cost, time and the scope. There was also evidence that SWM achieved desired mid and long term anticipated goals evident from the mean score of 3.88. The same sentiment is shared with [12] The study had also significant evidence that SWM projects experienced cost overruns evident by a mean of 3.94. However there was some slightly agreement on whether SWM projects were implemented according to schedule and meeting anticipated milestones with a mean of 3.41.

Generally, there was significant evidence of the influence of project planning on performance of SW projects in Kericho County from the mean score of 3.78.

**b) Project Stakeholder’s**

The second objective of the study was to investigate the effect of project stakeholders’ management on performance of solid wastes projects in Kericho County. Table II below presents the statistics.

**TABLE II: PROJECT STAKEHOLDERS**

Indicator	Mean	Std Dev
The County government identifies SWM projects stakeholders so as to ensure SWM team work.	3.79	0.461
The County authorities carry out SWM projects stakeholder’s analysis	3.01	0.084
SWM projects workers in Kenya, team up with county authorities for better results.	2.98	0.230
County government and donor agencies as stakeholders collaborate with authorities to ensure SW projects sustainability.	3.54	0.463
SW projects in Kericho are managed by qualified stakeholders.	3.76	0.321
<b>Average</b>	<b>3.42</b>	<b>0.311</b>

There was some slightly agreement (mean 3.79) the stakeholders are identified by the Kericho County government so as to form SWM team. The project managers need to identify key stakeholders of the project and determine their influence and reaction to major decisions of the project [36]. [37] argued that it crucial in any project management that stakeholders are identified through stakeholders’ analysis so that those affected by the project as well those with power or influence are known and their interests captures to ensure successful completion of projects. [38] further emphasized that, identification of stakeholders and understanding and their relative degree of influence on a project balances their demands, needs, and expectations ensures project success and subsequent sustainability. However respondents were unsure whether stakeholder analysis was done by the County government. This is contrary to the argument of [37] of the need to carry out stakeholder’s analysis to support successful implementation of projects.

There was no significant evidence (mean = 2.98) that SWM projects workers in Kenya, team up with county authorities for better results. SWM project workers key stakeholders of the project. The [39] defines project stakeholders as those people who may influence the outcome of the project, the SWM workers are internal stakeholders. If the key stakeholders are not involved in the project then there is likelihood that the project outcome will be influenced negatively. [36] emphasized the need to satisfy the project team failure to which will require Adjustment of scope, time, cost and quality so as their expectations are met.

Respondents slightly agreed (mean = 3.54) that project donors and the County government as major stakeholders collaborate with other authorities to ensure sustainability of projetcs. Finally there is some slight evedince that SW projects are managed by qualified stakeholders. According to [40] a competent project team involves project leading its members who are specifically selected, undergoes training and possess the right experience, knowledge, and skills to handle the requirements or the demands of the project. Generally there was no significant evidence to how various stakeholders’ influenced the performance of SW projects with a mean of 3.42.

**6.4. Inferential Analysis**

The study used the inferential statistics to identify relationships between the Predictor Variables and the Dependent Variable. At 0.05 significance level the study tested Correlation, ANOVA, and finally regression.

6.4.1 Correlation Analysis

Correlation Analysis using Pearson Product coefficient. Existence of a significance relationship is critical to show interdependency between the predictor Variable and the dependent variable. Table III shows the correlation Matrix

Table III: Correlation Matrix

		Performance of Projects	Project Planning	Project Stakeholders
Performance of Projects	Pearson Correlation	1	.631**	.529**
	Sig. (2-tailed)		.000	.000
	N		105	105
Project Planning	Pearson Correlation		1	.499**
	Sig. (2-tailed)			.000
	N			105
Project Stakeholders	Pearson Correlation			1
	Sig. (2-tailed)			
	N			

\*\* Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0.05 level (2-tailed).

The findings from Table 4.5 above indicate that the Pearson coefficient for Project planning was 0.631 and the P-value was 0.000. Therefore there is a significant and very strong correlation between project planning and performance. The findings are also supported by [41] that project planning is the heart of a project cycle thus very crucial. The study also revealed that there is a correlation between project stakeholders and project performance, as the Pearson coefficient was 0.529 and the P-value was 0.000. This indicated that project stakeholders had a significant strong relationship with project performance. This corresponds with [9] that integration of stakeholders with good project planning sets a good ground for high quality realization and project operations.

6.4.2. Regression Analysis

Regression analysis was done to estimate the relationships among the variables. Table IV below represent the summary and the bet Table IV: Regression Results

TABLE IV: REGRESSION RESULTS

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	6.779	.541		12.535	.000
	Project Planning	0.444	.096	0.327	4.633	.000
	Project Stakeholders	0.543	.077	0.479	5.668	.000

a. Dependent Variable: Performance of SW Projects

Based on the results from Table IV, the beta coefficient for Project Planning was 0.444, P-value was 0.000; a project stakeholder was 0.543, P-value was 0.000. Since two predictors (Project Planning, Project Stakeholders) had evidence of being significant for the study, then the estimated model was fitted as below:

$$Y = 6.779 + 0.444 X_1 + 0.543 X_2 \dots\dots\dots (iii)$$

This can be translated as:

$$\text{Performance of SW Projects} = 6.779 + 0.444\text{Project Planning} + 0.543\text{Project Stakeholders}$$

7. CONCLUSION

The study concluded that project planning is significant for performance of any project. Project leaders need to have good planning skills and ensure detailed plans for the project are in place. Project planning sets ground for a high-quality realization and operation in projects management. Its integration with stakeholders also, ensures appropriate technologies with minimal pollution are used in project’s management, in line with set policies.



Stakeholders are individuals, groups, or organizations, who may affect, get affected by, or perceived to be affected by a decision be it internal or external to the project. In any project management, there is need to carry out stakeholder's analysis to identify among other, those who are affected by the project as well as those who have influence or power over the projects and as such identify who support its successful completion. Projects with heterogeneous stakeholders should embrace stakeholders' communication and engagement plan, as a means of constantly updating and creating a link for understanding their needs and expectations.

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