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Assessing County Government Strategies on Disaster Risk Management: A Case Study of Nakuru County

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Abstract
Disasters, both natural and manmade, have the potential to lead to significant human and economic losses at any time without warning. The rising emergencies such as fires, climate change resulting to floods, pandemic event and terrorist attack that rapid urbanization brings to Nakuru necessitated the current study. The main aim of the study was to assess the extent to which disaster management strategies have been deployed in Nakuru County. The specific objectives were to examine how hazard mitigation, disaster preparedness, disaster response and disaster recovery strategies have been applied to bring about community resilience among Nakuru County residents. The study used the descriptive survey. The target population consisted of those with disaster management roles employed at the county level comprising 456 employees where a sample of 138 employees was selected using stratified random sampling. A semi-structured questionnaire was used to collect data from the respondents. Collected data was analyzed using both descriptive and inferential statistics. Percentages were used to describe the responses while inferential statistics involving correlation analysis, regression analysis and chi-square test were used. Correlation analysis showed positive relationship between improved disaster mitigation, disaster preparedness; disaster response and disaster recovery strategies on community resilience. The study recommended need for training, increased communication and coordination on a continuous basis with all the key stakeholders. Further research is needed to highlight how that coordination can be carried out.

Key words: Disaster, Mitigation, Preparedness, Response, Resilience, Management

1. Introduction

1.1 Background to the study

Disasters, both natural and manmade, have the potential to lead to significant human and economic losses (Paul & Hariharan, 2012). Disasters include such emergencies as fires, severe weather, tornadoes, earthquakes, floods, pandemic events, and life threatening situations, equipment failures, cyber-attacks or terrorist attack. They can strike anywhere at any time with little or no warning (Akeyo, 2010). Existing records, while less reliable, shows a relentless upward movement in the number of disasters and their human and economic impacts (Ze-fu & Chuan-liang, 2012). According to Altay and Green (2006), the main categories of disaster types consist of hurricanes, cyclones, typhoons, floods, drought, earthquakes, volcanic eruption, epidemics, famine, food insecurity, man-made disasters, population movement, and technological disasters among others.

To distinguish a disaster from routine emergencies, Altay and Green (2006) observed that disaster event occurs when resources become stressed, when non-standard procedures are

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implemented to save life or when special authorities are invoked to manage the event. On the other hand, a routine or daily emergency is typically managed with the resources of a single governmental agency, or partial resources from several, using standard procedures, and with minimal dislocation. In Kenya, the most recurrent disaster types include floods, drought, landslides, fires, HIV/AIDS, terrorism among others (Akeyo, 2010). In order to improve safety from adverse events, Cutter, Burton and Emrich (2010) advocate that government should promote resilience by developing capacities that can be fostered through interventions and policies, which in turn help build and enhance a community's ability to respond and recover from disasters. Yet, it is the quintessential role of government to protect its citizens from harm (Comfort, 2005).

Consequently, disaster management has been attracting a lot of attention by many research communities, including computer science, environmental sciences, health sciences and business (Hristidis, Chen, Li, Luis, & Deng, 2010). From business perspective, a disaster can lead to reduced revenues, customer loss, reduce market shares which can also arise due to even brief business interruption and major business interruption may threaten a company's survival (Kaushalya, Karunasena, & Amarathunga, 2014). The government thus has the role of formulating policies and implementing actions designed to anticipate risk, prepare citizens to manage risk, and assist them in recovering from damaging events (Prater & Lindell, 2000).

According to Altay and Green (2006), disaster management has four phases comprising: (1) mitigation; (2) preparedness; (3) response; and (4) recovery. The first two phases involve pre-disaster hazard adjustments while response and recovery are associated with post-disaster actions. Hazard mitigation provides passive protection at impact (e.g., land use and building construction practices that prevent property destruction) (Prater & Lindell, 2000). Disaster preparedness supports active response after impact (for example, warning systems, emergency response plans, and mutual aid agreements that allow emergency personnel to respond more quickly and effectively). Response involves efforts to minimize the hazards created by a disaster such as search and rescue and emergency relief while recovery usually meaning the restoration of lifelines and basic services (Waugh & Streib, 2006).

From a global perspective, annual losses from natural hazards alone are staggering. For instance, in 2001, 700 natural disasters were identified, resulting in 25,000 deaths, $36 billion in economic losses, and $11.5 billion in insured losses (Godschalk, 2003). The damage caused by disaster depends on climate, the geographical location and the type of the earth surface/degree of vulnerability and disasters adversely the mental, socio-economic, political and cultural state of the affected area in general (Caymaz, Akyon, & Erenel, 2013).

Often, developing counties suffer more losses as compared to their developed countries counterparts. For instance, In March 2011, a 9.0-magnitude earthquake struck Japan and resulted in more than 20,000 people considered either dead or missing. The 2004 Indian Ocean tsunami that was caused by an earthquake killed approximately 230,000 people in Southeast Asia while more than 60,000 people were victims of the 2008 Sichuan earthquake in China (Iwata, Ito, & Managi, 2014). Even where economic losses in the developing countries tend to be more when considered relative to the country's Gross Domestic Product (GDP).

Further, when disasters strike in developing countries, relief organizations may face additional challenges. The local government does not always cooperate with the international relief organizations, security problems impede access to the victims, and a population's

extreme poverty increases its vulnerability (Kunz, Reiner, & Gold). Recently, though, there has been a paradigm shift from traditional relief approach to disaster management incorporating a more holistic and long term approach as part of the development planning process (Caymaz, Akyon, & Erenel, 2013). According to Claudianos (2014) the millennium heralded a paradigm shift from vulnerability towards resilience as a lens through which exposure to risk has been explored. The focus moved from weakness to strength.

Nakuru County is one of the 47 devolved governance units in Kenya. It therefore forms a focal unit for disaster risk management, besides having key characteristics that are associated with disaster proneness such as rapid human population growth, urbanization, and increasing concentration of property contributing exposure to greater losses should disaster occur (Mayunga, 2009). According to Ze-fu and Chuan-liang (2012) the exposure of economic assets to emergency incidents and disasters in cities will also grow. The seeming randomness of impacts and problems and uniqueness of incidents demand dynamic, real-time, effective and cost efficient solutions, thus making the topic very suitable for study in the County (Altay & Green, 2006). In addition, the County government performs numerous other functions that have a direct bearing on planning and particularly on hazard identification and post-disaster recovery and acts as sites for implementing numerous national programs (Schwab, 2014).

1.2 Statement of the Research Problem

Nakuru County being one of the 47 devolved government units in Kenya and forms a focal unit for disaster risk management having key characteristics that are associated with disaster proneness the county government performs numerous functions that have a direct bearing and particularly on hazard, identification and post-disaster recovery and acts as sites for implementing numerous national programs.

This research aimed at assessing how and what strategies Nakuru County government have put in place for any eventualities which may occur as a result of disaster. From a global perspective, annual losses from natural hazards alone are staggering. Further, when disaster strikes in developing countries, relief organization may face additional challenges. These have prompted to undertake to understand the strategies used by the Nakuru County to cope with the disaster risk management.

1.3 Purpose of the study

The overall objective of the study is to assess county government strategies on Disaster Risk Management in Nakuru County.

1.4 Objective of the study

The study is based on the following objectives:

i. To establish the extent to which disaster risk management strategies have been deployed in Nakuru County.
ii. To investigate the possible impact of disaster and how to mitigate the same in Nakuru County.
iii. To evaluate disaster strategies on preparedness, response and recovery in Nakuru County.
iv. To analyze strategies to bring about community resilience in Nakuru County in event a disaster occur.

1.5 Research Questions

The following research questions were used as a guideline to the research work.

i. To what extent do the structure of the county government and type of information systems installed account for the strategies in the perceived disaster risk management.
ii. What are the effects of disaster in the county and how do we mitigate them?
iii. Which strategies has Nakuru County put in place towards disaster preparedness, response and recovery?
iv. What are the strategies put forward to bring about community resilience?

1.6 Significance of the study

Academics, stakeholders and members of the public will benefit from the present study in the sense that it will inform theory and practice of strategies on disaster risk management, thus it will ensure increased financial stability and efficient economic functioning in the governance of the county. It will also provide a basis for further research in disaster risk management, focusing on developing countries.

2. Literature Review

In the 2005 World Conference on Disaster Reduction, the Hyogo Framework for Action 2005–2015 for disaster risk management was developed with the aim of building the resilience of nations and communities to disasters. Its main components included ensuring that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation; identify, assess and monitor disaster risks and early warning; use knowledge, innovation and education to build a culture of safety and resilience at all levels; reduce the underlying risk factors; and strengthen disaster preparedness for effective response at all levels (Gencer, 2013). The framework provided general understanding of the concept of disaster management emphasizing the importance of disaster risk management phase's activities of building disaster resilience (Mayunga, 2009).

These phases include hazard mitigation, disaster preparedness, disaster response, and disaster recovery. This indicates that nations need to develop a comprehensive approach to disaster management (Carter, 2008). To be effective, this comprehensive approach clearly needs to cover all aspects of the disaster management cycle and needs to include an appropriate balance of prevention, mitigation, preparedness, response, recovery, and disaster-related development.

2.1 Hazard Mitigation and Resilience

Hazard mitigation involves actions taken before a disaster to decrease vulnerability, primarily through measures that reduce casualties and exposure to damage and disruption or that provide passive protection during disaster impact (Tierney et.al, 2001). Its long-term focus and proactive nature distinguished hazard mitigation from the more immediate and reactive activities taken during disaster preparedness, response, and recovery. Disaster mitigation, thus, is concerned with sustained action to reduce or eliminate risk to people or property (Col, 2007). Technical approaches to mitigate the vulnerability of key infrastructures include transportation, information and telecommunications systems, health systems, the electric power grid, emergency response units, food and water supplies, among others (Godschalk, 2003).

Hazard mitigation is the phase of emergency management dedicated to breaking the cycle of damage, reconstruction and repeated damage from disasters (Godschalk, 2003). According to Mohit and Sellu (2013) hazard mitigation has two approaches, that is, structural approach and non-structural approach. Structural approach is concerned with the engineering measures

adopted to control floods or protect human settlements. They include the building of seawalls and revetments, levees, embankments and others. On the other hand, nonstructural approach is based on the adjustments of human activities and societies to mitigate flood damages. It includes insurance, land use management, awareness, environmentally sensitive area protection and other emergency and recovery policies for managing flood damages.

Thus mitigation measures include land-use regulations that reduce hazard exposure and building codes and construction practices designed to ensure that structures resist the physical impacts created by hazards, such as wind, water, or seismic forces (Tierney et.al, 2001). The most distinguishing feature of mitigation is that it permanently alters physical conditions of risk, hazards, and vulnerability, thereby lessening the potential severity of future disaster impacts that can threaten life and property (Schwab, 2014).

Unfortunately, some communities either lack the resources to invest in hazard mitigation capabilities or simply do not see the need to do so (Carter, 2008). Prater and Lindell (2000) concurs that pre-disaster measures unquestionably are effective, but local governments often are reluctant to adopt risk reduction policies for various reasons. Thus, there may be recognition of the hazards in many communities; risk reduction and vulnerability often are not salient concerns until after the disaster occurs. Residents have other issues that assume priority, and local elected officials do not want to dwell on the hazard vulnerability of their communities as it might hurt economic investment and growth (Cutter et.al, 2010).

The low visibility of disaster risk reduction work in comparison to emergency relief has made it unattractive for governments chasing votes and international recognition and for Non-Governmental Organizations (NGOs) dependent on disasters for funding (Schipper & Pelling, 2006). Prater and Lindell (2000) points out that the first thing a community must do is to identify the hazards to which the community is vulnerable and assess the severity of each hazard. Here, a substantial investment in hazard mapping can pay off in the long run by informing decision making with adequate facts.

Risk represents the possible occurrence of a harmful event that has some known likelihood of happening over time (Comfort, 2005). Thus risk is ever present in a complex social world, and it would be impossible for any government to eliminate risk altogether. However, the society should take steps to anticipate a damaging event and to take proactive steps to reduce that risk, knowing that there would still be some likelihood that the event could occur (Cutter, Burton, & Emrich, 2010). Further, Schipper and Pelling (2006) argues that from a developing country perspective, Poverty Reduction Strategy Papers (PRSPs) provide a vehicle for integrating risk reduction into poverty alleviation programs but so far, emphasis has been on early warning and relief, not on prevention.

Therefore mitigation measures including appropriate land-use, mandatory and voluntary building codes, and other long-term loss reduction efforts are very important. In some cases, mitigation can also include moving neighborhoods and communities to other locations in order to avoid future losses. Mitigation activities can take the form of specific projects, such as elevating homes for flood protection, as well as process-related activities, such as hazard and vulnerability analyses, that are designed to lead to future mitigative actions (Sutton & Tierney, 2006).

2.2 Disaster Preparedness and Resilience

According to Tierney et. al (2001), disaster preparedness encompasses actions undertaken before disaster impact that enable social units to respond actively when disaster strikes. It is the readiness to respond to any emergency based on planning, training and exercises. According to Col, J. M. (2007), but I do add that although emergency managers agree that implementing emergency plans in real time involves flexible improvisation, planning and exercises are supposed to take into account most surprises. For instance, whereas 260,000 died as a result of Tangshan earthquake of magnitude 7.8 in China, lives were saved largely due to effective preparedness involving continuous monitoring, mitigation and exercises.

Yet, according to Schwab (2014) preparedness typically signify preparations related to what to do during a disaster, what food and supplies to have on hand, how to evacuate, where to go, who to contact, and where to seek emergency shelter. Kapucu (2008) also asserts the need in creating a culture of preparedness that emphasizes the shared responsibilities and disaster preparedness at all levels of government and communities. For instance, there is the need for increased training in disaster preparedness areas such as fire services, blood donation, first aid and Cardiopulmonary Resuscitation (CPR). Other needed disaster preparedness provisions include a disaster supplies kit that contains enough food, water, medication, emergency shelter, smoke detectors, fire extinguishers, storm shutters, a fire sprinkler system, and carbon monoxide detector.

United Nations (2008) noted that disasters undermine development achievements, thereby impoverishing people and nations. In the absence of concerted efforts to address root causes, disasters represent an increasingly serious obstacle to the achievement of the Millennium Development Goals (MDGs). Further, Comfort (2005) argues that inability to imagine attacks on the security of U.S. cities on the scale of the 9/11 events limited government capacity to plan defensively for such threats. Preparedness, thus, is more temporary and provisional, focused on short-term measures to minimize the effects of existing risk, hazard, or vulnerability in the absence of mitigation actions (Schwab, 2014).

Preparedness is commonly viewed as consisting of activities aimed at improving response activities and coping capabilities (Sutton & Tierney, 2006). However, emphasis is increasingly being placed on recovery preparedness—that is, on planning not only in order to respond effectively during and immediately after disasters but also in order to successfully navigate challenges associated with short- and longer-term recovery. According to Sutton and Tierney (2006), emergency preparedness practices involve the development of plans and procedures, the recruitment and training of staff, and the acquisition of facilities, equipment, and materials needed to provide active protection during emergency response. Disaster risk reduction (DRR) has long been recognized in the literature for its role in mitigating the negative environmental, social and economic impacts of natural hazards (Shreve & Kelman, 2014).

After a disaster occurs, demand for aid supplies will likely change over time; some items are needed immediately at the earliest stages of relief operations, while other items can be safely supplied during later stages. Types of pre-positioned stocks vary, and are chosen to meet the immediate needs of those affected: food items (e.g. high-energy biscuits, and ready-to-eat meals), non-food items (e.g. jerry cans, taps, tents, blankets, hygiene kits, and kitchen sets), medical supplies and equipment (e.g. telecommunication equipment, and metal detectors). Some relief organizations store a variety of items, while some specialize in a particular sector, such as food (Balcik & Beamon, 2008).

Additional preparedness measures may include the government use of hazard awareness campaigns to make households and businesses aware of the risks they face and of suitable hazard adjustments for reducing their vulnerability (Prater & Lindell, 2000). Disaster Recovery Planning (DRP) are also necessary, involving decisions and actions taken after a disaster to restoring or improving the pre-disaster living conditions while encouraging and facilitating to obtain necessary adjustments to reduce disaster risk (Kaushalya, Karunasena, & Amarathunga, 2014). Further, planning for insurance protection are inextricably linked because the obvious solution for organization finance needs during an interruption of business is to transfer the risk of loss through the insurance (Nquot & Kulatunga, 2014).

2.3 Disaster Response and Resilience

The response component includes actions taken to respond to the actual disaster once it has occurred, such as rescuing survivors, conducting mass evacuations, feeding and sheltering victims, providing emergency medical care, and restoring communications (Schwab, 2014). Emergency response consists of actions taken a short period prior to, during, and after disaster impact to reduce casualties, damage, and disruption and to respond to the immediate needs of disaster victims (Tierney et.al, 2001).

Disaster impacts tend to be large, intractable problems that test the ability of communities, nations, and regions to offer responses that effectively protect their populations and infrastructure, to reduce both human and property loss, and to rapidly recover (Altay & Green, 2006). Accordingly Col (2007) surmise that disaster response comprises immediate actions to save lives, protect property and meet basic human needs. Hurricane Katrina revealed weaknesses that may prevent effect response where the national emergency management system is in disarray, incapable of responding effectively to the immediate needs of communities along the risk areas and unprepared to coordinate the massive relief effort required to support recovery (Waugh & Streib, 2006).

According to Schwab (2014), a DRP for multi-hazard events is more effective than concentrating on a single hazard event. Consequently, a multi-hazard approach involves translating and linking knowledge of a full-range of hazards into disaster and risk management. It will look not only at natural hazards, but also factors including political strategies, technical analysis, and operational capabilities and public understanding. This approach will ultimately lead to greater effectiveness and cost-efficiency (United Nations, 2008). Emergency response activities are conducted routinely by county governments on a daily basis for emergencies that draw only upon locally available resources. A substantial share of county government budgets are dedicated to supporting day-to-day emergency response activities, such as fire suppression and ambulance calls. These emergency response needs are amplified in a disaster and will prompt local governments to call upon other entities for assistance, support, and resources (Schwab, 2014).

DRR also needs to take into consideration the vulnerable populations such as those with poor health, disabilities, and chronic diseases are at an increased risk of adverse health outcomes resulting from natural disasters (Bethel et.al, 2011). They are more likely to have a slower response time to disasters or be unable to take appropriate response steps. Similarly, people with at least one chronic disease may have their illnesses aggravated by conditions left by the disaster such as extreme heat or cold, lack of potable water, and lack of food.

2.4 Disaster Recovery and Resilience

Col (2007) defines disaster recovery to include decisions and actions related to replacing lost residential and business properties, rebuilding the economic base, and repairing and rebuilding the infrastructure. This component includes restoring housing, transportation, and public services; restarting economic activity; and fostering long-term community redevelopment and improvements (Schwab, 2014). The post-disaster recovery process usually consists of a series of distinct but interrelated programs; for instance, covering infrastructure, medical and health systems, education facilities, and so on. Recovery requires sustained commitment over time to rebuilding goals and objectives often formed or articulated after a disaster has happened. On the other hand, effective recovery may be enhanced by pre-event planning that identifies linkages between all four disaster management components (Schwab, 2014).

A disaster recovery project is a job which is never completed – project planning must be tested and revised several times during its lifetime. Long-term disaster recovery has become a much more central concern, and pre-disaster recovery planning has become a focus in emergency planning (Prazeres & Lopes, 2013). There is more pressure to link disaster recovery to economic development and to deal with the long-term social and economic problems exacerbated by disasters. The broadened mission of emergency management requires a much different skill set than what was once expected of civil defense officials and has been expected of homeland security officials (Waugh & Streib, 2006).

According to Cutter et.al (2010), vulnerability is the pre-event, inherent characteristics or qualities of social systems that create the potential for harm. On the other hand, resilience is the ability of a social system to respond and recover from disasters and includes those inherent conditions that allow the system to absorb impacts and cope with an event, as well as post-event, adaptive processes that facilitate the ability of the social system to re-organize, change, and learn in response to a threat. Vulnerability thus is a function of the exposure (who or what is at risk) and sensitivity of system (the degree to which people and places can be harmed).

It is understood that disasters do turn back the development clock through loss of infrastructure, livelihoods and psychological stress (Schipper & Pelling, 2006). Climate change too can pose one of the most serious environmental problems confronting human development. The impacts of climate change on development are expected to manifest primarily through impacts on natural resources, on which the poor depend heavily, and on human health. Hence climate change responses, particularly building adaptive capacity and technology transfer, will regularly be akin to development activities.

2.5 Conceptual Framework

In order to investigate the research questions, the following conceptual framework was adopted as indicated in figure 1 hereunder. The independent variables were; disaster mitigation, disaster preparedness, disaster response and disaster recover. The dependent variable was disaster resilience. The intervening variables are derived from the emergencies such as fire, terrorist attack, and climatic change.

2.5.1 Community Disaster Resilience Framework (CDRF)

In hazards research, the definition of resilience is refined to mean the ability to survive and cope with a disaster with minimum impact and damage (Cutter et.al, 2010). Thus the CDRF is generally focused on engineered and social systems, and includes pre-event measures to prevent hazard-related damage and losses (preparedness) and post-event strategies to help

cope with and minimize disaster impacts. Accordingly, Waugh and Streib (2006) stresses importance of increasing resilience through hazard mitigation to prevent or lessen the impact of disaster, such as building levees or moving people out of floodplains; disaster preparedness, such as through emergency planning and training; disaster response activities, such as through conducting search and rescue activities; and disaster recovery, usually involving the restoration of lifelines and basic services.

2.5.2 Disaster Resilience of a Place (DROP)

The DROP model presents the relationship between vulnerability and resilience in a manner that is theoretically grounded and amenable to empirical testing. Furthermore, the DROP framework explicitly focused on antecedent conditions, specifically those related to inherent resilience. Antecedent conditions are the product of place specific, multi-scale processes that occur within and between natural systems, the built environment, and social systems (Cutter, Burton, & Emrich, 2010). DROP therefore encompasses enhancing disaster-risk reduction before a disaster occurs, and also during the reconstruction process, requires enhanced knowledge regarding the most vulnerable groups, the areas at risk and the driving forces that influence and generate vulnerability and risk (Birkmann, 2007). In summary, DROP involves both disaster risk reduction (prevention, preparedness and mitigation) and humanitarian and development action (emergency response, relief and reconstruction) (Schipper & Pelling, 2006).

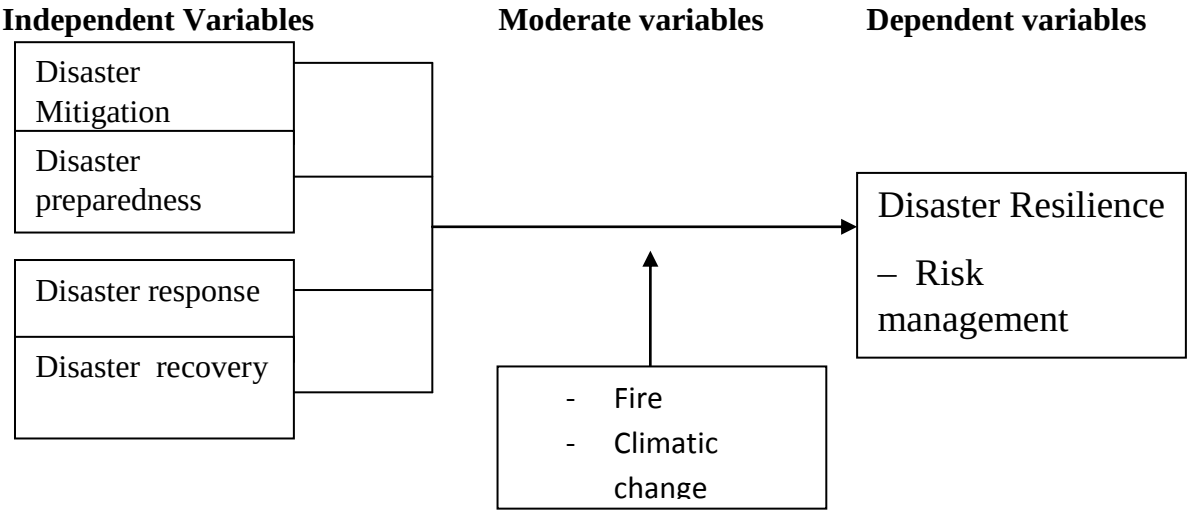

Figure 1 Conceptual framework (*Source: Researcher (2015))*

2 Methodology

2.1 Research Design

A descriptive survey design was used to help fulfill the study objectives. The design can be used to portray an accurate profile of persons, events or situations while at the same time allowing for collection of quantitative data that can be analyzed quantitatively using descriptive and inferential statistics (Mugenda and Mugenda, 2009)

2.2 Target Population

The target constituted those with disaster management roles employed at the county level comprising of 456 employees where a sample of 138 employees was selected using stratified random sampling. The sample for this study composed of employees in various departments of the government (Environment = 15.9%; Public works = 19.6%, Fire department = 3.6%,

Public Health = 22.5%) NGO (Red Cross = 38.4%). Participant selection was based on theoretical sampling using the Cochran Formula cited in Zare, et.al (2010) sample volume in this research has been estimated at 138 people using the expression:

$$n = \frac{N * z^2_{a/2} * P(1-P)}{\varepsilon^2 (n-1) + z^2_{a/2} * P(1-P)}$$

where P = Estimated as adjective ratio of variable (P=0.5). Where p=0.5, n quantity is maximum and it causes sample to be large enough; Z = The quantity of normal variable of unit, proportionate to safety level of 95 percent; $Z_{a/2} = 1.96$ ε = The wrong permissible quantity (ε = 0.07); and N = The volume of statistical social (N = 456).

Therefore, n = 138

The gender composition of the sample was 51.4% male and 48.6% female. The experience measured in terms of length of service varied from Less than 1 year (13.8%); 1 to 3 years (15.9%); 4 to 7 years (36.2%); and Over 7 years (34.1%). Level of education attained by the participants ranged from Certificate or Diploma (59.4%); Bachelor's degree (31.2%); and Master's degree and above (9.4%).

2.3 Instrumentation and Analysis

Data was collected using self-report questionnaire. All indices were measured on five-point Likert-type scales ranging from "1" (strongly dissatisfied/disagree) to "5" (strongly satisfied/agree). The validity and reliability of the instrument were ensured through experts' opinions and pilot testing in the field involving 10% of the sample size, that is, 14 participants. The overall reliability of the questionnaire was established at 0.877 Alpha, which was acceptable to launch the study at large scale since the scales met the generally accepted reliability of 0.7. Data analyses were conducted using SPSS 20.0 software. Univariate analysis (that is, percentages) was performed to describe the study sample. Correlation and multiple regression analyses were appropriate as a test of the independent association between the four disaster management measures and the dependent variable.

3. Results

Multiple regression analysis was employed to identify which disaster management dimensions best predict disaster resilience. For the regression, all four factors of perceived disaster management were included in the equation. The results in Table I show that Hazard mitigation (β = -0.43, p = 0.041), Disaster preparedness (β = 0.565, p = 0.0), Disaster response (β = 0.658, p = 0.0), and Disaster recovery (β = -0.049, p = 0.74). Thus according to participants, only short term measures of disaster management were associated with disaster resilience positively, that is Disaster preparedness and Disaster response. The long term dimensions of disaster management were perceived to relate negatively with Disaster resilience all the relationships were significant except with respect to Disaster recovery. The model explained 44.9% of the total variance in Disaster resilience [F(4,114) = 25.037, p = 0.0]. Thus the model generally found some empirical support for the relationship Disaster management and Disaster resilience as shown in Table 1.

Table I: Regression Analysis

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.684[a]	.468	.449	.58714

a. Predictors: (Constant), Disaster recovery, Disaster response, Disaster preparedness, Disaster mitigation

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	34.523	4	8.631	25.037	.000[b]
	Residual	39.299	114	.345		
	Total	73.822	118			

a. Dependent Variable: Disaster resilience

b. Predictors: (Constant), Disaster recovery, Disaster response, Disaster preparedness, Disaster mitigation

Coefficients[†]

		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	.622	.329		1.888	.062
	Disaster mitigation	-.430	.208	-.348	-2.064	.041
	Disaster preparedness	.565	.152	.385	3.730	.000
	Disaster response	.658	.153	.694	4.315	.000
	Disaster recovery	-.049	.147	-.027	-.333	.740

The correlation matrix revealed that all four measures of Disaster management were significantly and positively correlated with Disaster resilience. Specifically, the four phases of Disaster management were correlated with each other as well as with Disaster resilience. Disaster resilience correlated positively with the entire Disaster management dimension which were all significant at $\alpha = 0.05$ as shown in table II below.

Table II: Correlation Analysis

[†] **Dependent Variable: Disaster resilience**

		Hazard mitigation	Disaster preparedness	Disaster response	Disaster recovery	Disaster resilience
Hazard mitigation	R	1				
	P					
	N	131				
Disaster preparedness	R	.701**	1			
	p	.000				
	n	124	128			
Disaster response	r	.891**	.663**	1		
	p	.000	.000			
	n	131	126	133		
Disaster recovery	r	.453**	.534**	.396**	1	
	p	.000	.000	.000		
	n	127	123	129	130	
Disaster resilience	r	.530**	.591**	.628**	.263**	1
	p	.000	.000	.000	.003	
	n	127	127	129	126	132

4. Discussion

The study found out that disaster risk management strategies especially preparedness, response and recovery is differently understood by different categories of participants. Consequently, the regression analysis indicated a negative coefficient for hazard mitigation unlike Disaster preparedness that posted a positive beta coefficient. This contradicts (Schipper & Pelling, 2006) view that disaster risk management strategies like risk reduction is largely a task for local actors, albeit with support from national and international organizations, particularly in humanitarian action. It is then surprising that even disaster risk management staff from Government agencies largely construe their major role as mainly involving immediate post disasters actions such as disaster response.

Consequently, the study showed that prevention as indicated by long term interventions has not been given adequate attention through measures such as Hazard mitigation and disaster recovery actions and plans. Altay and Green (2006) recommended recovery planning involving taking long term actions after the immediate impact of the disaster has passed to stabilize the community and to restore livelihoods and some semblance of normalcy, which this study supports totally

Disaster risk management programs involve a complex web of institutional linkages. These include the participation of national and county government agencies, businesses and private sector associations, non-government organizations, volunteer groups, the academia, media, and foreign funding agencies. Some local communities affected by or vulnerable to disaster risks natural hazards have also formed associations for disaster preparedness. Coordination among these organizations, therefore, remains a serious challenge for stakeholders involved according to Quero, R (2012) the same is supported by the outcome of the study. The study further found out the following; emergency management capacity is built from the ground up, neighborhood and community programs have to stand on their own because assistance may not arrive immediately. Major incidents are addressed by mutual assistance arrangements

among community police, fire, and emergency medical service providers. Prevention is generally a local responsibility as well.

Further to the foregoing, mitigation is the application of measures that will either prevent the onset of a disaster or reduce the impacts should one occur. Preparedness activities prepare the community to respond when a disaster occurs. Response is the employment of resources and emergency procedures as guided by plans to preserve life, property, the environment, and the social, economic, and political structure of the community. Recovery involves the actions taken in the long term after the immediate impact of the disaster has passed to stabilize the community and to restore some semblance of normalcy.

5. Conclusions and Recommendations

The significance of developing a comprehensive disaster management model is emphasized more comprehensively and measures should be taken both for pre and post disaster phases and these measures should be supported by a strategic plan which is developed according to specific local hazard maps. Further to the foregoing, there is need to account for the strategies in the perceived disaster risk management in respect to the structure of the county government and type of information system installed therein.

The study notes that it is not enough for departments to be established and functions as outlined for the personnel, however, continuous training, increased communication and coordination on an ongoing basis with all the key stakeholders and awareness is necessary to enable appreciation of the state of the science and artificial changes in the disaster risk management theory as well as practice so that increased collaboration and effectiveness can be attained. The study suggests future research to include the participation of national and county government agencies, business and private sector associations, non-government organizations, volunteer groups, the academia, media, and foreign funding agencies. This is because coordination among these organizations remains a serious challenge for stakeholders involved, thus further research is needed to highlight how that coordination can be carried out.

References

Akeyo, S. (2010). Youth Involvement in Disaster Management. *The 5th Annual Caribbean Conference on Comprehensive Disaster Management* (pp. 1-24). Montego Bay: The Caribbean Disaster Emergency Management Agency (CDEMA).

Altay, N., & Green, W. (2006). OR/MS research in disaster operations management. *European Journal of Operational Research , 175*, 475–493.

Balcik, B., & Beamon, B. (2008). Facility location in humanitarian relief. *International Journal of Logistics: Research and Applications , 11* (2), 101–121.

Bethel, J., Foreman, A., & Burke, S. (2011). Disaster preparedness among medically vulnerable populations. *American Journal of Preventive Medicine , 40* (2), 139–143.

Birkmann, J. (2007). Risk and vulnerability indicators at different scales: Applicability, usefulness and policy implications. *Environmental Hazards , 7*, Environmental Hazards.

Carter, N. (2008). *Disaster management: A disaster manager's handbook.* Mandaluyong City: Asian Development Bank.

Caymaz, E., Akyon, F., & Erenel, F. (2013). A model proposal for efficient disaster management: The Turkish sample. *Procedia - Social and Behavioral Sciences , 99*, 609 – 618.

Claudianos, P. (2014). Out of harm's way; preventive resettlement of at risk informal settlers in highly disaster prone areas. *Procedia Economics and Finance , 18*, 312 – 319.

Col, J.-M. (2007). Managing disasters: The role of local government. *Public Administration Review* , 147-124.

Comfort, L. (2005). Risk, security, and disaster management. *Annual Review of Political Science , 8*, 335–356.

Cutter, S., Burton, C., & Emrich, C. (2010). Disaster resilience indicators for benchmarking baseline conditions. *Journal of Homeland Security and Emergency Management , 7* (1), 1-22.

Gencer, E. (2013). The interplay between urban development, vulnerability, and risk management: A theoretical overview. *Mediterranean Studies , 7*, 7-43.

Godschalk, D. (2003). Urban hazard mitigation: Creating resilient cities. *Natural Hazard Review , 4* (3), 136-143.

Hristidis, V., Chen, S.-C., Li, T., Luis, S., & Deng, Y. (2010). Survey of data management and analysis in disaster situations. *The Journal of Systems and Software , 83*, 1701–1714.

Iwata, K., Ito, Y., & Managi, S. (2014). Public and private mitigation for natural disasters in Japan. *International Journal of Disaster Risk Reduction , 7*, 39-50.

Kapucu, N. (2008). Culture of preparedness: Household disaster preparedness. *Disaster Prevention and Management , 17* (4), 526-535.

Kaushalya, H., Karunasena, G., & Amarathunga, D. (2014). Role of insurance in post disaster recovery planning in business community. *Procedia Economics and Finance , 18*, 626 – 634.

Kunz, N., Reiner, G., & Gold, S. (n.d.). Investing in disaster management mapabilities versus pre-positioning Inventory: A new approach to disaster preparedness.

Mayunga, J. (2009). *Measuring the measure: A multi-dimension scale model to measure community disaster resilience in the US Gulf Coast region.* Texas City: Unpublished Doctor of Philosophy from Texas A&M University.

Mohit, M., & Sellu, G. (2013). Mitigation of climate change effects through non-structural flood disaster management in Pekan Town, Malaysia. *Procedia - Social and Behavioral Sciences , 85*, 564 – 573.

Mugenda and Mugenda, (2009). Research Methods. Quantitative and Qualitative Approches. Nairobi.

Nquot, I., & Kulatunga, U. (2014). Flood mitigation measures in the United Kingdom. *Procedia Economics and Finance , 18*, 81 – 87.

Paul, J., & Hariharan, G. (2012). Location-allocation planning of stockpiles for effective disaster mitigation. *Annals of Operations Research , 196* (1), 469-490.

Prater, C., & Lindell, M. (2000). Politics of hazard mitigation. *Natural Hazards Review , 1* (2), 73-82.

Prazeres, A., & Lopes, E. (2013). Disaster recovery – a project planning case study in Portugal. *Procedia Technology , 9*, 795 – 805.

Quero, R. (2012). Reframing coordination challenges for public-private partnerships in disaster preparedness. *Procedia - Social and Behavioral Sciences , 57*, 440 – 447.

Schipper, L., & Pelling, M. (2006). Disaster risk, climate change and international development: Scope for, and challenges to, integration. *Disasters , 30* (1), 19−38.

Schwab, J. (2014). *Planning for post-disaster recovery: Next generation.* Chicago: American Planning Association.

Shreve, C., & Kelman, I. (2014). Does mitigation save? Reviewing cost-benefit analyses of disaster risk reduction. *International Journal of Disaster Risk Reduction , 10*, 213–235.

Sutton, J., & Tierney, K. (2006). *Disaster preparedness: Concepts, guidance, and research.* Boulder, Colorado: Natural Hazards Center Institute of Behavioral Science, University of Colorado.

Tierney, K., Lindell, M., & Perry, R. (2001). *Facing the unexpected: Disaster preparedness and response in the United States.* Washington, DC: The National Academies Press.

United Nations. (2008). *Disaster preparedness for effective response: Guidance and indicator package for implementing priority five of the Hyogo Framework.* New York: United Nations secretariat of the International Strategy for Disaster Reduction (UN/ISDR).

Waugh, W., & Streib, G. (2006). Collaboration and leadership for effective emergency management. *Public Administration Review* , 131-140.

Xiaoyan, D., & Xiaofei, L. (2012). Conceptual model on regional natural disaster risk assessment. *Procedia Engineering , 45*, 96-100.

Zare, R., Jajarmizadeh, M., & Abbasi, N. (2010). Relation between Job Characteristics Model (JCM) and Learning Organization (LO). *World Applied Sciences Journal , 8* (10), 1253-1259.

Ze-fu, L., & Chuan-liang, J. (2012). The optimization model in the disaster risk mitigation investment. *Systems Engineering Procedia , 5*, 191 – 197.