

EVALUATION OF DISASTER PREPAREDNESS PLANS, INFORMATION MANGEMENT AND RESCUE STRATEGIES OF HIGH RISE BUILDINGS IN LAGOS METROPOLIS

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ABSTRACT

Although disasters could happen anywhere and at any time, certain types of disasters are more likely to affect some building structures than others; especially those situated in highly populated urban areas. Buildings in Lagos metropolitan districts in Nigeria have had nasty experiences from both natural and artificial disasters in the recent past; claiming enormous lives and properties. This study aims at evaluating some aspects of disaster preparedness in the high rise buildings of the metropolis. To determine which disasters were likely to onset and how prepared the buildings were in events of the occurrences; a structured questionnaire was administered to the owners of the buildings, the estate managers and disaster managers who managed those high rise buildings. To supplement the information, interview was also conducted with tenants, and relevant rescue organizations. The study identified typical potential disasters, their likelihood of occurrence and severity of impact if occurred. 66% of disaster response preparedness plan was in place to confront the disasters with only 41% available evacuation facilities and 60% disaster management plan. 63% of those buildings benefit from early warning systems for information and 67% of the rescue assistance expected from rescue organisations could be realised.

Keywords:

High-rise-building, Disaster-preparedness-plan, Disaster-management, information-management and Lagos

1. INTRODUCTION

The International Federation of Red Cross and Red Crescent Societies, (2000) described disaster as an extreme disruption of the function of a society - human life, livelihoods and property, that causes widespread human, material, or environmental losses, usually exceeding the ability of the affected society to cope with using its own resources. Also, disaster can be seen as an impending situation caused by forces of nature, accident, intentional act or otherwise that constitutes danger to life or property (Turnbull

2002). Buildings located in urban areas are likely to face disasters that are less likely to occur in rural areas (Chesapeake Virginia, 2010) and the effects are usually unique and worse in high rise buildings- 10 floor and above, than in low rise buildings situated in the same locality. This is because high rise buildings may require more effective preparedness strategies and use more sophisticated equipment to ward away and or minimise severity of the impact of disasters (FAO/GIEWS, 2003 and Federal Emergency Management Agency 2005).

The broader concept of disaster describes all the set of measures that minimises effects of disaster as disaster preparedness (Standardization News, 2005 and National Institute for Standard and Technology, 2008). Preparedness for disaster is achieved partially by putting in place readiness measures that expedite emergency response, rehabilitation and recovery (International Federation of Red Cross and Red Crescent Societies, 2000 and Federal Emergency Management Agency 2005). It may entail rapid, timely and targeted assistance to affected areas. Comprehensive disaster analysis, assessment, preparedness and response plans form vital activities of pre-disaster preparedness (Burrus et al; 2002) and the International Federation of Red Cross and Red Crescent Societies (2000) and The Hartford Loss Control Department (1999) outlined scope of the assessment to cover identification of disaster characteristics, and potential severity, areas and communities that are vulnerable and ability of these sectors to withstand and cope with the effects of the disasters. Preparedness for disaster is of paramount importance because waiting for events to occur is no longer a viable option to deal with disaster incidences (Eun et al 2010) and in many instances, it is usually not enough to just return disaster-hit communities to their frequently impoverished and vulnerable pre-disaster state (Burrus et al; 2002). Moreover, it is quite necessary to be prepared rather than adapt buildings after a disaster. The International Further Federation of Red Cross and Red Crescent Societies (2000) and Eun et al (2010) highlighted the objectives of disaster preparedness to encompass: increasing the efficiency, effectiveness and impact of disaster emergency response Mechanisms, strengthening community-based disaster preparedness and developing activities that are useful for both addressing everyday risks and for responding to disaster situations. This research however, focuses on investigating response preparedness plans, rescue strategies and information management plans set-up to confront disasters in high rise buildings in Lagos metropolitan area.

2. METHODOLOGY

A structured questionnaire was used to collect information from departments of disaster management, Estate managers and Facility managers. In addition to assessment factors identified from literatures, a pilot study was undertaken in a form of independent interviews with prototype high rise buildings in different locations to supplement and rectify the questionnaire. The final structure of the questionnaire contained 106 factors which were regarded by the literatures and the pilot study to have potential influence on disaster preparedness plans, disaster information management, adequacy of rescue and evacuation facilities, and coordination with relevant outfits of early warning systems and rescue organizations and departments.

The sampling frame contained 94 high rise buildings among which were those in clusters; some were single, isolated and scattered over the metropolitan area. In the questionnaire, the respondents were asked to rank each factor towards preparedness in achieving preparedness in pre-disaster state on a five-point Likert scale from 1 to 5, where degrees of availability, significance and coordination were represented and severity of either low, medium and high point. The respondents were also requested to introduce and accordingly rate any other potential factors and rate them accordingly. The questionnaire was sent to the respondent by the researchers in field trips to 60 randomly selected sites of high rise buildings and 41 valid responses were returned amount to 68% of the total number sent out.

Further more, interviews were conducted with users, rescue offers and owners of the buildings some of whom were also respondents to the questionnaire. During the interview session, qualitative data were collected about tenancy mix or profile of the high rise buildings and how they influence to disaster risk and preparedness; history of disaster occurrence and impact in each zone or area; and age of building and changes in use over time. The interview sessions were voice recorded, transcribed, and coded. Quotes and comments from the interviews were confirmed and approved by the interviewees. A couple of these citations were presented in the paper as representative in respect to specific subjects to help illustrate points rose.

Certain portions of the regions were found to be more prone to certain types of disasters, particularly those relating to natural disasters (Mshelgaru and Olowoyeye 2010). The metropolitan area was divided into four: Lagos Island – ‘A’, Victoria Island – ‘B’, Ikoyi – ‘C’ and the remaining parts – ‘D’, according to location and nature of environment. Area D covers Mainland, Ikeja, and Isolo. About 86% of the high rise buildings are situated on these Islands. The 14% located in the less dense areas. Of the 53.3% of the high rise buildings covered in this study, 79% of them fell between 10 to 40 years of existence and the number of storeys encountered was 10-28 storeys. The assessment and the analysis were conducted in accordance with the outline standard methods of the International Federation of Red Cross and Red Crescent Societies, (2000) and National Institute for Standard and Technology, (2008) and the outputs were presented in percentages on table and charts.

3. RESULTS AND DISCUSSIONS

3.1 DISASTERS VULNERABILITY AND SEVERITY

For the potential treat of a particular threat-source to successfully exercise a particular vulnerability, the vulnerability must posses a weakness that can be accidentally triggered or intentionally exploited and a threat-source does not present a risk when there is no vulnerability that can be exercised (Federal Emergency Management Agency 2005). About 86% of the high rise buildings in the metropolitan are located on the islands in densely populated settlements and these buildings had been under stressing service for decades.

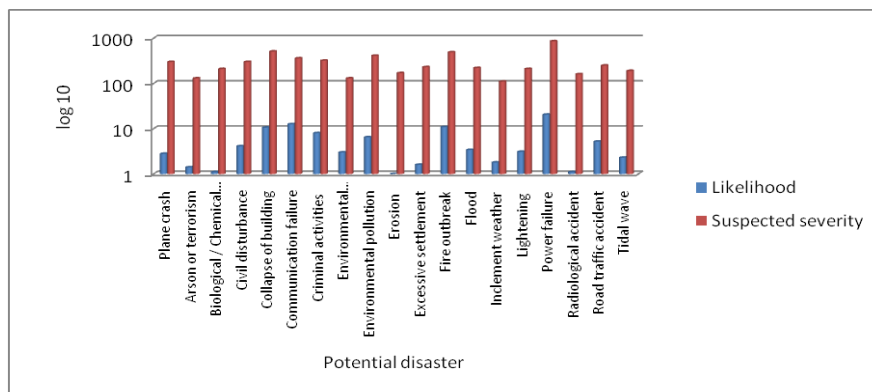


Figure 1: Likelihood of Occurrence and Anticipated impact of Disasters

The three sources of disasters: natural, human and environmental were found (fig 1) vulnerable but with differing likelihood and severity. There was involvement of each source, contributing to the risk faced by high rise buildings.

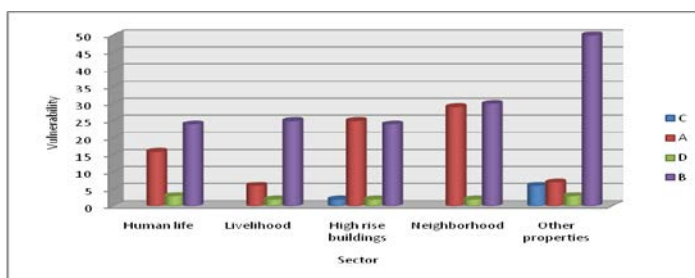


Figure 2: Anticipated areas of Vulnerability

Figure 2 shows vulnerability of different sectors to the anticipated disasters. The figure suggests that in area B other-properties were more vulnerable than in other sectors and human lives, livelihood, and neighborhood were safer at C. The vulnerability of the high rise buildings, other properties and neighborhood in areas A and B is an indication of the extent that the buildings are likely to be damaged or disrupted. The human vulnerability such as human life and livelihood indicate relative lack of capacity of a person or community to cope with or resist the impact of the disaster hazard.

3.2 DISASTER PREPAREDNESS PLANS

Table 1: Disaster Preparedness Plans

Preparedness plan	Not Available	Insufficient	Moderately Sufficient	Sufficient	Highly Sufficient	Percentage preparedness Attained
	Percentage					
Disaster preparedness policy statement	13	22	25	28	13	67
Developed policies and procedures	10	26	35	16	13	59
Identified organisational resources for disaster	9	30	33	15	12	58
Outlined response activities	9	30	36	15	9	57
Allocation of roles and specific responsibilities to personnel	9	16	41	13	22	64
Identified emergency shelter sites to be used during disaster	18	24	36	12	9	54
Publicised evacuation routes	3	21	33	39	3	64
Identified sources of emergency life-line-services (e.g. water)	3	24	39	24	9	62
Functional stopcocks	14	32	25	21	7	55
Set budgets, resource lists, supplies, relief stocks and equipment	14	21	46	14	4	54
Determined chains of command and communication procedures,	3	19	59	6	13	61
Trained response personnel and people on what to do during disaster	3	9	59	19	9	64
Described how relief supplies will be procured, stored and distributed	23	38	31	8	0	45

The percentages of elements of disaster preparedness plan are shown in table 1. Thirty-four percent of these elements were either 'not available' or 'not adequate' but 66% of preparedness plan indicated 'moderate sufficiency' to high sufficiency. Majority did not sufficiently 'describe how relief supplies will be procured, stored and distributed' in event of disaster.

3.3 AVAILABILITY AND ADEQUACY OF EVACUATION FACILITIES

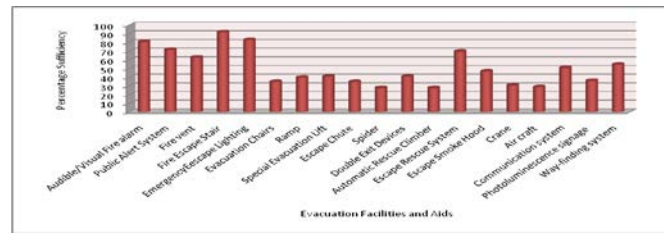


Fig 3: Adequacy of Evacuation Facilities

Figure 3 shows the adequacy of disaster evacuation facilities. There is generally low level of preparedness, as only 41% overall efficiency of evacuation facilities were sufficient. 59% was either 'insufficient' or 'not available' at all. The only elements with good sufficiency were audible or visual fire alarm system, public alert system, fire escape stairs, emergency escape lighting and escape rescue system.

3.4 LEVEL OF RESCUE RESPONSE EXPECTED FROM OTHER ORGANISATIONS

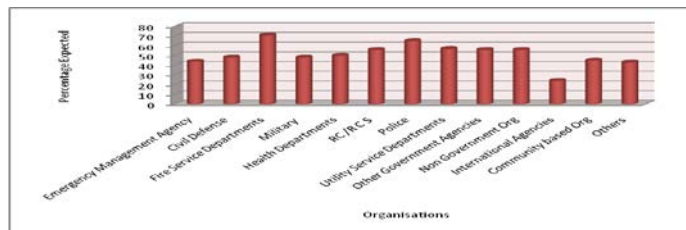


Fig 4: Rescue Response Obtainable from Rescue Organizations

The amount of rescue assistance that could be obtained from relevant rescue organizations are shown in fig 4. Sixty-seven of the expected rescue assistance fell above 50% confident of getting the assistance required. The highest (71%) rescue aid was expected from the 'fire service departments' while the least expected (24%) is from the 'international agencies'.

3.5 DISASTER RESCUE MOBILIZATION

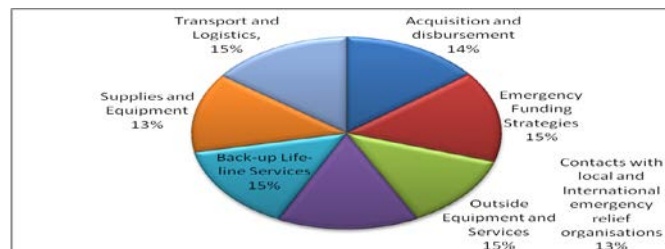


Fig 5: Disaster Resource Mobilized

Fig 5 illustrates the level of resources mobilized for disaster. Only 49% mobilization was achieved and 51% was either not planned for or was insufficient. Equal mobilization attention (13-15%) were giving to the items on their plan list. The average mobilization was fair. Hence, more attention to this section is required.

3.6 DISASTER INFORMATION MANAGEMENT PLANS

Table 2: Disaster Information Management

Disaster Information Management Issues	Not Available	Insufficient	Moderately Sufficient	Sufficient	Highly Sufficient	Information Management plan achieved
	Percentage					
Policies and procedures describing who deal with which media.	13	16	28	34	9	63
Knowledge of what information is needed in event of disaster	0	25	25	38	13	70
Developed procedure for information collection	9	19	50	9	13	59
Already collected Information on disasters	6	47	28	16	3	53
Disaster assessment personnel or department	3	25	41	19	13	63
Mechanisms for information analyses	16	19	47	16	3	54
Procedures for information integration into decision making process	16	23	35	13	13	57
Information tapping from any disaster warning system or forecast	13	41	25	19	3	52
Information reporting procedures	3	50	25	16	6	54
Proven processes for identifying and assessing disasters	3	42	26	19	10	58
Critical data required for disasters response	16	38	22	19	6	53

Table 2 shows the percentage of disaster information management. The only area of highest (70%) achievement is on 'Knowledge of what information is needed in event of disaster' and the average information management attained was fair. Forty percent was either 'not available on their list or 'not sufficient' and 60% was significantly sufficient.

3.7 EARLY WARNING SYSTEMS

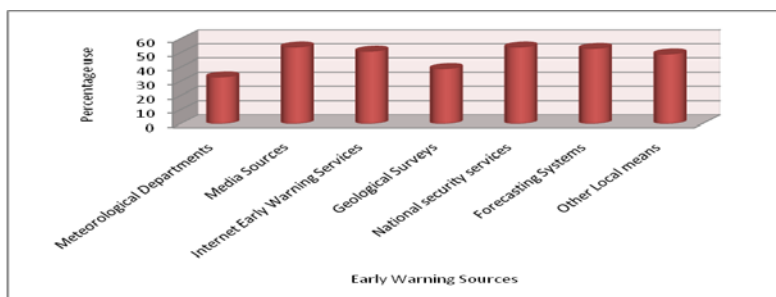


Fig 6: Use of Early Warning Systems

Fig 6 shows the use of early warning systems in disaster management of the high rise buildings. Up to 37% did not have access to any early warning system. Information from meteorological departments was not tapped, but 63% efforts sourced information from one or more early warning outlets.

3.8 INFORMATION AND COORDINATION OF DISASTER RESPONSE EFFORTS AND RESOURCES WITH OTHER RESCUE ORGANISATIONS

Table 3: INFORMATION AND COORDINATION OF RESPONSE AND RESOURCES

Rescue Organisations	No coordination	Poor coordination	Moderate coordination	Good coordination	High coordination	Coordination achieved
	Percentage					
Federal Fire Service Department	0	9	31	38	22	74
Corporate Fire Service	3	9	22	44	22	74
Red Cross / Red Crescent Societies	3	13	53	25	6	64
National Emergency Management Agency	13	13	59	13	3	56
Civil Defense	16	19	41	22	3	56
Community based Organizations	10	23	29	39	0	59
Health Department	6	19	32	35	6	63
Military	23	10	39	26	3	56
Non Government Organisations	6	16	39	32	6	63
Other Government Agencies	10	19	42	26	3	59
International Agencies	26	19	35	16	3	50
Utility Services Departments	13	29	32	23	3	55
Others	43	7	36	14	0	44

Table 3 shows information and coordination of response and resources efforts made with rescue organizations. A good stand of 72% coordination was achieved in this sector. A fair to good achievement in each of the elements and there was much more attention given to fire service departments than others

3.9 PUBLIC EDUCATION, TRAINING, REHEASAL AND OTHER COMMUNITY-BASED PREPAREDNESS



Fig 7: Education and campaign activities

The disaster public education, training rehearsal and campaign activities are illustrated in fig 7. Sufficiency of this sector stood at 65% with the least attention given to ‘sponsoring media campaign for disaster awareness’ and ‘rehearsals of emergency response scenarios’.

4. CONCLUDING REMARKS

The general status of disaster preparedness in respect of preparedness plans, information management and rescue strategies in the high rise buildings in Lagos metropolitan area was 70% and the users of these buildings were 75% confident in the plans made so far. However, there were aspects that did not measure up well and required to be improved upon. These included adequacy of evacuation facilities, resources mobilization plans and use of early warning systems.

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