Disaster Response Operations Incident Command Systems in Mombasa County, Kenya

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Abstract

Most of the previous disaster response by first responders shows the insignificant existence of a management structure that syntheses complex disaster scenarios and response under exceptional circumstances as a unitary system. Cases of Delay in response to emergencies resulting in death and uncoordinated response are prevalent among response organizations due to minimal use of Incident Command System. Globally, the U.S. response organization's ability to provide effective and coordinated responses to complex incidents came under intense scrutiny in the aftermath of the 9/11 terrorist attacks and the dissemination of anthrax in 2001. Regionally, the response to the Ebola virus outbreak in Sierra Leone overwhelmed the national capacity to contain it necessitating a massive international response. The inapplicability of the Incident Command System contributed to the duplication of efforts between the coordination groups, and slow resource mobilization. At a national level, the 2002 Mombasa attack was a two-pronged terrorist attack on 28 November 2002 in Mombasa, Kenya against an Israeli-owned hotel and a plane belonging to Arkia Airlines. An all-terrain vehicle crashed through a barrier outside the Paradise Hotel and blew up, killing 13 and injuring 80. At the same time, attackers fired two surface-to-air missiles at an Israeli charter plane. The Paradise Hotel was the only Israeli-owned hotel in Mombasa. The Paradise Hotel terror attack in 2002 in Mombasa and the Westgate terror attack in 2013 in Nairobi showed operation decay. The Westgate terror attack siege lasted 80 hours and resulted in at least 67 deaths and more than 175 people wounded in the mass shooting. A fatal friendly fire incident between security forces undermined the response and left the attackers free to prolong their slaughter. This research, therefore, sought to examine the structure of Mombasa County Incident Command System of a few selected organizations influencing disaster response operations. Contingency theory and goal theory guided the study. A descriptive research design was used. A stratified sampling technique was used to determine the sample category of 155 respondents from, the Red Cross Society, Kenya Police Service, Mombasa Fire Brigade, and Na-

tional Youth Service. The instruments of data collection were structured questionnaires. SPSS version 27 was used to analyze data and then presented it on tables and graphs. Test validity refers to the degree to which the test actually measures what it claims to measure. Test validity is also the extent to which inferences, conclusions, and decisions made on the basis of test scores are appropriate and meaningful. Validity was determined using content validity while reliability using a retest process. Results indicated that differences in organizations' Incident Command System affected effective response to disaster operations. Also, lack of cooperation by multiagency, waste and duplication of resources, and difficulty in coordinating response activities were the challenges identified that an organization face while responding to large disasters in the absence of the Incident Command System. The study recommends that response agencies should embrace fostering cooperation during joint operations to avoid waste of resources and duplication of roles and difficulty in coordinating response activities through the use of the Incident Command System.

Subject Areas

Disaster Management, Emergency Management, Humanitarian Assistance & Peace and Conflict Studies

Keywords

Incident Command System, Response Operation, First Responders

1. Introduction

1.1. Background

Disasters experienced in recent years have had a significant impact on people, property and the environment, and this widespread impact has informed the review of policies, measures and approaches to managing them. Despite response arrangements such as multi-agency response, military efforts and various other international efforts, disasters continue to have a negative impact on communities across the world [1].

Longer incident response time comes with notable delay to response organizations and this increases the likelihood of a secondary incident that is often more severe than the initial incident. The traditional incident management approach is a systematic approach, largely performed independently with limited coordination among involved agencies. To minimize the incident response time, the Incident Command System has ensured that every agency involved in the response operation work effectively and efficiently [2].

Globally, aftermath of the 9/11 terrorist attacks and the dissemination of anthrax in 2001, the ability of the U.S. healthcare system to provide an effective and coordinated response to mass casualty or complex incidents came under intense scrutiny. The devastation caused by Hurricane Katrina and the mass dis-

ruption of public health and medical services along the Gulf Coast spotlighted the need for cohesive strategies that focus on management systems for major public health, medical and other humanitarian organizations response. The need for management structure will allow the U.S. to discuss, analyze, and describe complex disaster scenarios and response under exceptional circumstances as a single system [3].

Incident Command System (ICS) has been tested in the U.S. for more than 30 years of emergency and non-emergency applications, and therefore, all levels of government are required to maintain different levels of ICS training and private sector organizations regularly use ICS for management of events. According to Scholl and Carnes [4], ICS is mandated by law for all Hazardous Materials responses nationally and for many other emergency operations in most states.

In Africa, response to the 2014-2015 Ebola virus disease (EVD) outbreak in Sierra Leone overwhelmed the national capacity to contain it and necessitated a massive international response and strong coordination platform. Lack of effective establishment of Incident Command System led to competition and duplication of efforts between the numerous coordination groups, slow resource mobilization, inadequate capacity of staff for health coordination, and an overtly centralized coordination and decision-making system as the main coordination challenges during the outbreak [5].

Nabutola [6], noted that despite the many important disaster management initiatives undertaken in Kenya over the past two decades, an adequate level of preparedness required to address its significant risk profile has not been achieved. Initiatives have been undertaken in an inconsistent, unharmonious, reactive and uncoordinated manner due to the lack of a unified policy framework. Disaster systems and risk management are still centralized and bureaucratic, with decision-making authority not yet devolved to the counties. Although Kenya's economy and by extension its population could be classified as highly vulnerable to natural and man-made disaster risks, the country does not have a comprehensive disaster management framework and strategies guided by appropriate policy and legislative provisions. The country is fortunate to have been able to sort of manage from one emergency to another, without an effective disaster management system.

The continued lack of disaster preparedness is a development challenge in Kenya. Poor collaboration and coordination efforts from all stakeholders including government departments have led to poor responses to flood incidents in Kenya. The United Nations Office for Coordination of Humanitarian Affairs [7], indicates that 170 people died and 22,500 people were displaced due to the March-April-May enhanced rains in 2013 that impounded parts of Kenya.

In Nairobi County, the Al-Shabaab claimed the Westgate Malls attack on Saturday 21st September, 2013 was "retributive justice for crimes committed" by Kenya Defence Forces (KDF) in Somalia. The incursion and the subsequent capture of Kismayu by Kenya Defence Forces (KDF), a strategic port city, translated to the strangulation of Al-Shabaab's lifeline. When Al-Shabaab lost Kis-

mayu, it lost its hold on the revenue from imports and exports through the Kismayu port. The response to Westgate shopping mall terrorists attack on Saturday 21, September 2013, which lasted 80 hours and resulted in at least 67 deaths and wounding of more than 175 people in the mass shooting, Odhiambo (2014) [8], was a result of infighting and a fatal friendly fire between response agencies undermining their response and left the attackers free to prolong their slaughter [9]. According to Dron [10], Kenyans have questioned the ability of forces both in terms of operations and skills to effectively respond to daily threats when they occur.

1.2. Statement of the Problem

The need for developing an Incident Command System that can coordinate response activities has not been embraced by the response agencies. Most responses have been undertaken in an inconsistent, inharmonious, reactive and uncoordinated manner due to the multiplicity of response organizations. Previous disasters response could have been a case for identification of response organizations preparedness challenges for future preparedness for effective response and coordination. Nikbakhsh and Farahani [11], noted that the scale and complexity of emergencies in Mombasa County strongly suggests the need for appreciating the role of Incident Command System for effective response to these emergencies. Examinations of major emergencies reveal exceptionally complex management scenarios contributing to delay in response to emergencies, infighting and incompetence among response agencies during disasters due to lack of Incident Command System [12].

While ICS has been used by emergency responders for nearly four decades, there has not been much scientific research on the effectiveness of the system [13]. In a recently published paper, there were only 14 scholarly peer-reviewed journal articles reporting the findings of empirical research on ICS in the United States but were not again addressing on the issue of preparation effectiveness of the systems. It's in this view that the study sought to examine structure of Mombasa County Incident Command Systems of selected organizations influencing disaster response operations.

1.3. Objective of the Study

The objective of the study was to examine structure of Mombasa County Incident Command System of selected organizations influencing disaster response operations.

1.4. Research Question

How does the structure of Incident Command System help in effective disaster response operation?

1.5. Academic Justification

The study findings bridges that gap and contribute to the general field of know-

ledge, which may be of utmost importance to other researchers doing their research in disaster management field. The research findings will also assist response organizations in assessing their training curriculum so that they can make changes on aspects that seem to be lacking for effective response to disasters.

Policy Justification

Findings can be beneficial to Kenya government in formulation of policies, improve existing policies through sealing identified gaps in relation to these findings for effective response to disasters. First Responder organizations and NGOs interested in planning and responding to disasters can find the findings beneficial for guidance purposes.

2. Literature Review

2.1. The Culture of Preparedness in Response to Disasters

Demands imposed by disasters have prompted the evolution of emergency management into a formal set of activities assigned to responsible parties and coordinated across governments. Practices and policies have evolved over decades, and organizations and agencies, such as the Red Cross and emergency services, such as police and fire departments, have evolved a complex system of practices and procedures. However, the events of September 11, 2001 (terrorist attack in United States of America), further crystallized these responsibilities [14].

Kenya National Disaster Management bill, 2015 acknowledges importance of disaster preparedness through collaborative way [15]. Overall, direct reference to capabilities in response organizations policies is sparse. While there is general acknowledgement of the role that Incident Command System and tools may play in incident response and management. Some of response organizations in Mombasa County have implemented a National Incident Management System (NIMS) while others not [16].

According to Aparna [15], at the County level in Kenya, disaster response could be significantly enhanced by integration and coordination of the various response agencies' through use of ICS capabilities. Mission demands of the ICM towards preparedness and the organizations that participate in fulfilling them vary across the phases of disaster and across hazard types. As a result, preparedness requirements also vary.

In areas affected by extreme natural phenomena, there is a tendency to believe that these are rare events that will not recur with the same intensity for many years. The consequences of these phenomena are increasing in severity, not because they increase in intensity and frequency, but because the element at risk, population and infrastructure continue to grow. The implementation of mitigation measures not only improves the capacity of emergency response, but protects routine operations and makes the systems more reliable [17].

For the emergency preparedness and response program to be successful, it should be included in the institutional planning process. That is, the program should complement the routine corrective and preventive aspects of operation and maintenance. Ensuring the success of the program, response organizations have to: maintain training and retraining more so joint training; carry out simulations and evaluation exercises to test emergency plans. The ideal response plan in Mombasa County is expected to be designed to respond to emergencies and disasters with the resources that are currently available within the response organizations capability, assuming that an emergency could occur at any moment. Kovacs and Spens [18], observes that the plan should be kept up to date and be available at any time for use by persons involved in emergency response. Its success will depend on how simple and practical it is to carry out, as well as on the knowledge of the persons involved, obtained through periodical training and simulation exercises.

2.2. Components of an ICS Ready Response in Relation to Incident Command System Structure

Decisive responses must be immediate in order to minimize potentially escalating impacts. Use of the Incident Command System (ICS) provides Humanitarian organizations with a proven response management structure, process, and methodology. ICS is a widely applicable management system designed to enable flexible, effective, efficient all-hazards incident management. By integrating a common emergency planning organizational structure, response operations can be streamlined, coordinated, and coherent to every necessary responder [19].

ICS standardizes titles, clarifies reporting relationships, and eliminates the confusion caused by multiple, conflicting directives. Prior to an incident, standardized roles and responsibilities is clearly established and assigned in the response plan. The individuals assigned to each area of response is trained accordingly and thus familiar with applicable response plans, this make Incident Command System adapt to its function during humanitarian relief operation. According to Decker [20], a typical ICS organizational structure is built around five major management activities or functional areas:

2.2.1. Command
The command function is, the act of directing, ordering, or controlling by virtue of explicit statutory, regulatory, or delegated authority. With a significant or prolonged incident, command will be transferred to other individuals. When command is transferred, the process must include a briefing that captures all essential information for continuing safe and effective operations. Command transfers should be expected during an extended incident, and does not reflect on the competency of the acting Incident Commander [21]. Humanitarian organizations train each individual for their designated role to ensure a smooth command transfer, or at a minimum, coordinate transfers with external responders or agencies. The ICS Unified Command structure allows state, and local

On-Scene Coordinators to work together effectively without affecting individual agency authority, responsibility, or accountability.

2.2.2. Operations

The operations function of ICS is responsible for the direction and coordination of all incident tactical operations. ICS operations enable short and long-term field-level operations for a broad spectrum of emergencies, from small to complex incidents, both natural and manmade. The designated Operations Section Chief organizes, assigns, and supervises the entire tactical field resources assigned to an incident. However, a manageable span of control is established to monitor the number of resources that report to any one supervisor. Per ICS guidelines, a supervisor optimally should not have more than five subordinates.

2.2.3. Planning

The planning function of ICS accounts for the collection, evaluation, and distribution of information regarding incident development and the necessary resources required to counteract the circumstances. Despite potential incomplete scenario details, planners must implement an Incident Action Plan that can be communicated through concise briefings during the initial stages of incident management. Pre-planning applicable emergency scenarios is highly recommended and can greatly minimize the initial planning stage. Implementing an unexercised plan during an incident may result in a prolonged and inefficient response.

As the incident management effort evolves over time, additional lead time, staff, information systems, and technologies enable more detailed planning and cataloging of events and "lessons learned." Coordinated communication is a critical planning element that enables targeted directives to be carried out.

2.2.4. Logistics

The logistic component of ICS is responsible for providing the necessary facilities, services, and materials to meet the needs of the incident response. According to Hughes [22], potential complexity of response logistics should be analyzed, optimized, and communicated within an established and exercised response plan.

During an emergency, logistics personnel may be involved in: Participating in preparation of the Incident Action Plan (IAP), providing utility maps to emergency responders, providing material safety data sheets to employees, coordinating and processing requests for additional resources, repairing equipment, arranging for medical support, food and transportation, arranging for shelter facilities, providing for backup power, providing for backup communications and implementing the Incident Demobilization Plan [23].

2.2.5. Administration

The Finance/Administration Section has two key missions during an incident: Cost monitoring and payment: Account for all financial elements related to the

incident. This may include providing financial and cost analysis information as requested. The finance or administration Section Chief is responsible for tracking all costs incurred during the event.

Administration: Collects, details, and maintains a record of the incident events, investigations, and recovery operations. The administrative component may also be responsible for gathering pertinent information from agency briefings and ensuring all documents initiated at the incident are properly prepared, completed, and submitted as necessary [24]. All teams, sections, and divisions establish logs and submit copies to the Finance/Administration Section Chief, or delegate every 12 hours or at determined increments.

2.3. Conceptual Framework

Wasike and Odhiambo [25], discuss the role of theories in guiding the thrust of academic studies. They emphasise the importance of theories in offering compelling and incisive causal explanations with calculated precision. They buttress their argument by quoting Smith [26], who asserts that theories play the role of predicting, prescribing and evaluating socio-political phenomena hence they cannot be ignored.

2.3.1. Contingency Theory

Contingency theory has its roots in organizational theory and it explains how organizations can survive in the environment they function in. The contingency theorists presented an open system view and rationalized that the organization in itself is not a closed system but an open one in which the organization is dependent on other external variables such as the environment [21]. Contingency theory is concerned with how an organization can systematically achieve a good fit with its environment, how it can adapt to changing environmental circumstances, how it can ensure that internal relations are in balance and appropriate and what it means in operational terms.

Morgan [27] claims that there is no best way to organize a corporation or to make decisions. Instead, the optimal course of action is contingent (dependent) upon the internal and external situation. A contingent leader effectively applies their own style of leadership to the right situation. Being flexible in choosing and adapting to succinct strategies to suit change in situation at a particular period in time in the running of the organization which also fits the characteristics of the effective Incident Command System [28].

2.3.2. Goal Setting Theory

Goal-setting theory illuminates the concept of performance and strategy when presenting contingency theory in relation to mission of the disaster response organizations for instance when responding to disasters in Mombasa County. Locke and Latham [29], stated that organizations should strive to set challenging, yet attainable, goals. The performance of an organization is enhanced by setting (measurable) goals.

Goal-setting theory consequently suggests that a conscious goal will regulate behavior which will then change the mindset of the first responders in Mombasa County to work towards their goal. Duke and Long [30], have implemented goal-setting theory in the humanitarian sector, for example, to predict success in achieving sustainable agricultural systems in developing communities. Lathman [31], argued that the enhanced performance outcome could not be achieved if several goals were set at the same time, since a focus on one goal could lead to difficulties in achieving another. Trade-offs between goals can include trade-offs between quantity versus quality. The same effect has been identified when goals are measured. In operational performance management literature, the effect of individuals being too focused on one goal, thus leading to a blurred understanding of other goals, is discussed as a dysfunctional behavior among disaster response organizations [32]. Figure 1 showing the interaction of the variables.
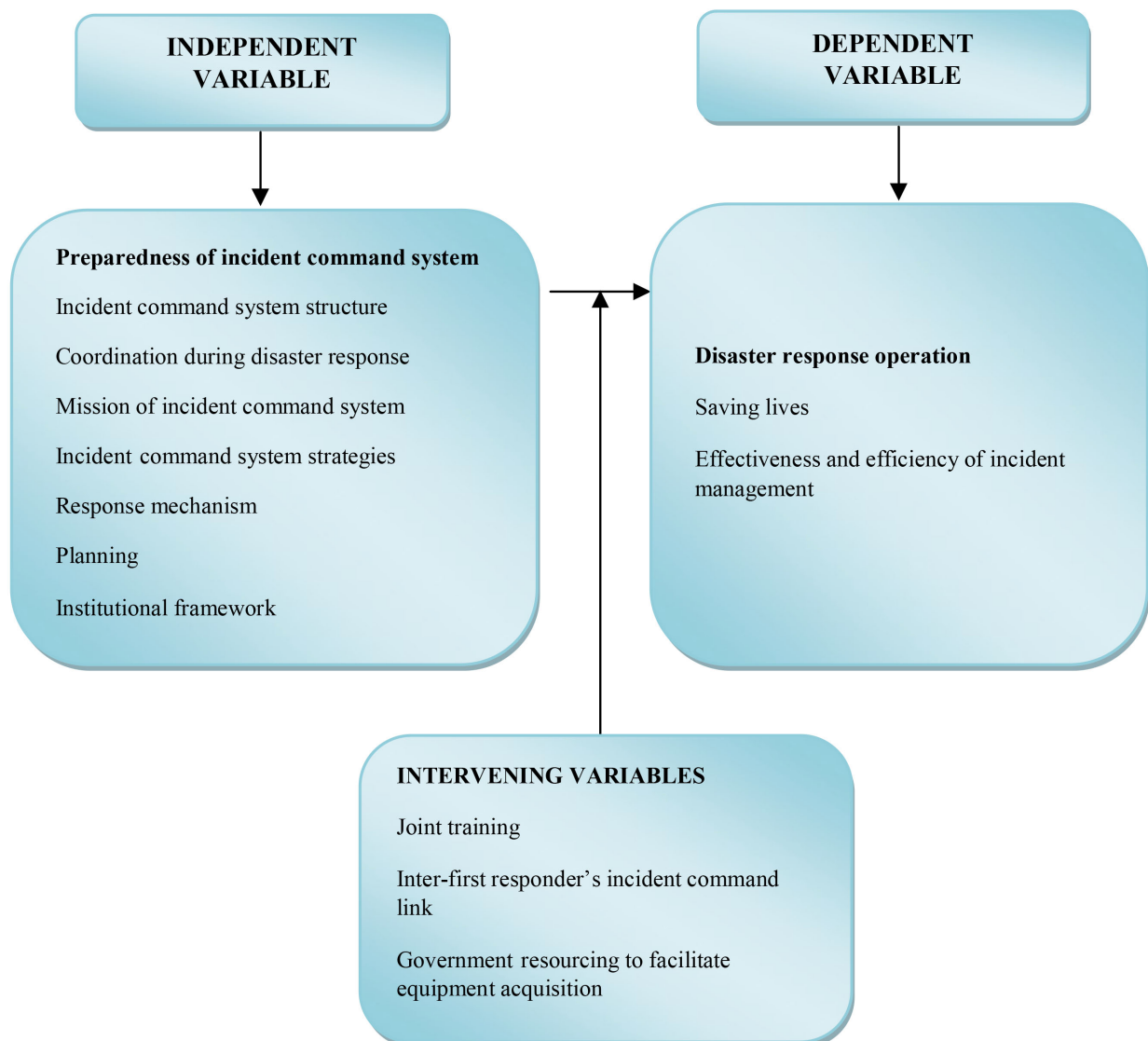

INDEPENDENT VARIABLE

DEPENDENT VARIABLE

Preparedness of incident command system

Incident command system structure

Coordination during disaster response

Mission of incident command system

Incident command system strategies

Response mechanism

Planning

Institutional framework

Disaster response operation

Saving lives

Effectiveness and efficiency of incident management

INTERVENING VARIABLES

Joint training

Inter-first responder's incident command link

Government resourcing to facilitate equipment acquisition

Figure 1. Conceptual framework model showing variables interactions. Source: Researcher (2022).

3. Material and Methods

3.1. Research Design

Descriptive survey research design was used in making a detailed examination in the study due to homogeneous nature of the population under the study, in which both qualitative and quantitative research techniques applied. The design involved gathering data by describing events and then organizes it, depicts, opinions, attitudes, or previous experiences through asking questions. Kothari [33], describes this design as a systematic empirical inquiry into which the researcher does not have direct control of independent variables as their manifestation has already occurred.

Purposive sampling was used in selecting respondents relevant to the research questions [33]. A part from qualitative aspect of the study, quantitative approach was applied to enhance the reliability and validity of the findings thus avoiding bias.

3.2. The Study Location

Mombasa County lies to the east of Kenya, along the Indian Ocean Coast (Lat: −4.043740, Long: 39.658871), and is the premier trading port for Kenya and East Africa, as well as the premier destination for tourists, both local and international. In Kiswahili, Mombasa is called "*Kisiwa Cha Mvita*", which means "Island of War" due to the many violent changes in its administration over the years. Many nationalities have had a say on the Island at one time or another; Africans, Persians, Arabs, Portuguese and British as far back as the 6th century AD. Mombasa County is host to Kenya's second-largest city of Mombasa, which is cosmopolitan with almost all Kenyan people living here. The County has six sub-counties which also act as electoral constituencies: Mvita, Changamwe, Kisauni, Jomvu, Nyali and Likoni.

The economy of the county can be described as mixed with agriculture, manufacturing, maritime activities and tourism being the mainstay of the County. Among these, tourism which contributes to 68% of the wage employment is the leading employer generating both formal and informal employment. Others economic activities are fishing, farming of sisal, sugarcane, cashew nuts, and coconuts and livestock farming. Much of the farming of foodstuff is for subsistence at the household level. Various manufacturing firms have set up base in the County including cement companies, petroleum refining, food processing, and salt production [34].

The history of the county can be traced back to the 16th century. From about the 8th to the 16th century Mombasa was the centre of the Arab slave trade and they attempted to stamp their control on the Island and later on the mainland. The Portuguese later came, led by Vasco da Gama who is said to be the first known European to visit Mombasa. His goal was to spread Christianity and expand Portugal's trade with India. Mombasa became Portugal's main trading centre of spices, cotton and coffee, and they built Fort Jesus as their protection as

well as a trading centre. Mombasa was later taken over by Omani Arabs and then in 1895, the British took over, established the British East African Protectorate and effectively colonised Mombasa, which was to remain its capital from 1887 to 1907.

The British quickly consolidated their control over Mombasa and the whole of East Africa and built a railway line in the early 1900s from Mombasa to Uganda. This increased the importance of Mombasa as a port city, which it is up to today. In the middle of the exchange of power between the Portuguese, the British and Omani Arabs was the issue of land which had been taken from indigenous Mijikenda people who were treated as irrelevant in the power struggle. Kanyinga [35], in a paper titled *The Politics of Land Rights and Squatting in Coastal Kenya*, argues that the land problem started with the Arab slave trade in the 19th century when Kenya's coastal region was loosely federated to the Sultanate of Zanzibar and which continued when the region became a British protectorate. Huge sisal plantations were created in former indigenous lands without any compensation. As time went by, the absence of a comprehensive land policy on the Mijikenda who has lost land worsened, and the locals found themselves as squatters on their land. Subsequent Governments in independent Kenya did little to solve the problem, thus driving many locals to continued poverty. Figure 2 shows the Map of study locale.
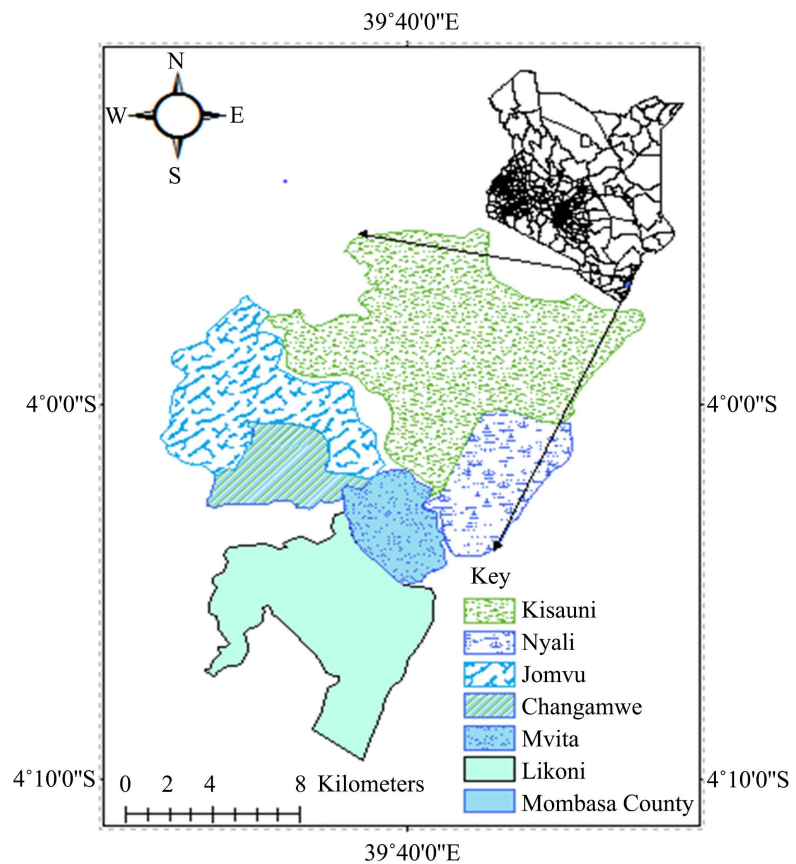

Figure 2. Map of Mombasa County. Source: Researcher (2022).

3.3. Target Population, Sampling Technique and Sample Size

The study population of the research comprised respondents from organizations responsible for disaster response operations Mombasa County; 1240 from Red Cross Society personnel, 1225 National Youth Service, 900 Kenya Police Service, 550 from Mombasa Fire Brigade, totaling to 3915. Purposive sampling was used to determine the settings and the participants. Whereas quantitative studies strive for random sampling, qualitative studies often used purposive sampling, that is, a sample that has a characteristic relevant to the research question [36]. The selection of the sample size was based on those trained to respond to emergencies and on organizations that have been mostly responding to disasters in Mombasa County. These comprised of: Red Cross Society, Kenya Police Service, Mombasa Fire Brigade and the National Youth Service. Therefore, the sample selected for the study was derived from a Simplified Formula for Proportions as employed by Thulin [37] in selecting 155 respondents.

The sample selected for the study was derived from a Simplified Formula for Proportions as employed by Thulin [37] as represented.

Given the population size of the study as 3915 (population of Mombasa County response agencies). With a level of precision at 0.05% expressed as a proportion, while confidence level of 95%, the calculated sample size was:

$$n = \frac{x^2 \times N \times P \times (1-P)}{ME^2 \times (N-1) + (x^2 \times P \times (1-P))}$$

where

n = Sample size

x^2 = Chi square for the specified confidence level at 1 degree of Freedom

N = Population size

P = Population proportion (0.50)

ME = Desired margin of error (expressed as a proportion)

$$n = \frac{0.95^2 \times 3915 \times 0.50 \times (1-0.50)}{0.0005^2 \times (3915-1) + (0.95^2 \times 0.50 \times (1-0.50))}$$

$$n = \frac{883.32}{5.69}$$

$$n = 155$$

Bogdan and Taylor [38] argue that the sample selection is appropriate, implying that the inquirer selects individuals and venues that can offer the essential information. The larger the group, the less information and main idea in regard to the subject under investigation emerges from each individual, resulting in detailed opinions of individuals and the specific context in which they hold these views [39]. The total sample size for the study was 155 as summarized in Table 1.

3.4. Data Collection Instruments

The study used structured questionnaires which was designed by the researcher

Table 1. The summary of the sample size of the study.

Organization	%	Target population	Sampling strategy	Sample size
Red Cross Society	30%	1240	Purposive	47
National Youth Service	26%	1225	Purposive	40
Kenya Police Service	23%	900	Purposive	35
Mombasa Fire Brigade	21%	550	Purposive	33
TOTAL	100%	3915		155

Source: Researcher, 2022.

to answer to the research objective to collect data. The questionnaire was valid, reliable, clear, succinct and interesting. It was designed based on a conceptual framework, which helped the researcher to scrutinize each question for relevance and clarity. 5-point Likert Scale was used to standardize the way data was collected for easy analysis. Quantitative methods characterized by the use of close-ended questions for yes or no answers or set of predefined answers like Likert scale, which can be quantified, comparable and measurable to provide numeric results [37]. Quantitative data was collected from respondents from disaster response organizations from Mombasa County who formed part of respondents. A questionnaire was developed to collect individuals' data and analyzed.

Test validity refers to the degree to which the test actually measures what it claims to measure. Test validity is also the extent to which inferences, conclusions, and decisions made on the basis of test scores are appropriate and meaningful. Validity of the data collection instrument measures what the instruments were intended to achieve in the research. It involves collection of the data from the field and evaluating it from the data collecting instruments to assess its validity in relation to the study. The questionnaires for respondents were thoroughly checked and subjected to critical evaluation by the researcher. The initial responses from the first batch of respondents was pre-tested by the researcher and found to be in line with the research. Validity of research instruments was done by myself and also sought the input of my two senior colleagues to evaluate the applicability and appropriateness of the content, clarity, and adequacy of the instrument. Their input helped me to modify the instrument appropriately. The instrument was found to be valid and the finding fully explained the objective of the study.

Test reliability refers to the degree to which a test is consistent and stable in measuring what it is intended to measure. A test is reliable if it is consistent within itself and across time. Reliability of the research instrument questionnaires, was established through a test-retest process during piloting [40]. Data collection was done by the researcher. Questionnaires were reviewed regularly through while in the field and also in consultations with other experts from the research field of study.

Reliability of the measurement scales was assessed using Cronbach's alpha.

The reliability of the measurement instrument is defined as its ability to consistently measure the phenomenon it was designed to measure (test consistency). The importance of reliability lies in the fact that it is a prerequisite for the validity of the test. Simply, for the validity of measuring instrument to be supported, it must demonstrate reliability. Any measuring instrument that fails the consistency test has little chance of being considered a valid measure of that attribute. Kothari [41] states that the reliability of research instruments refers to the extent to which a test or an instrument measures what it was intended to measure. To ensure that the research instruments yield consistent results across time and in line with the various items of the instrument, Cronbach's alpha coefficient was used. This measure is widely used to determine inter-consistency or average correlation of items in a survey instrument to gauge its reliability. The instruments are said to be reliable if the measure for independent and dependent variables is greater than the accepted minimum of 0.70.

3.5. Data Analysis

Quantitative data collected was analyzed using the statistical package of social science (SPSS) version 27. This was done by tallying responses, computing percentages of variations in response as well as describing and interpreting the data with the study objectives and assumptions. Content analysis was also used to test data that is qualitative in nature. According to Baulcomb [42], content analysis uses a set of categorization for making valid and replicable inferences from data to their context. The study used frequency on single response question and Likert scale in collecting and analyzing data where a scale between 5 points to 7 points was in computing the means and standard deviations. The findings were then presented in tables, graphs and charts.

4. Findings

4.1. Importance of Incident Command System Structure in Disaster Response Operations

The Incident Command System (ICS) Organizational Structure and Elements ought to have the following elements:

Command Staff: The staff who report directly to the Incident Commander, including the Public Information Officer, Safety Officer, Liaison Officer, and other positions as required.

Section: The organizational level having responsibility for a major functional area of incident management (e.g., Operations, Planning, Logistics, Finance/Administration, and Intelligence/Investigations (if established). The Section is organizationally situated between the Branch and the Incident

Command.

Branch: The organizational level having functional and/or geographical responsibility for major aspects of incident operations. A Branch is organizationally situated between the Section Chief and the Division or Group in the Opera-

tions Section, and between the Section and Units in the Logistics Section. Branches are identified by the use of Roman numerals or by functional area.

Division: The organizational level having responsibility for operations within a defined geographic area. The Division level is organizationally between the Strike Team and the Branch.

Group: An organizational subdivision established to divide the incident management structure into functional areas of operation. Groups are located between Branches (when activated) and resources (personnel, equipment, teams, supplies, and facilities) in the Operations Section.

Unit: The organizational element with functional responsibility for a specific incident planning, logistics, or finance/administration activity.

Task Force: Any combination of resources assembled to support a specific mission or operational need. A Task Force will contain resources of *different kinds and types*. All resource elements within a Task Force must have common communications and a designated leader.

Strike Team/Resource Team: A set number of resources of the *same kind and type* that have an established minimum number of personnel, common communications, and a designated leader. In the law enforcement community, Strike Teams are sometimes referred to as Resource Teams.

Single Resource: An individual, a piece of equipment and its personnel complement, or a crew/team of individuals with an identified work supervisor that can be used on an incident. The Incident Command System (ICS) Organizational Structure and Elements is captured in Figure 3.
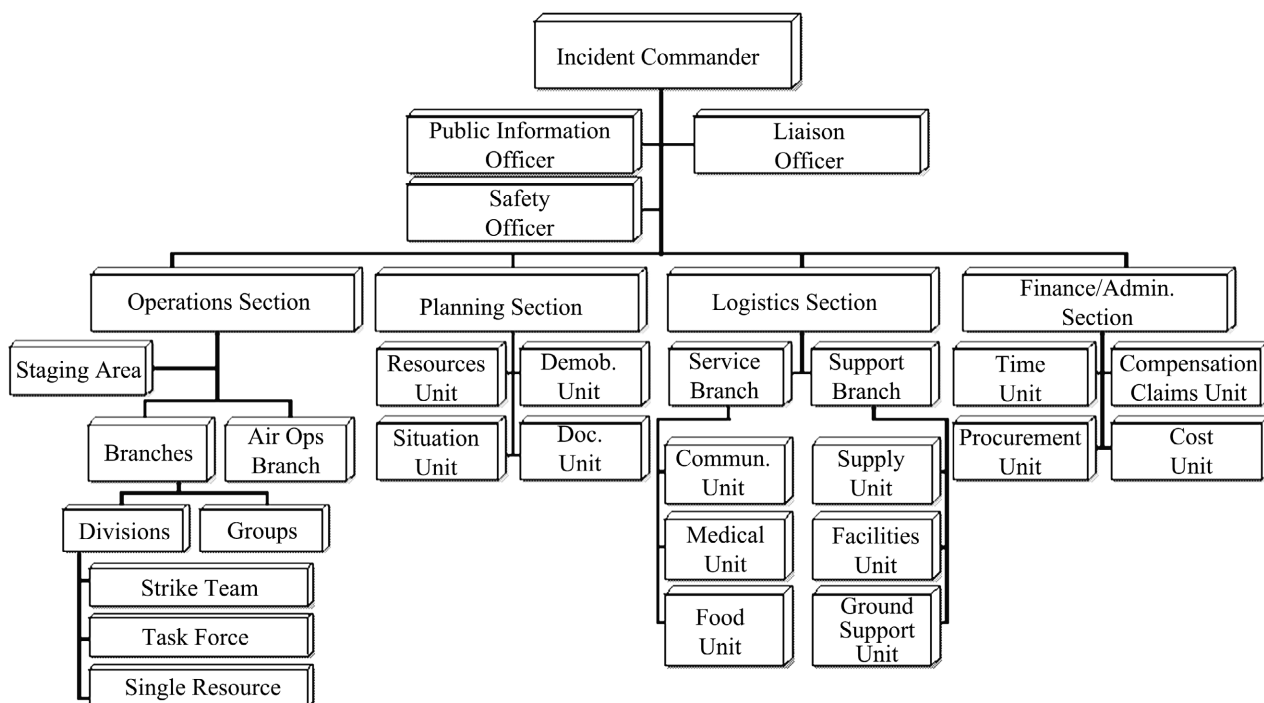

Figure 3. The Incident Command System (ICS) Organizational Structure and Elements. Source: FEMA website https://www.fema.gov/nims-doctrine-supporting-guides-tools.

Figure 4 shows the respondent's responses on the importance of Incident Command System structure in disaster response operations.

Respondents were asked to rate on importance of Incident Command System structure in disaster relief operations and findings are as indicated. (104) 67% of the respondents indicated that it was very effective. (48) 31% of the respondents indicated that it was important thus supporting the first respondents while 3 (2%) of the respondents indicated that Incident Command System structure in disaster relief operations was of less important. Those with opinion that Incident Command System was important in response to emergencies admitted that, "We had used it previously and it bore fruits." This was a comparison between response to different scenarios whereby one proved to be complex and confusing due to un coordination between response agencies and the other incident was responded to effectively because of coordination between response agencies with use of Incident Command System, the lesson that they learnt from the first disaster.

Findings corroborate Bigley and Roberts [43], in his study on "The Incident Command System: high reliability organizing for complex and volatile task environments". Bigley and Roberts acknowledges that although initially developed in response to problems associated with wildland fire fighting, the ICS evolved into an all-risk system supposedly suitable for almost any type of emergency like natural disasters, riots, terrorist attacks and for emergencies of nearly any size ranging from a minor incident involving a single unit, such as a fire engine company, to a major event involving numerous agencies. Consequently, the use of fundamental ICS principals has expanded rapidly because of its usefulness. For instance, the ICS was adopted by the National Fire Academy as its standard for incident response. Federal law now requires the ICS be used for management of hazardous materials emergencies.
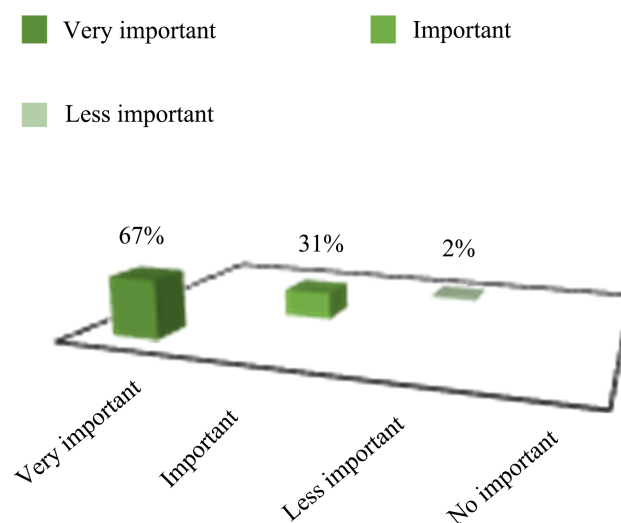

Figure 4. Importance of Incident Command System structure in disaster response operations. Source: Field data (2022).

Many states have adopted the ICS as their model for responding to all types of incidents. Finally, the ICS is a cornerstone of Federal Emergency Management Agency's Integrated Emergency Management System (IEMS). The IEMS has the objective of developing and maintaining a credible, nationwide emergency management capability involving all levels of government and all types of hazards [44].

4.2. Effectiveness of Aspects of Incident Command System in Regard to Disaster Response Operations

Respondents were asked to score the effectiveness of aspects of Incident Command System in regard to disaster response operations. Their score was captured in Table 2. The responses were on a likert scale where VE = means very effective, I = effective, UD = undetermined, IE = ineffective, and VIE = very ineffective.

Findings indicated that 65 (41%) of the respondents viewed it as very effective, 82 (52%) of the respondents viewed it as effective, 5 (3%) had the views that decision making was under effective while 3 (1%) agreed that decision making was ineffective. Basing response of majority of the respondents, it is clear that decision making is effective in regard to disaster operations.

On decision making, Yates [45], acknowledges that decision is a commitment to an action intended to yield satisfying states of affairs for particular parties. The action is distinguished from the decision itself, but the intention emphasizes the deliberate commitment of the decision maker to achieve important goals for targeted beneficiaries' victims, stakeholders, themselves.

According to Chakravarthy [46], Multiple Agency Coordination Center (MACC) is a central command and control facility responsible for the strategic of a disaster. A MACC is often used when multiple incidents are occurring in one area or are particularly complex for various reasons such as when scarce resources must be allocated across multiple requests. Personnel within the MACC use Multi-agency Coordination to guide their operations. The MACC coordinates activities between multiple agencies and incidents and does not normally directly control field assets, but makes strategic decisions and leaves tactical decisions to individual agencies which have to be emulated by disaster response agencies in Mombasa County. The common function of all MACC's is to collect, gather and analyze data; make decisions that protect life and property,

Table 2. Effectiveness of aspects of Incident Command System in regard to disaster response operations.

Aspect	VE	E	UD	IE	VIE
Decision making	65	82	5	3	0
Interagency coordination	55	94	0	4	1
Use of resources without duplication	70	83	0	2	0

Source: Field data (2022).

maintain continuity of the government or corporation, within the scope of applicable laws; and disseminate those decisions to all concerned agencies and individuals when responding to emergencies.

Regarding this aspect as important to response to disasters with use of Incident Command System, the study conducted by Njå and Rake [47] on a Discussion of decision Making Applied in Incident Command, they indicated that decision-making situation is characterized by the necessity of critical choices related to on-scene activities, such quantities could be the number of victims trapped under earthquake debris, the volume of gas from a gas leak, the diffusion of an ammonia cloud, the location of children caught in a fire scenario, materials exposed to fire, structural breakage during firefighting, the time and capacity needed to carry out rescue operations or the number of injured and killed victims. It is acknowledged that the incident commander's on-scene decision making is important for the outcome. When the crisis is novel, the consequences could be unclear, different authorities could be involved, many actors would struggle on-scene and the media will pay particular attention. In such cases, a visible and determined incident commander seems to be essential for the crisis outcome, but what kind of decisions must be made.

The research findings on Table 2 on decision making differs with Rosenthal *et al.* [48], based the "contingent decision path perspective" on case-oriented retrospective analyses of different crises. The crisis concept is reconsidered as more than discrete events limited in time and space to a process unfolding as manifold forces interact in unforeseen and disturbing ways. They pointed out that decision makers tend to give priority to the source of information instead of its contents and also reduce uncertainty by supplementing sparse information which may lead to impossibility in acquiring the most crucial aspects of the crisis.

Decision makers can have extreme difficulty in redefining the situation. They stick to the chosen course of action. They tend to focus on one goal and one particular way of achieving that goal which are inclined to refer to previous crises as a reference point and a means to achieve stability in an unstable and uncertain environment. In regard to Incident Command System, this will lead to uncoordinated response between response agencies.

Klein [49], studied fire ground commanders at 32 incidents and found that more than 80% of their decisions were non deliberate decisions. In these cases, the fire ground commanders' situational awareness enabled them to select a course of action without consciously deliberating among alternatives. Another study contrasted novice fire ground commanders with expert fire ground commanders [50]. The study confirmed recognition-primed decision making as the dominating decision strategy under conditions of extreme uncertainty, risk and time pressure. The experts showed a higher tendency to deliberate over situations and novices deliberated more on alternative options.

A third study on wildland fire decision making, was conducted by attaching observers to an "overhead team". Five separate fires were burning simulta-

neously, each with its own team of firefighters. Compared to the urban fire ground studies, the time pressure was less and the need for team coordination and communication was greater. The study revealed a weaker tendency of rapid decisions than the urban fire ground study. However, the functional decisions (how to fight the fire) had a greater proportion of rapid decisions characteristics than organizational decisions, how to get things done within the Bureaucracy [49].

On the second aspect (Interagency coordination), research findings indicated that 55 (35%) of the respondents stated that it was very effective in regard to humanitarian disaster relief operations. Supported by 94 (61%) of the respondents who stated that it was effective. (4) 3% of the respondents were viewed it as ineffective, while 1 (1%) of the respondents differed in opinions indicating that interagency coordination was very ineffective in regard to disaster operations.

According to Akhtar *et al.* [51], mutual aid responses involve dozens of distinct agencies and working together. Interagency coordination is critical to successful preparation for and response to emergencies affecting people all over the world today. As emergencies become more complex, and as humanitarian agencies become more interdependent, the need for effective interagency coordination increases. Coordination can serve many useful purposes that go beyond basic information sharing. At its best, coordination can eliminate gaps and duplication in services, determine an appropriate division of responsibility and establish a framework for joint planning and strategic decision-making on issues of common concern.

Interagency coordination facilitates in developing a strategic plan, identification of gaps and overlaps in humanitarian assistance that in a large emergency gaps in assistance provision will occur [52]. This is especially problematic when some of the distribution systems are inaccessible to the affected population, where the population is out of favor with the authorities, or where the population is difficult to locate as in families and individuals dispersed throughout an urban environment.

Identification of duplication or overlaps of assistance will also result from this exercise. Not only is duplication an obvious waste of resources, but there is a lost potential of utilizing the resources for alternative priorities. Attaining universal agreement on standards of assistance and services among all humanitarian organizations would be very helpful to avoid the pitfalls of inconsistent, or the absence, of standards. However, in all likelihood, each emergency will bring together a unique set of organizations, each with its own set of standards. Similarly, each situation bears re-examining existing standards to verify their continuing appropriateness. The coordination forum, therefore, must be utilized for harmonizing organization's standards for each emergency [51].

Flin [53] confirms that among the tenets of emergency management for humanitarian assistance is that each organization should engage in preparedness and contingency planning. The group process of harmonizing these plans within

the coordination forum will increase the total usefulness of these exercises. This process would, therefore, benefit from an agreement on emergency scenarios for which contingency responses would be prepared.

Third aspect on Table 1 assessed on the structure of Incident Command System influence use of resource without duplication, respondents under this aspect under very effective response were 70, translating to (45%). 83 (54%) of the respondents stated that it was effective while 2 (1%) of the respondents who stated that use of resource without duplication was ineffective. Findings concur with Friedberg [54] that emergency managers determined that the existing management structures frequently unique to each agency. ICS includes procedures to select and form temporary management hierarchies to control funds, personnel, facilities, equipment, and communications. Personnel are assigned according to established standards and procedures previously sanctioned by participating authorities. ICS is a system designed to be used or applied from the time an incident occurs until the requirement for management and operations no longer exist and this prevents resource duplication [54].

4.3. Difference in Organizations Incident Command Structure between Response Agencies Affect Effective Disaster Response Operation

The need to understand the different organizational structure that contributes to structuring and implementation of Incident Command System and its effect on effective disaster response operations was assessed and response from the respondents captured as in Figure 5.

Response rate was on a likert scale where (large extent means = 45% - 60%, low extent means = 45% - 30%, no association = 30% - 14% and not sure = below 13%).

From the findings, 80 (51%) of the respondents indicated that difference in organizations Incident Command System affected effective response to disaster operations to large extent. (57) 37% of the respondents had views that it was affected at low extent, 22 (14%) of the respondents admitted that difference in organizations Incident Command System had no association with response to
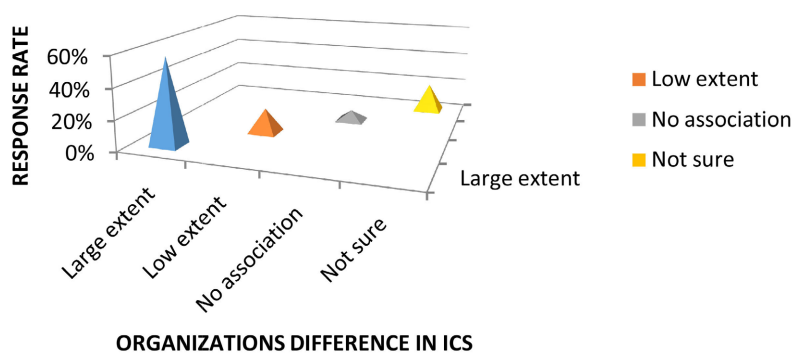

Figure 5. Effects of difference in organizations Incident Command structure between response agencies affect effective disaster response operation. Source: Field data (2022).

disaster operations while 10 (6%) of the respondents were not sure if difference in organizations Incident Command System affects effective response to humanitarian operations.

Basing on the findings, it is evident that difference in organizations Incident Command System affected effective response to disaster response operations negatively since it was supported by majority of the respondents from different organizations.

According to Arnold *et al.* [44], supports the findings noting that overseeing and coordinating Incident Command System functions is either a single Incident Commander (IC) or a collaborative Unified Command (UC). An integrated command structure under a single IC is typically employed when emergency responders come from a single agency or jurisdiction or in mutual aid situations where there is no ambiguity about lines of authority over all responders. Unified command, by contrast, is employed when no single hierarchy of authority exists (as when responders come from multiple political jurisdictions) to connect the full set of deployed responders who must collaborate. Unified Command then provides a potentially effective voluntary means of integrating decision making and allocation of resources.

5. Summary and Conclusions

Results indicated that differences in the organization's Incident Command System affected effective response to disaster operations. Lack of cooperation by multiagency, waste and duplication of resources, and difficulty in coordinating response activities were the challenges identified that an organization face while responding to large disasters in the absence of Incident Command System. According to the findings, those response agencies that don't use Incident Command System while responding to emergencies were prone to face challenges that can hinder their effectiveness.

6. Recommendation

Response agencies should embrace fostering cooperation during joint operations to avoid waste of resources and duplication of roles and difficulty in coordinating response activities through the use of the Incident Command System. There should be disaster drills and simulation exercises. The County government in collaboration with the private sector should conduct disaster drills and simulation exercises in banks, churches, malls, universities, colleges, schools, hospitals, and communities at risk.

Conflicts of Interest

The author declares no conflicts of interest.

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