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Effectiveness of Solid Waste Management Programs in Kenya: A Case of Kilifi County

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Abstract

Purpose: The study was therefore done to evaluate the Efficiency of Solid Waste Management Programs in Kenya- specifically Kilifi County, being guided by four specific objectives; How Public-Private Partnership(X_1), Community Participation (X_2), Budget Allocation (X_3) and Government Policy (X_4) Influence Effective SWM Programs in Kilifi county.

Methodology: Descriptive design with the target population of 1,453,787drawn from Kilifi County where multistage and random sampling techniques gave sample size of 72 subjects. Data was captured using questionnaires. Data analysis was through descriptive statistics and chi square to ascertain effect of the variables using SPSS.

Findings: Findings were that all the four variables of the study indeed have effect to SWM programs in Kenya. X_1 Hypothesis test results revealed that the calculated $\chi 2(223.4 = P< .001)$. While X_2 indicated that, the $C\chi 2 = 268.5$ = P-value in the asymptotic significance column was 0.00001. X_3 revealed $C\chi 2 = 216.9$ where P-value was .00001. And X_4 established $\chi 2C = 201.88$ with P Value and P-value was 0.0001. The study rejected all the H_O and accepted H_1 which established there was relationship between all the study variables and waste management programs. Illustration of R=0.532 represents the simple correlation; therefore, a moderate positive linear relationship among independent variables and effective SWM programs in Kenya existed. $R^2=0.283$ which indicated the total difference the dependent variable is clarified by the independent variables. In this case, the four independent variables explained 28.3% of the variability in effective SWM programs in Kenya and 72.7% variation in sustainable implementation being described by external issues not discussed in this research project. Regression analysis was done model equation; Effective SWM Programs (Y) =3.197+ 0.188 Public-Private Partnership (X_1) + 0.213 (Community Participation (X_2) + 0.177 (Budget Allocation (X_3) + 0.080(Government Policies (X_4). The model described that all the elements had a positive influence on the effective SWM programs. This regression equation proved that when all other elements are held constant (no determinants or elements) effective SWM programs would be 3.197. The study concluded, public-private partnership and availability and proper management of budget allocation as key determinants of effectiveness of the SWM programs.

Unique contribution to theory, policy and practice: It also uncovered that community participation greatly weighs in on the performance of SWM programs thus improved greatly efficiency and effectiveness of the programs. Lastly, proper government policies must be imposed to ensure legal policy and regulatory frameworks to ensure proper governance of SWM programs and sustainability. Future research required in all Counties across the Country. This will bring relevant information that could be useful for policy framework that focuses on to promoting effectiveness of the SWM in Kenya.

Keywords: *Public-Private Partnership, Community Participation, Budget Allocation, Government Policies and Solid Waste Management (SWM)*

1.0 INTRODUCTION

1.1 Background of the Study

Throughout history, development of human beings is always inherently connected to their capacity to control of solid waste because of its influence on community and ecological system. As economic activity grows, so does solid waste generation in municipalities in terms of kg/capita/ day at a world scale. The urban rural migration is a factor that has increased waste generation where and increase in 7% of increase in waste in 2006 was noted compared to 2003 (UNEP, 2012), there is also an 8 per cent increase in waste per year between the year 2007 and 2011. According to Japanese Corporation agency (JICA) study (2010), systematic solid waste collection service had been a challenge, dumping is done in open areas, on roads and along waterways.

Waste has been identified as a menace to both social and ecological matters because many cities had grown fast, which led to worsening of the waste management (Mezier, 2013).This is because dumpsites as a result of invasion by the animals and street kids (pickers) became breeding places for disease vectors, flies and rats. The dumps decomposition results to infection of water and soil thus contaminate food which causes diseases and/or grave ecological issues. The uncollected garbage may additionally block drains and dam up stagnant water, encouraging the breeding of mosquitoes and other dangerous insects resulting to various diseases (JICA 2010). In this regard, the counties and countries are required to carefully observe the projected trends and plan their waste disposal accordingly. Nevertheless, the counties may not tackle the waste issue diligently as they tend to face problems in managing wastes (Sujauddin, 2008). The counties have a responsibility of efficiently and effectively managing waste in their areas and possibly reuse it. Challenges of waste managing in counties include: inadequate governing structures, unreliable private public partnership (PPP), inadequate assets to control solid waste and lack of right legislature (Ndum, 2013).

1.2 Statement of the problem

The aggregate dense waste in the world is projected at around 2 billion tonnes by Global Waste Management Outlook (GWMO), 2010, which a country's municipalities are in charge of managing. Almost half of the solid watse is produced in highly developed areas in Europe, Canada, Asia. The main challenge faced by both developed and developing nations is proper disposing of waste (Gakungu, et al. 2012). In Kenya SWM is a crucial activity because rural-urban migration is increasing daily resulting to increased waste generation with constrained waste disposal

resources. In addition, globalization as resulted in increased industrial activity which means more poisonous industrial wastes continue to be generated while Kenyan government has devolved waste management to counties (Gakungu, et al. 2012). This challenging because of inadequate resources and poor planning (Ndum, 2013) whilst the impact poor solid waste management is being felt and becoming a menace as days go by. Poor solid waste management leads to accumulated garbage which become breeding places for bad germs which risks disease outbreaks for slums dwellers, blockage of drains hence causing floods, and the chemicals may affect fish in lakes and sea.

For the case of Kilifi County, SWM is a mandate of the Department of Environment, Natural resources and SWM in the County Government of Kilifi. Despite the availability of various policies and legislations aimed at providing a legal framework to coordinate SWM functions, poor enforcement of the same and a raft of many other factors are contributing to the current Kilifi County Reports (2018). Whereas the Community Based Organization (in this case the local youth groups) do collect waste and take them to a central place where the county government is supposed to collect the waste, the county fails to do so. Furthermore, the large populations outdoing the little infrastructure available, the unplanned settlements and the fact that there is the issue of absentee landlordism have largely contributed the problem of unsustainable SWM practices in the area (GWMO), 2010

Besides, many of the settlers are tenants, and the fact that they do not have the security of land tenure inhibits them from contributing to any developmental issues. The low level of education on sustainable SWM practices by the residents of Mtwapa Township and its surroundings compounds the problem according to First County Integrated Development Plan (2013-2017). If nothing is done on SWM, the negative impacts such as exposure of residents to diseases because dumpsters are breeding grounds for disease-causing microorganisms, clogging of drains and effects of industrial effluents to marine sustainability which is a key revenue point for Kilifi may slow developmental progress in the county. Thus the county will lose funds that were to be used for other developmental projects being used in rescue and salvage activities. There is evidence that most waste is dumped openly and thrown into the sea thus posing dangers to the environment and thus cause hazards to the marine parks within the coastal strip (Kilifi County Integrated Development Plan (2019). This is an issue which might get out of hand, therefore, justification of the study to investigating an assessment on SWM Programs in Kenya; Kilifi County with a view of coming up with a sustainable and cost-effective solutions.

1.3 The purpose of the study

The purpose of this study was to examine effectiveness of Solid Waste Management Programs in Kenya the case of Kilifi County.

1.4 Objectives of the study

The study was guided by these specific objectives:

i. To establish how Public-Private Partnership influence effective SWM Programs in Kenya-Kilifi County
ii. To assess how community participation influences effective SWM Programs in Kenya-Kilifi County
iii. To evaluate how budget allocation influences effective SWM Programs in Kenya- Kilifi County
iv. To examine how Government policies, influence effective SWM Programs in Kenya- Kilifi County

2.0 LITERATURE REVIEW

2.1 The Concept of Effective Solid Waste Management

Effective solid waste management leads to waste reduction and pollution prevention. The aim is to reduce waste as well as toxicity of waste to the environment. This an area of concern for policy makers and researchers since despite this straightforward definition, it has been difficult for government to efficiently manage solid waste. Campaigns for solid waste management should focus on waste reduction to preserve the surroundings of the citizens to improve it's the living conditions (Tonglet, 2009).

There is a more elaborate definition of waste management as prevention, and/or reducing the generation of hazard and campaigning for 3Rs reuse, recycle and recovery. The use of the 3Rs (reduce, reuse and recycling) can help in minimizing wastes (Franchetti, 2009) and Schall, (2012) proposes proper treatment through composting and/or burning to disposal waste. Regional strategy is key for proper disposal of waste both at local and national level by Read et al. (2008). Sustainability issues of SWM practices are pointed out in the various definitions using the 3Rs.

2.2.1 Public-Private Partnership and Effective Solid Waste Management (SWM) Programs

The public-private partnership is an effective SWM strategy as it ensures the involvement of the locals in management of waste of a county (JICA, 2010). Involvement of the citizens and private businesses can improve waste management as counties have limited resources, poor planning and mismanagement despite it being their responsibility to collect and manage wastes. The partnership with the citizens come in handy as they can promote quality and volume of service in waste management.

The private sector's participation cannot be ignored since it's more efficient, accountable and has a holistic management style (World Bank 2011). Capabilities of the private segment can help minified waste that is produced daily because of the increase in population (UNESCAP, 2011). To add to the PPP a third party that is the citizens can improve the PPP service delivery, through

payment for the service and be responsible in their disposal practices thus improve the SWM programs positively. Such an arrangement can make the service receiver more accountable and lead to better sanitation and waste disposal efforts in the area (Ahmad et al., 2006, UNESCAP, 2011).

2.2.2 Community Participation and Effective Solid Waste Management Programs

Community is a group of people that are related and form cohesion (Waste, 1996). The associates of the community share various norms in political, social and economic activities therefore they share a number of interests. To protect their interests members of have to come together which is a process known as Community Participation where inhabitants of a community take charge of their well-being and prosperity of the community and/or cultivate the capacity to improve their development as well as the community advancement at large. This motivated by the fact that they better understand their problems and can suggest better mechanisms to improve their welfare.

Community participation in SWM should become the new norm for both National and County governments in the less developed countries. Therefore, for any project thrive, community participation is a pillar/ cornerstone because many county governments are constrained in terms of resources and therefore not able to deliver this basic service in the community (Pokhrel & Viraraghavan, 2005). However, it was established by Kalwani, (2009) that despite the benefits of community participation in SWM may not realize its benefits because there is lack of proper mobilization, planning and coordination of the community to engage in SWM. It concluded that metropolises lacked commitment to engage the community SWM programs (Kalwani, 2009).

2.2.3 Budget Allocation and Effective Solid Waste Management Programs

Seaga (2001) implies that budget is an outline of spending and revenue over project's lifecycle. It is a projection of the probable costs incurred by undertaking planned tasks. Realization of programs are dependent on financial planning. An expert and a clear methodology to budget planning can assist in persuading financiers, donors and development banks thus make finances for the project available. It is crucial to obtain the inputs such as human resource, travel expenses, equipment and consumable, required for a project so as to realize the goals of the project (Philip et al., 2008).

The expenses should be clearly pointed out, listed and classified accordingly in order to organize costs for proper budgeting. The materials should be classified as indirect and direct expenses where the direct costs are ascribed directly to the project and can be pointed out by the user whereas the indirect cost may not be tracable to the project but it's justifiable to keep the operations running (EC, 2009). Approximately 20-50% of the overall municipal budget is allocated for waste management but still, waste collection is not fully covered (Bello et al., 2016).

2.2.4 Government Policies and Effective Waste Management Programs

To ensure a safe environment it the SWM program must ensure the collect and dispose waste in an effectual manner. To do this the government must ensure the enact laws and regulations to protect the public and encourage participation or regulate it for defaulters to pay taxes (FEBA: FRN, 1991). The poor administration of the counties are the core causes for poor sanitation and waste managing have contributed to poor service delivery as far as SWM programs are concerned (Ikiara, 2004).

The Kenyan government has been prompted to review its laws and policies on SWM in order to retort to the ecological contests and ratify the environmental management and Coordination Act (EMCA) of 1999. Which makes it the mandate of the citizens to protect the environment and improve it to guarantee a clean and safe habitant. The provision are in line with the Kenyan vision 2030 as well as in the constitution act 42 which states that every citizen must to enjoy a clean and safe environment for the benefit generations to come. Further in Section 69 (2) it is the duty of all Kenyans to ensure sustainable protection of natural resources for enjoyment of further generations. Obirih – Oparah (2003) concludes that citizens are dissatisfied by their administration because of the inefficient services on SWM.

2.3 Theoretical Framework

The study used Systems Theory and Factionalism Theory.

2.3.1 Systems Theory

Systems theory as introduced by biologist Bertalanffy (1930) is model that recognizes that an organ doesn't exist on its own but depends interrelationships that overlap between separate disciplines to achieve an objective. A "system" is a complex interaction of related components come into a particular environment to achieve whatsoever purposes required to attain the organization's objective. Systems theory is about exploring how people acclimatizes to its environment through adjustments in its structure, so as to maintain and achieve a better status quo. In the National/ County government in question, for SWM to work it must create the structures processes to favorably give efficient service and identify the stakeholders who will aid in delivery of SWM objectives.

2.3.2 Factionalism Theory

The factionalism theory identifies the worst side and the benefits of uprising in the cities. As the cities grow there is innovations and creativity which may lead to increase wastes, crimes and impersonality. For this study dumping may be a threat and a blessing in some instances. This is because SMW may be a source of livelihood for some people but may irritate others if not efficiently done. There are self-help groups that scavenge in the dumpsites and are able to sustain their daily needs from the urbanization effect. The youth are engaged in recycling activities which work in two-fold reducing the waste and protecting the environment (Ndum, 2013).

2.4 Conceptual Framework

The study sought to describe the correlation between the variables of the study where the dependent variable in this study is the Effective SWM Programs while independent variable as the factors leading to effective management. The conceptual framework is presented in figure 1

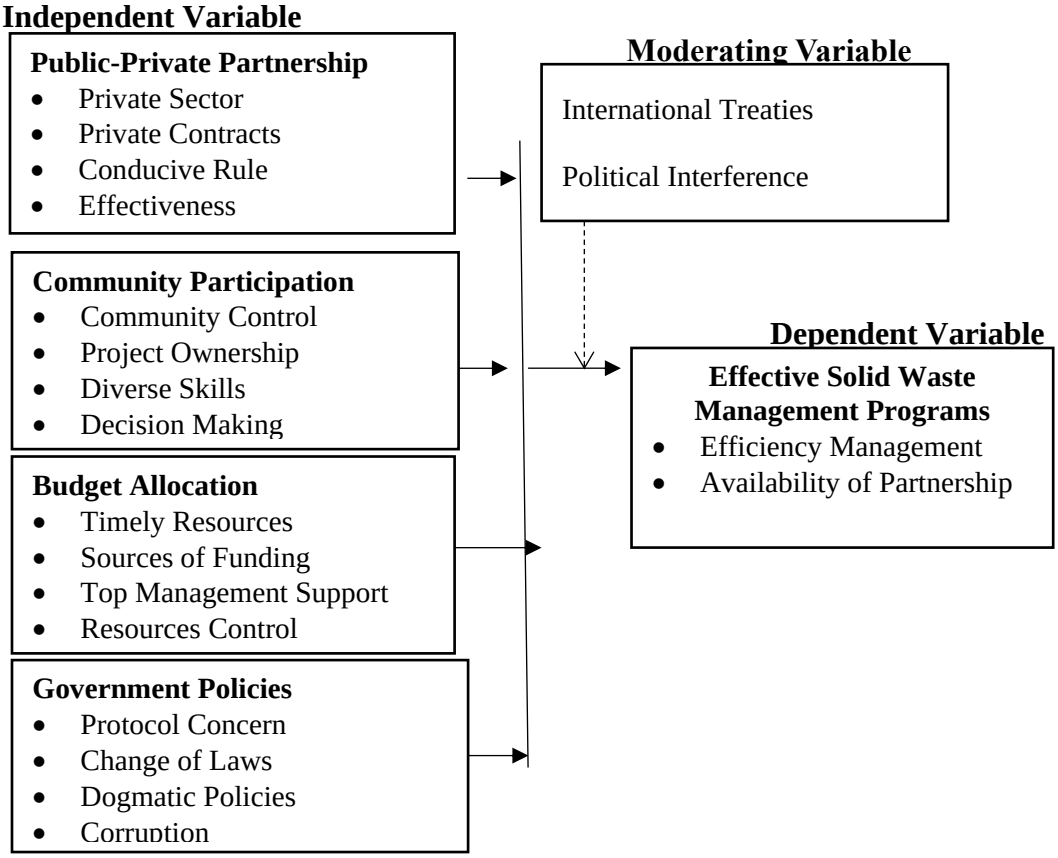

Figure 1: Conceptual Framework: Source, Author June 2020

2.5 Knowledge Gap

This level the study discussed research knowledge gap as illustrated and related in table 2.1.

Table 1: Research Gaps

Objective	Researcher/ Author	Findings/Conclusion	Knowledge gap
1). To establish how Public-Private Partnership, Influence effective SWM Programs in Kenya: Kilifi County	**JICA (2010)**	They proposed that gathering and movement or disposal of solid waste will improve if they involve the private entities because they have transparent monetary systems as well as processes that are efficient Thus SWM is easier, goal oriented and more cost effective.	The study showed clearly that the private businesses were needed to efficiently run the SWM programs. It also established the need to involve individual citizens into the SWM programs to ensure reduction of waste and protection of the ecosystem.
2). To assess how Community Participation Influence Effective SWM Programs in Kenya: Kilifi County	**Kalwani (2009)**	The results indicated that community participation was crucial but had not been achieved due to poor mobilization and planning. The community was not well empowered in PPP and local resources were not put in the picture. It was also established that the county councils wasn't committed in community participation.	The study found that communication of policies by the counties should be improved as it will help in effective performance of SWM programs. When the community is involved then there will be a sense of ownership and this guarantees successful implementation as everyone feels part and parcel of the solution their participation in different levels.
3). To evaluate how Budget Allocation, Influence Effective SWM Programs in Kenya: Kilifi County.	**Appasamy&Nelliyatt, (2007).**	Their findings were that lately, various funding alternatives have been pursued, including PPPs and carbon tax to promote efficiency through better technologies in the managing solid Waste	This study established that resource mobilization was critical for success of SWM programs. It established that when budgeting process is transparent and accountability is well done the monies are used to achieve the intended objective. Counties budgeting committees should allocate enough resources for SWM programs
4). To examine how Government Policies, Influence Effective SWM Programs in Kenya: Kilifi, County	**Obirih - Oparah (2003)**	The study established that government fail in their role in SWM and thus the people are often disappointed by this inefficiency. It recommended privatization of the sector and pointed out the importance of PPP in SWM.	This study focused on involving the government, more importantly, examine how existing policies affect SWM and recommend policy changes.

3.0 RESEARCH METHODOLOGY

3.1 Research Design

The study used the descriptive survey design. This design when adapted enables a researcher get information from respondents through developing an insight into the phenomenon under study.

3.2 Target Population

Kilifi county population is 1,453,787 population data from Kenya National Statistics Bureau-KNSB Kenya Census (2019).

3.3 Sample Size

A representative sample size with level of confidence margins of errors adapted Yamane Formula of (1967). Hence

$$n = \frac{N}{1 + Ne^2}$$

Where; n = sample (required responses), e2 = Margin of error= 95%, N = sample size

$$\mathbf{n= \frac{1,453,787}{1+1,453,787}}$$

Therefore, n = 399.88 approximately 400 people

3.4.1 Sample Technique and Procedure

That Kilifi County has seven constituencies a multi stage and random sampling was applied. Due to time constraint the study focused to a leaner target population for households within Shimo La Tewa Ward of Kilifi South Constituency and other significant informants within line ministries of Kilifi County Government. In this case the researcher divided (400 by 7= 57.14). The research was carried out in Kilifi South, Shimo La Tewa Ward, Mtwapa Township. The assumption that Shimo La Tewa Sub Location was able to provide of 57 Participants + 15 Significant Informants (Civil servants, implementers, program managers for solid waste programs and regulators the National Environment Management Authority) giving a total of 72 repondents.

3.5 Data Collection

Data was collected using a questionnaire to achieve the search objective (Mugenda & Mugenda, 2011). The instrument was filed with the aid of the assistants hired from Kilifi County Government. The researcher was the team leader throughout during the research.

3.6 Data Analysis

Data analysis involves gathering, modelling, and transformation to get information for use to explain the variables (Mugenda, 2003). The analysis used descriptive statistics and Chi square and Multiple Regression Analysis (MRA) and presentation was done using American Psychology Association (APA) Tables. The regression model: $\mathbf{Y= \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \varepsilon}$;

Where: *Y = Effective Solid Waste Management Programs, X^1 = Public-Private Partnership, X^2 = Community Participation, X^3 =Budget Allocation, X^4 = Government Policies, ε= Error Term*

4.0 DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Questionnaire Response Rate

Data was taken from all 72 respondents. All questionnaires fully completed and returned reflected 100 % per cent return rate as showed in Table 4.1.

Table 2: Response Rate

STATUS	Frequency	Percentage (%)
Targeted	72	100
Respondent	72	100
Discrepancy	**N/A**	**N/A**

Description of findings in Table 2, confirmed 100 % of respondents return rate. Thus, the response rate was excellent according to Mugenda Mugenda (2012).

4.2 Effectiveness of Solid Waste Management Programs in Kenya: Kilifi County

Descriptive statistics was used to establish the levels of effectiveness of SWM programs in Kenya. The emphasis was on Public-Private Partnership, Community Participation, Budget Allocation and Environmental Policies.

4.2.1 Descriptive statistics on how Public-Private Partnership to influence effective SWM Programs in Kenya.

The researcher found it essential to establish if a Public-private partnership had an influence. To confirm this, the study developed descriptive statistics results were presented in table 3.

Table 3: Descriptive statistics on Public-Private Partnership

STATEMENTS	MEAN	STD.DEVIATION
Private sector influences effective SWM programs in Kenya	4.78	0.3032
Private Contracts Influence Effective SWM Programs in Kenya	4.84	0.2837
Conducive Rules Influence Effective SWM in Kenya	4.68	0.3943
Effectiveness Influence Effective SWM in Kenya	4.80	0.3188
Composite Mean and Standard Deviation	**4.78**	**0.325**

Table 4 show majority of the respondents very strongly supported private contract influence on effective SWM programs in Kenya. The Composite mean of 4.78 = to Standard deviation-STDV

of 0.32 < 1 were confirmations that majority of respondents very strongly agreed with all the statement for this variable.

4.4.2 Inferential statistics on Public-Private Partnership

The first objective of this study was to establish the effect of public-private partnership on waste management programs in Kilifi County where we tested null hypothesis; **H_1**, that there is a significant relationship between Public-Private Partnership and effective SWM Programs in Kenya. The relationship was tested using the Chi-Square test of the relationship as presented in Table 5.

Table 1: Relationship of Public-Private Partnership and Effective SWM programs

O	E	(O-E)	$(O-E)^2$	$(O-E)^2/E$
0	14.4	-14.4	207.36	14.4
0	14.4	-14.4	207.36	14.4
2	14.4	-12.4	153.76	10.67
5	14.4	-9.4	88.36	6.13
65	14.4	50.6	2,560.36	177.80
∑	**$(O-E)^2/E = 223.4$**			

Findings as illustrated in Table 5 the Calculated-C $\chi 2$ =223.4 The Probability (P)-Value is < .00001. The result is significant at P < 0 .05. When the P-Value is 0.000 or <, the alpha level of significance of 0.05. Therefore, the study statistically concludes a significant association between PPP and effective SWM programs in Kenya. Thus the researcher accepts H_1 that public-private partnership has a significant influence on effective SWM programs in Kenya.

4.5 Descriptive statistics on how community participation influences effective SWM Programs in Kenya:

The study sought to establish the effect of community participation influence on effective solid management. The researcher used descriptive statistics and chi-square test to establish the levels of community participation influence.

4.5.1 Descriptive Statistics on community participation influence on effective SWM Programs in Kenya.

The study sought to establish how community participation had influence on solid waste management programs in Kilifi County

Table 6: Descriptive statistics on Community Participation Influence

STATEMENTS	MEAN	STD.DEVIATION
Community control effective influence solid waste management programs in Kenya	4.88	0.2686
Community project ownership influence effective solid waste management programs in Kenya	4.85	0.2822
Diverse skills influence Effective solid waste management programs in Kenya	4.82	0.2913
Community decision making influence effective SWM programs in Kenya	4.90	0.2235
Composite Mean and Standard Deviation	**4.86**	**0.265**

Descriptions as specified from Table 6 had a composite mean of 4.86 = STDV of 0.265 implying this variable was rated by the majority of the respondent very strong influence. Community decision-making statement was ranked the highest with (STDV of 4.90) as an effect of solid waste management programs in Kenya.

4.5.2 Inferential statistics on Community Participation.

The research sought to determine the relationship between Community participation influence and effective waste management programs.

This was done through the testing of alternative hypothesis H_1: That there is a significant relationship between is between Community Participation and effective SWM Programs in Kenya. The relationship was tested through Chi-square as indicated in Table 4.8

Table 7: Relation of Community Participation and Effective SWM Programs

O	E	(O-E)	$(O-E)^2$	$(O-E)^2/E$
0	14.4	-14.4	207.36	14.4
0	14.4	-14.4	207.36	14.4
0	14.4	-14.4	207.36	14.4
2	14.4	-12.4	153.76	10.67
70	14.4	55.6	3091.36	214.67

$\sum$(O-E) 2/E = 268.5

Findings depicted in Table 7 indicated the Cχ2 =268.5 with the degree of freedom 5 and 95% level of significance. The P-Value is < .00001. The result is significant at p < .05. It is significant when the P-Value is < 1 in the testing of hypothesis, we rejected H_O and accepted H_1. There is a significant relationship between community participation and effective Solid Waste management programs in Kenya.

4.6.1 Descriptive statistics on how Budget Allocation influences effective SWM programs in Kenya:

The study sought to establish the effect budget allocation on SWM. The findings were presented in table 8

Table 8: Descriptive statistics on Budget Allocation influence on SWM programs

STATEMENTS	MEAN	STD.DEVIATION
Timely resources influence effective SWM programs in Kenya	4.80	0.3207
Sources of funding influence effective SWM programs in Kenya	4.83	0.3076
Top management support Influence effective SWM in Kenya	4.89	0.2398
Resources control influence effective SWM programs in Kenya	4.94	0.1378
Composite Mean and Standard Deviation	**4.87**	**0.251**

Findings, as indicated in Table 8, describes that majority of informants very strongly supported that Budget Allocation influence SWM programs in Kenya. With a combined of 4.87 =STVD and standard de 0.251 < 1 meant that most responses were grouped around the mean, thus the variable very greatly influence SWM programs in Kenya.

4.6.2 Inferential statistics on Budget Allocation

Hence the researcher did hypothesis testing to confirm a significant relationship between Budget Allocation and effective SWM Programs in Kenya. Findings presented in Table 9

Table 9: Relation of Budget Allocation and Effective SWM Programs

O	E	(O-E)	$(O-E)^2$	$(O-E)^2/E$
0	14.4	-14.4	207.36	14.4
0	14.4	-14.4	207.36	14.4
8	14.4	-6.4	40.96	2.84
0	14.4	-14.4	207.36	14.4
64	14.4	49.60	2460.16	170.84
$\sum$	**$(O-E)^2/E = 216.9$**			

Data as described in Table 9 show that Cχ2 =216.9 where the degree of freedom is 5 and 95% level of significance. In chi-square data analysis the outcome is always considered significant when the P-value is ≤ than the selected alpha level of 0.05. The P-Value is < 00001.It is significant

when the P-Value is < 1. This study therefore thus rejected H_O and accepted H_1. The is a significant relationship between budget allocation and effective SWM programs in Kenya.

4.7.1 Descriptive statistics on how Government policies, influence effective SWM programs in Kenya:

The researcher sought to determine whether Government Environmental policies had effects on SWM programs. This was done using descriptive statistics the Likert scales

Table 10: Descriptive Statistics for Government policies influence on SWM programs

STATEMENTS	MEAN	STD.DEVIATION
Protocol concern influence effective SWM programs in Kenya	4.65	0.4114
Change of laws influence effective SWM programs in Kenya	4.81	0.3624
Dogmatic policies influence effective SWM programs in Kenya	4.63	0.4317
Corruption influence effective SWM programs in Kenya	4.89	0.2383
Composite Mean and Standard Deviation	**4.74**	**0.361**

Results, as specified in Table 10, illustrated that respondents strongly approved the statements on Government policies influence; this was explained with all responses scoring means > 4.6. The composite mean of 4.74= STDV 0.361 was a display that all informant's respondents strongly supported government policies as a great influence of SWM programs in Kenya.

4.7.2 Inferential statistics on Government policies.

The study researcher desired to examine the influence of the fourth variable of the study. To establish the degree of influence, a test of Alternative Hypothesis H_1 that, there is a significant relationship between Government policies and effective SWM programs in Kenya. This was done and confirmed through chi-square testing of the hypothesis as prescribed in Table 11

Table 11: Relation of Government policy and Effective SWM Programs

O	E	(O-E)	$(O-E)^2$	$(O-E)^2/E$
0	14.4	-14.4	207.36	14.4
0	14.4	-14.4	207.36	14.4
0	14.4	-14.4	207.36	14.4
10	14.4	-4.4	19.36	1.34
62	14.4	45.60	2079.36	144.40
$\sum$	**$(O-E)^2/E = 201.88$**			

Findings as indicated in table 11 state that $\chi 2C=201.88$. The P-Value is < .00001. The result is significant at when P< .05. The P-Value being < 1, we rejected H_O and accepted H_1 that, there is a significant relationship between government policies and effective SWM programs in Kenya.

4.8 Regression Analysis on Effectiveness of SWM Programs in Kenya: A case of Kilifi County.

Since the study revealed that there was existence of statistically significant relationships between each independent variable and the effective SWM programs in Kenya, a multiple regression was initiated in order to examine magnitude of the relationships. The outcomes on regression analysis are displayed on tables 12, 13 and 14.

Table 12: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.532[a]	.283	.240	.43647

a. Predictors: (Constant), Government Policies, Community Participation, Budget Allocation, Public_Private_Partnership

Table 13: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.040	4	1.260	6.614	.000[b]
	Residual	12.764	67	.191		
	Total	17.804	71			

a. Dependent Variable: DV

b. Predictors: (Constant), Government Policies, Community Participation, Budget Allocation, Public_Private_Pertnership

Table 14: Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.197	.570		5.606	.000
	Public Private Partnership	.188	.087	.274	2.163	.034
	community Participation	.213	.105	.257	2.034	.046
	Budget Allocation	.177	.077	.247	2.306	.024

Government Policies	.080	.103	.083	.774	.042

a. Dependent Variable: DV

Illustrations from Table 12 indicated R=0.532 represents the simple correlation; therefore, a moderate positive linear relationship among independent variables and effective solid waste management programs in Kenya existed. R^2=0.283 which indicate the total difference the dependent variable can be clarified by the independent variables. In this case, the four independent variables explained 28.3% of the variability in effective solid waste management programs in Kenya and 72.7% variation in sustainable implementation being described by external issues not discussed in this research project. As described in the Analysis of variance (ANOVA) which determines whether there existed significant differences between the study variable means, the findings show that F (4, 67) =6.614; P value = 0.000, the F value was above 2 and P value < than 0.05 therefore entailing the variables are statistically significant. This is evident in the ANOVA Table 13. Data as shown in Table 14 also shows the beta coefficients of constructs that constitute the four independent variables that predict the dependent variable (effective solid waste management programs). The values of the **sig.** column of table 14 show that the values are less that p-value =0.05 which indicates that all the four independent variables are statistically significant to the research study.

Regression model equation can be represented as shown in equation 4.1

Equation 3.1: $Y= \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \varepsilon$

Equation 4.1: $Y=3.197+ 0.188 (X_1) + 0.213 (X_2) + 0.177 (X_3) + 0.080 (X_4)$

This model shows that all elements have a positive influence on the effective solid waste management programs. This regression equation has proven that when all other elements are held constant (no determinants or elements) effective SWM programs would be 3.197.

5.0 SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary of Findings

The drive for this exercise was to find out the aspects influencing the Effectiveness of SWM Programs in Kenya: Kilifi County.

5.1.1 Public-Private Partnership (PPP) influence effective Solid Waste Management Programs in Kenya.

Objective one sought to determine the influence of the effect of public-private partnership on waste management programs in Kilifi County. Chi Square test assisted in establishing relationship whereby regression analysis aided in establishing the extent of the relationship. Hypothesis test results revealed that the Chi-Square statistic (223.4) and its small significance level (p< .001) helped in the establishment that indeed an association exists between PPP on waste management programs. Regression results revealed a positive relationship with which is significant. The findings indicated that the relationship public-private partnership on effective SWM programs had a positive correlation.

5.1.2 Community participation influences effective Solid Waste Management Programs in Kenya

Objective two attempted to assess the influence of community participation on effective solid waste management programs. Chi Square test assisted in establishing relationship whereby regression analysis aided in ascertaining the extent of the relationship. Chi-square statistic value was 268.5 while the P-value in the asymptotic significance column was 0.00001; this therefore implies that there is a significant relationship between community participation and effective SWM programs in Kenya. This was also evident from the computed composite mean of 4.86 = STDV of 0.265 for community participation indicators which implied very strong influence.

5.1.3 Budget allocation influences effective Solid Waste Management Programs in Kenya

The third Objective was to determine the influence of budget allocation on effective solid waste management. Chi Square test established the relationship whereby regression analysis was useful in determining the extent of the relationship. The research findings revealed a Chi-square statistic value of 216.9 while the P-value was .00001. In this case the P-value was smaller than the standard value therefore the null hypothesis was rejected. This therefore showed an indication of existence of an association among budget allocation and effective SWM programs. The findings also denoted that a bigger number of the participants agreed with indicators of budget allocation since the indicators obtained mean scores greater than 4. It was also evident on the composite mean of 4.87 as well as the standard deviation of 0.251 that budget allocation influences effective SWM programs.

5.1.4 Government policies, influence effective Waste Management Programs in Kenya

Objective four of the study on the other hand sought to determine the influence of government policies on effective SWM programs. Chi Square test was done to establish the association. Descriptive statistics revealed that the participants agreed with the indicators of government policies since all indicators obtained mean score greater than 4 and a composite mean score of 4.74 and a standard deviation of 0.361. Regarding inferential statistics, hypothesis test results revealed a Chi-square statistic value of 201.88 and P-value was 0.0001 hence indicated significance. Regression results revealed a weak positive relationship with which is significant.

5.2 Discussion of Findings

From the outcomes of the study presented on determinants of effective SWM programs, the study focused on influence of public-private partnership, community participation, budget allocation and government policies on effective solid waste management programs in Kilifi county.

5.2.1 Public-Private Partnership

The research findings indicated that public-private partnership in the provision of effective SWM is very vital in that it ensures that there is no misappropriation and mismanagement of funds, also ensures proper planning of activities and provision of quality services in terms of service delivery. This is in tandem with other researches and studies that have been carried out previously as captured in citation in chapter 2

5.2.2 Community Participation Effect

There is a significant relationship between community participation and effective SWM programs, as established by this study. This conforms to the findings according to Anschuz(1996) that community participation is a crucial aspect of SWM as it's a process that requires sustenance and continuous maintenance and this can be done best by the respective community

5.2.3 Budget Allocation Effect

The study above reveals that there is direct relationship between funding through budget allocation and sustainability of effective SWM programs within Kilifi County. This is in agreement with the findings of (Morara, 2008) who mentioned that in some cases there had to have a reduction of programs, switching, replacing or even facing a total closure due to lack of funds to finance the programs either by county government, local authorities. The study findings focused on influence of adequate budget allocation on sustainable implementation of effective solid waste management programs in Kilifi County, the study discovered that budget allocation influenced the implementation the programs and therefore adequate financial resources should be availed and properly managed to ensure sustainability of these SWM programs.

5.2.4 Government Policies Effect

There is a positive correlation between government policies and effective SWM programs as established by this study. The County and local government should ensure frequent reviews of environmental laws and regulated policies so as to ensure clean and protected environment is preserved and well maintained.

5.3 Conclusion

In reference to the research study objectives, it is apparent that majority of the respondents agreed that presence of public-private partnership in SWM programs would ensure that all the components work towards realization of the stated goals and objectives. This could enhance effectiveness and efficiency of resources and lead to sustainability of effective SWM programs. According to the study findings, availability and proper management of financial resources, resource control and diverse sources of funding in terms of budget allocation is a major determinant of the sustainability of effective solid waste management programs. The study also revealed that community participation also plays a great role in the implementation of the management programs. The respondents strongly agreed that public participation in terms of community diverse skills, community owned projects and community control should be encouraged in order to expand the efficiency of the programs. The study also revealed that government policies are also determining elements for achievement of sustainable implementation effective SWM programs.

5.4 Recommendation

Based on the results drawn from the field and the empirical review of this study, these recommendations have been presumed by the researcher; According to the study findings public-private partnership and availability and proper management of budget allocation are the major determinant of the effectiveness of the SWM programs and should be made available and properly managed. The study also revealed that community participation also greatly influences the

implementation of the management programs and should be enhanced so as to expand the efficiency and effectiveness of the management programs. Lastly, proper government policies must be imposed to ensure legal policy and regulatory frameworks are in place to ensure proper governance of SWM programs and their sustainability.

5.5 Suggestion for Further Studies

The study outcomes of this work serve as a source for further researches on effectiveness of determinants of solid waste management and implementation of these programs in Kenya. Future research is needed with other Counties across the Country. This will also yield relevant information that could be useful for policy design to promote the effectiveness of the SWM in Kenya.

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