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# MARKET FIRE DISASTER EXPERIENCE IN LAGOS STATE, NIGERIA: THE CHRONICLE OF TRADERS

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**ABSTRACT:** *Urban market fire disasters in recent times are becoming rampant, rendering many homeless and loss of livelihood. This study examines response and recovery measures to market fires in Lagos metropolis using market fire data from the Lagos State Fire Service and questionnaire from traders who are victims of fire disaster in the area. In this study, questionnaire was administered to two hundred and fifty market traders in twenty-five markets of sixteen local government area where fire disaster occurred. Interview was also conducted for market stakeholders and government officials. Findings from the analysis show that in a seven-year period market fires have affected over 50 markets in Lagos metropolis. Traders reported that response to fire calls has been poor from emergency responders who, more often than not, arrive late and ill-equipped at fire scenes. Traders have also often been helpless resorting to crude and less effective means of firefighting like pouring water and detergent solution on the fire. It also shows that 68.6% of the market fires were caused by electrical faults. The Chi-square analysis revealed an observed difference in the recovery duration amongst markets affected with a chi-square coefficient of 0.000, in which biasness was observed in the distribution of relief materials amongst the different local government involved with a chi-square coefficient of 0.000. The study reveals that the rate and duration amongst markets affected varied with wealth of the traders and the type of wares sold. Some traders never returned after the incident. It also appears from the field study that markets in the affected areas were not designed or prepared to combat fire eventualities due to their inaccessibility to fire fighting vehicles. Some others were far from the available water hydrants and lacked enough fire extinguishers. The study concluded that Lagos market fire outbreaks are avoidable incidences. However, it would remain recurrent if the markets vulnerable are not restructured for safety. The researchers recommend that governments at all levels should strengthen the capacity and revitalise emergency management agencies towards urban market fire disaster preparedness and mitigation.*

**Keywords:** *Market Trader, Fire Disaster, Emergency-responders; Response, Recovery*

## INTRODUCTION

Markets have been one of the most vulnerable sections of the urban centres to fire disaster. Losses due to market fires have been reported to run into millions if not billions of naira over the years. Disasters have plagued livelihoods of urban settlers across the globe for decades with developing countries being the worst hit. World Fire Statistics Centre (WFSC) (2012) documented that fire disaster related loses account for about one percent of the global nation gross domestic product. Disaster prevalence and other social ills in develop-

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ing countries are the negative outcome of urbanisation (Olatubara, 2007; Güneralp, Lwasa, Masundire, Parnell, & Seto, 2017; Guan, Wei, Lu, Dai, & Su 2018). Despite the global urban concentration of economic activities, city fire disaster continues to underplay the city resilience and sustainability (Oteng-Ababio, Sarfo, & Owusu-Sekyere, 2015). In Nigeria, it has been documented that urban planners and city managers are continually faced with the problem of responding and managing frequent urban business and market structure, goods and place fire disaster (Oladoku and Emmanuel, 2014). It was argued that despite government effort through renewal, upgrade and clearing projects in such crowd business areas, market places have become the most vulnerable fire disaster site in Nigeria. The rapid rate of urbanisation (characterised by social ills) in developing countries pose formidable challenges and render the environment precarious and vulnerable to disasters of this nature (Popoola, Adekalu, Audu, & Adeleye 2016).

Gerald & Dorothy (2011) state that the varying disaster risk as a result of difference in settlements' activities and characteristics remains a global phenomenon. Urbanisation and increasing human population result in environmental pressure which triggers the incidence of disasters. Mtani & Mbuya (2018) iterate that urban space densification contributes to the prevalence of disasters which result in the loss of life, property, means of livelihood, and spatial displacement. Loss of lives due to fire incidences is becoming a frequent cause of death in developing nations (Chhetri & Kayastha, 2015). Agbola & Falola (2021) has reported that no land-use is spared when it comes to fire disaster. In fact, the authors iterate that that fire disaster in Nigerian cities has become more frequent and remains an institutional and communal concern to stakeholders in Nigeria.

Globally, disasters are two-edged. On one edge is the natural and man-induced mishap or the trigger mechanism which could be flooding, erosion, earthquake, tremor, thunder/windstorm, landslide, land subsidence, technological disasters, among others (Wahab et al., 2013). On the other edge, the receiving end, are the damages done to the built environment, the injuries and losses of lives and properties. Market fire happens to belong to the second category. The spatial arrangement within many urban markets is disorderly and remains unplanned. The 'unplanlessness' is characterised by poor accessibility, zero air spacing of stores in relation to one another and absence of firefighting facilities, has added to the devastation of markets by fire in developing countries.

Vulnerability as described by Blaikie, Cannon, Davis & Wisner (1994) entails disaster preparedness, coping, prevention, response and recovery mechanism features of a settlement or group of people (traders in this context). It does not include susceptibility to natural mishaps alone but also involves inability to recover from man-induced disasters. Three dimensions of vulnerability are identifiable: economic, social and ecological (Schmidt-Thomé 2005; Kumpulaine 2006). In distinguishing between the dimensions, Kumpulaine (2006) saw the economic dimension to represent the risk to production, distribution and consumption while the social dimension entails the vulnerability of people from the perspective of coping capacity (capacity in this instance can be a weak or poor citizen). In explaining the relevance of capacity to vulnerability, smaller villages, rural settlements and unplanned places such as markets are more vulnerable due to their weak and limited preparedness in the advent of disaster such as fire (Cross, 2001; Pyne, 2012). The major point of concern in this study however, is the post-disaster response and recovery processes engaged after a fire outbreak in the markets. Nonetheless, the level of exposure of a settlement or market is a function of the social, economic, and political factors that influence people and communities (Schneider et al., 2007).

Nigeria markets have been rocked with incidences of market fires throughout the earlier decades. Amongst many other challenges, the late arrival of emergency responders at the scenes of these conflagrations as well as the inadequacy of facilities to combat the fire has seen some market fires burn for over 20 hours. This has heightened the losses incurred during fire outbreaks at markets. Some traders have died, not from severe burns but from the shock of watching their means of livelihood go into ruins before their eyes. Many of these traders have little or no preparedness for fire eventualities. They lack fire extinguishers, fire buckets or any other fire combating implements. The first indigenous response to fire outbreaks has always been water and detergent (soapy substance) solutions to manage or put out the fire. More so, the culture of insurance is alien to most traders in the market which has made their situation hopeless when fire breaks out. Some traders of some previously affected markets, during an interview session with the researcher, have accused the govern-

ment of arson in some of the market fire cases owing to previous failed attempts to acquire and remodel the markets against the wish of the users.

With the cities and urban areas continually densified, disaster occurrence is now on the increase (Gernay, Selamet, Tondini & Khorasani 2016). The frequent and regular incidences of fire along business corridors and markets in Nigeria was attributed to unplanned urban areas (Oladokun & Emmanuel 2014; Adaramola et al. 2017). In Lagos, urban markets have become highly vulnerable to conflagrations which have seen some markets razed more than twice in less than a year (Lagos State Government Fire Service, 2011). Fire outbreaks in market places have occurred repeatedly claiming goods worth millions of naira and rendering scores jobless while displacing a few others residing in the market surroundings.

However, little lessons have been learnt has insignificant efforts been made to reduce the vulnerability of markets. Since the capacity of disaster victims to respond to and recover from fire disasters is often low, emergency agencies have to up their game in response and recovery measures. Dickey (2003) stated that post-crisis relief efforts are far more complex than just jumping onto the next flight and pitching in food and clothes. Rather than just an event that victims hold and remember for the sad situations they experienced, post disaster recovery processes should be considered as opportunities for development, by revitalizing the local economy and upgrading livelihoods and living conditions (Nakagawa & Shaw, 2004; Ma, Shu, Shen, Song, Li, & Liu, 2014).

Victoria (2007:0) reported that "within the last decade, parallel efforts in various regions of the world called for a paradigm shift from the prevailing emergency management framework to disaster risk reduction to reverse the increasing trend in disaster occurrence and loss, especially from small and medium scale disasters". The argument is that the need for a proactive approach to fire disaster remains vital to its management process. Thus, the study is aimed at assessing the response and recovery measures taken by traders and relevant institutions in the management of market fires in Lagos state, Nigeria. The activities of emergency responders during market fire disasters were also assessed vis-a-vis their capacity to curtail fire outbreaks and their roles in facilitating recovery after fire disasters. The perception of people on the effectiveness of responders to fire emergencies in markets, the level of recovery achieved in the affected markets and the prevention measures in place to forestall recurrence by traders and other key players were also assessed. Practical solutions and policies to reduce fire risk and vulnerability of markets to fire were adduced.

## RESEARCH MATERIALS AND METHODS

The research design employed for this study is a cross-sectional research procedure which involved data from primary and secondary sources. The secondary data on the history of market fire in Lagos state was sourced from the Lagos State Fire Service. The study is focused on the market fire incidences in Lagos State within the seven-year period of 2007 to 2013. This is because the period had the highest frequency of market fires disaster in the city. This study is purposive; as it was targeted at markets that were gutted by fire between 2007 and 2013. Data obtained from the Lagos State Fire Service, revealed that a total of forty (40) markets across 16 Local Government Areas (LGA) (14 of which are within the metropolitan area and 2 outside the metropolis) of Lagos State, were conflagrated between the years 2007 and 2013. Purposive sampling technique was employed to select the market within the local governments visited during the study. This is because not all LGAs was characterised by markets with the experience of fire disaster. However, the selection of the markets from each of the selected local governments was based on simple random technique. The samples selected within each local government and markets affected are assumed to have a good representation of the target population.

The primary data capture was used to gather perception about fire disaster event, disaster response and recovery. Information on the location and characteristics of the markets affected and the records of market fires were obtained from site observation visitations to the markets and the Lagos State Fire Service respectively.

Questionnaire administration, in-depth interview and field observations served as the primary data capturing tool. The stakeholders or study respondents in the study were grouped into two categories: The fire disaster 'Victims' and 'Fire Disaster Responder'. The 'victims' are the traders directly affected by the fire outbreak, while the 'Fire Disaster Responder' refer to the government and private agencies which play rescue and relief roles in cases of fire emergencies. The questionnaire was designed and interviews conducted to gather relevant information from the two categories of stakeholders, their roles and experiences in the market fire experience.

The rationale behind the different sample size selections is simple. Market sample was selected across LGAs with incidence of market fire. As mentioned above, from the sample frame of forty markets (across the sixteen LGAs- half of each LGA market representative), twenty-five which represents 62.5% was selected as the sample size (see Table 1). The selection of the sample size followed a simple random sampling technique.

Finally, purposively, considering traders disaster experience in the market and length of trading in the sampled market, ten traders were interviewed at each of market. Therefore, a total number of two hundred and fifty traders were administered the questionnaire. After data sorting and cleaning, only two hundred and ten of the questionnaire could be used as there were instances of the respondents inferring from other market experience as against their immediate sampled market fire disaster.

**Table 1.** Local Governments Areas (LGA) and Markets Affected by fire between 2007 and 2013 and Sample Sizes of Markets and Traders selected.

| S/N | LGA | | No. of Markets Affected | Sample size/LGA (62.5%) | Sample size/ Traders |
|---|---|---|---|---|---|
| 1 | Metropolitan Lagos | Ojo | 2 | 1 | 10 |
| 2 | | Mushin | 3 | 2 | 20 |
| 3 | | Ikeja | 7 | 4 | 40 |
| 4 | | Ajeromi | 1 | 1 | 10 |
| 5 | | Ifako-Ijaye | 1 | 1 | 10 |
| 6 | | Lagos Island | 4 | 2 | 20 |
| 7 | | AmuwoOdofin | 1 | 1 | 10 |
| 8 | | Lagos Mainland | 2 | 1 | 10 |
| 9 | | Kosofe | 5 | 3 | 30 |
| 10 | | Eti-Osa | 2 | 1 | 10 |
| 11 | | Oshodi | 3 | 2 | 20 |
| 12 | | Apapa | 2 | 1 | 10 |
| 13 | | Somolu | 1 | 1 | 10 |
| 14 | | Alimosho | 3 | 2 | 20 |
| Subtotal | | | 37 | 23 | 230 |
| 15 | Non Metropolitan Lagos | Ikorodu | 2 | 1 | 10 |
| 16 | | Epe | 1 | 1 | 10 |
| Subtotal | | | 3 | 2 | 20 |
| Total | | | 40 | 25 | 250 |

*Source: Lagos State Fire Service, 2014 and Authors' Analysis (2017)*

# FINDINGS AND DISCUSSIONS

## Socio-Economic Characteristics of Respondents

The descriptive analysis which was presented in table 2 below indicates that most (78.1%) of the sampled respondents were males. The observable gender disparity is because most of the women in such markets were still in shock and sadness about the fire disaster hence were less interested in the study. The men, on the other hand, were more disposed to talking about the incident and gave useful information on the fire event at the markets. The respondents were actually those who witnessed the fire incident. Others interviewed were non-disaster victims or traders who had reliable information about the market fire due to their proximity to the disaster scene.

**Table 2.** Socio-economic characteristics of respondents

| Sex | No. of Respondents | % | Occupation | No. of Respondents | % |
|---|---|---|---|---|---|
| Male | 164 | 78.1 | Trading | 162 | 77.1 |
| Female | 46 | 21.9 | Civil servant | 10 | 4.8 |
| Total | 210 | 100.0 | Student/apprentice | 24 | 11.4 |
| Age Group | | | Others specify | 14 | 6.7 |
| 21-39 | 144 | 68.6 | Total | 210 | 100 |
| 40-59 | 66 | 31.4 | | | |
| Total | 210 | 100.0 | | | |
| Level of Education | | | | | |
| Secondary | 104 | 49.5 | | | |
| Tertiary | 106 | 50.5 | | | |
| Total | 210 | 100 | | | |

*Source: Authors' Analysis (2017)*

In other to obtain reliable information on the fire incident, adult respondents were sampled in the markets. They were believed to have witnessed fire incidents in the past and had useful information on the response, recovery and coping mechanism adopted during and after the market fire outbreaks. Majority of the respondents, (68.8%) fall within the age bracket 21 – 39, while the remaining are aged between 40 – 59years. Gathering information from the respondents was easy in terms of question comprehension as a good number of them were educated. All the respondents had average formal education. This implies that a significant percentage of traders in the markets were well educated and easily understood the interview questions. With this level of education, one would expect that the awareness and observance of fire precautions would be high in the markets, but not necessarily so. The predominant response to fire outbreaks has been to call the fire service and to attack the fire with sand or water and detergent solution.

According to the respondents, only a few (17%) shops had fire extinguisher. In one case where one respondent alluded to the use of fire extinguisher, it was gotten from one of the cars of the traders parked nearby. UNDP (2011) has reported on the preparedness measures put in place to manage fire disaster by individuals and businesses. The authors argued that blame game by the public and victims of fire disaster may be peculiar and common in Nigeria. However, the basic community and individual responsibility as first responder to managing the spread and effect market fire disaster when it breaks out cannot be ignored. The forwarded argument away from Owusu-Sekyere, Adjuik, & Wedam, (2017) view of institutional compliance, was the argument for what the authors termed 'individual/traders first and early preventive compliance steps and mechanisms' to managing disaster. The notion was that fire disaster management and response required the responsive and collective roles of various actors (Owusu-Sekyere, Adjuik & Wedam, 2017). The study authors argue that traders (a first responder and victim) must provide support mechanism such as the mandatory pro-

vision and availability of fire extinguishers in their stores. This will serve as first-step response and preventions to fire disaster when it occurs.

The occupation of respondents was incorporated into the information garnered to assess the level of danger fire poses to the livelihood of people when it strikes at markets. It is expected to have majority of the respondents as solely traders. However, there are other occupational categories such as civil servants- 4.8%; students- 11.4% and 6.7% falls within the other specialized occupations like politicking, security personnel who have added trading to their means of livelihood. This implies the market fires rendered a good number of people jobless. Considering 85.7% earned below ₦60,000. This implies that market fires only add to the woes of many traders (many- 61.9% of were Yoruba) who were just within the low income and survival threshold.

Although, Lagos State is a south-western state and expected to be the domain of the Yoruba tribe, it is observed that migrants have pervaded the land and especially the Igbos-38.1% who are renowned for their business acumen; hence their significant presence in the markets. The non-representation of the Hausa group could be attributed to the fact that most people in this group are usually involved in the more mobile or carriage trade (bearing water, goods) within the market. Thus, do not really have a fixed location, as they are always on the move and are seldom victims of market fires.

## Building Characteristics; Building Materials and Height

Fire incidences have been significantly associated with building materials and structure within markets. This section attempts to explore the relationship between building types, structure, technique of construction and potential incidence of fire disaster as relating to the market fire in the study area. The study has shown that 90.5% of the buildings within the markets were used solely for commercial purposes while 9.5% of the respondents acknowledged the use of buildings and structures within the market for dual purposes- residential and commercial. This implies that few of the markets conflagrated serves as residence for the traders and only few market fires could be attributed to careless domestic cooking by market dwellers. Amongst the markets surveyed, 33.3% were built with wooden materials while portal cabin material accounted for 4.8% of the building materials used. Cement blocks accounted for 61.9% of the building materials used for constructing the sections of the markets that were conflagrated.

This implies that most of the buildings affected were built with materials that are not heat conductors. The inclusion of information on the height of the buildings involved in the market fire outbreaks is to assess the level of challenge the fire service must have faced in putting out the fire. From the study it was gathered that 71.4% of the buildings were single-floor (bungalows) structures, 14.3% were one storey buildings, 4.8% were two storey buildings and 4.8% were more than two storey buildings. It can be observed that most of the buildings in the affected markets were low rise structures hence would not have posed any height challenge to fire fighters. The relationship between building typology, structure, technique of construction and potential incidence of fire disaster has been well documented by Cheng, Chiu, Hsieh, Yang, Chou & Wu (2017).

In Aning-Agyei (2018), the relevance of post-disaster recovery was mentioned to be critical to disaster management process. Due to this, Jones et al. (2006) has alludes to the dynamics of environment to be arranged to accommodate fire emergencies responders. This is because responding to fire disaster maybe somewhat difficult if the urban configuration does not align with urban disaster response system (Cheng, Chiu, Hsieh, Yang, Chou, & Wu, 2017). Okon & Njoku (2018) argued that the location, service coverage and availability of fire hydrant can be essential in managing fire disaster. Thus, in situations where access is limited due to poor physical planning (building lines, airspaces and setbacks), lack of water points/fire hydrant, use of inflammable materials in building, improper land-use conversion and poor building material use, the exogenous shocks due to the destruction and loss of assets and market resources as mentioned by Aning-Agyei (2018) cannot but be expected. This is because the threat posed by fire disaster is not only subjected to the environment alone but can be take the form of a permanent or temporary livelihood shock to socio-economic livelihood and well-being of urban traders.

## Perceptions of Respondents on the Last Fire Incident

From the sampled respondents in sixteen markets, only one market had experienced market fire within the past ten years while respondents in four markets surveyed claimed the last fire disaster experience happened over ten years ago. From the respondents, 1.9% never experienced market fires, 56.2% have witnessed fire outbreaks once, 24.8% twice, and 17.1% have witnessed it more than twice. The implication of this is that majority of the respondents were witnesses of the fire incidents, hence; good sources of information.

Market fires, amongst other factors, have contributed to sabotaging the efforts of the government to reducing unemployment. Considering the damages caused by the fire outbreaks in the different markets, a good number have been rendered unemployed. Property loss incurred by traders owing to market fires ranges from five to over twenty shops depending on time and duration of incidence and effectiveness of emergency response. Two markets, Trinity market in Apapa (Figure 1) and Ketu plank market (Figure 2), were reported to have lost about 150 shops to an inferno that gutted it last year (Nigerian News and Stories 2013).

**Figure 1.** Fire Outbreak Scene at Trinity Market in Apapa LGA

**Figure 2.** Traders watching the remains of their means of Livelihood at the Ketu Plank Market, Kosofe LGA

Many have been plunged into indebtedness owing to the economic loss brought about by these market infernos. Traders, who are known for borrowing from different sources to pay back after sales, have not only lost goods but also lost raw cash kept in stores razed by fire. About 95.2% of the traders estimated the financial loss to be above a hundred thousand naira (₦100,000/ 270USD at ₦381 per dollar at the time of study) some others specifically claiming millions of naira had been lost to the inferno directly or indirectly. Narrating her experience, a trader said:

*"...I am yet to fully recover from the debt of that incidence, my husband just secured me a loan to stock the store against the festive demand. Now all is gone... every night I cry and dream about it wishing it is a dream of the night..."*

It was also gathered that many of these traders do not have any form of insurance against fire disaster. In fact, they never assume such could happen. Buttressing this, an executive member in the trader union in one of the markets has this to say when asked of any insurance mechanism:

*"...Who wishes for fire to consume his shop, this thing (meaning market fire outbreak) rarely happen if not intentional... many of us including me don't have insurance on our shop... I don't even think I have heard of insurance of fire against shop done by anyone before, when it is not a car or house... how many people are even formally registered talk less of doing insurance..."*

This finding is not a new development, as Oteng-Ababio, Sarfo, & Owusu-Sekyere (2015) also reported that traders' insurance of their goods and store is unacceptably low in Ghana. Most traders do not have any insurance policy covering their shops or goods.

Market fires have also resulted in the displacement of people from residences. Such displacements have occurred owing to the close proximity of the houses to the markets affected also because some traders are resident within the market. However, only a few cases (21.9%) of market fires as reported by traders and NEMA officers interviewed have resulted in displacement of people from their homes. In these reported cases, between five and twenty houses are affected and many cases between six and twenty people displaced with no death recorded but many cases of injury. This is because 57.1% of the reported cases occur at night with limited human presence in the market (like the Ketu market fire, see Figure 2), 23.8% in the afternoon while 19% occurred in the morning hours. Power surge (68.6%) tops the list of the causes of market infernos within the study period.

## Perception on the Response of Emergency Responders

The effectiveness of emergency response to fire disasters was assessed from the point of view of the traders. The emergency responders assessed include the Fire Service, Lagos State Emergency Management Agency (LASEMA) and the National Emergency Management Agency (NEMA). The Fire Service was the major and first responder at the market fire scenes as acknowledge by most (85.7%) respondents. However, 14.3% of respondents claimed no emergency responder showed up at the scene of the fire in the market. Such cases were handled by either the direct victims using an extinguisher or other means such as sand or water and detergent solution. More so, it was confirmed from the respondents that it took the Fire Service longer time than normal to respond to most of the fire incidents. 70.5% of the cases, according to the respondents, did not receive response from the Fire Service until over 30 minutes while the fastest response time was between 11 – 20 minutes (18.9%) (Figure 3). An angry trader stated:

*"...Nobody can tell me we have a good government in this country, those pana-pana(native name for fire service) came late... my fellow traders are even telling me now that they didn't come with enough water to handle the situation..."*

Several respondents claimed that the Fire Service struggled most of the time to put fire out in time when they arrived at the market fire scenes. Their best efforts took between 10 to 30 minutes for most of the cases.

This could be attributed to late arrival and response duration at the scenes when the inferno had spread extensively. Some respondents affirmed that late arrival is mostly as a result of the distance of the fire station from the scenes and inaccessibility of some markets (Daily News watch 2014). As a result of this, 19% rated the Fire Service less effective while 23.8% adjudged them not effective and craved for improvement. Studies (Ngunyi, 2011; IFRC, 2009; Sutton and Tierney, 2006) have documented the roles of community stakeholders in fire disaster management. The summation of argument is that local people (traders and local emergency respondents) are critical and first actors in disaster risk management. In the narratives of Ngunyi (2011), it was recalled that local community (as relating to community of market traders) taking control of the disaster management process can be imperative in managing disasters. This is embedded in the relevance of building trader's and responders' participation, strengthening their vulnerability capacity and also building a market that is resilience towards fire disaster.

According to an official of the Southwest Zone of NEMA in Lagos State, the national body does not meddle with small scale disasters within the capacity of the State arm unless called upon by the State. He believed fire disasters do not occur on a large scale simultaneously like flooding in Nigeria. However, whenever any fire disaster exceeds the capacity of the State, support is provided from the national body.

The recent market fire disasters in Lagos State between 2012 and 2013 did not witness much of the activities of NEMA except for the Oko Baba Sawmill fire which displaced a huge number of people (over 5000 residents). This is because LASEMA is the major state responding and coordinating disaster agency. After the fire was put out by the Fire Service, several residents and traders within the community were left homeless and destabilized. The burden was much on LASEMA and thus support was sort from the national body. NEMA was therefore responsible for the provision of food and non-food items such as mattress and clothing while LASEMA was responsible for providing a temporary relief camp for the residents.

Based on the interview with the officials at NEMA, response to any fire disaster was based on when the information reaches the agency's office, which is usually through the media or directly from the victims through distress calls. The search and rescue department of the agency then takes the job up from there. According to the respondents at the agency, response to any disaster is usually in two phases. A rapid assessment of the event is done to ascertain the immediate needs of the victims. Thereafter, a full assessment is carried out to ascertain the large-scale needs of the victims. In any case, monetary relief is not given to any victim. Disbursement of relief materials is done at the zonal level after a rapid assessment is done and takes less than a week to deliver food items and other daily needs. It could however, take up to 3 months for victims to get large scale relief such as roofing sheets, cement blocks and cement bags as approval for such has to come from the Federal level. This is done to cushion the effect of the loss on the victims of fire outbreaks. However, not every victim of fire incident in markets have benefitted from this government's largesse. About 54% of the respondents claimed to not have received any form of relief from the government. A situation and experience that needs to be improved upon.

The level of damage caused by the fire determines who gets relief materials from NEMA. At every emergency scene, NEMA responds and shows up at disaster scene. The role of the agency is to coordinate the activities of the other emergency agencies such as the State Emergency Management Agency and the Local Emergency Management Agency. The Agency also operates a Mission Control Centre (MCC) at the federal level for detecting disaster occurrences. Why this study did not investigate the sustainability of the relief sharing and distribution formula, the authors observed following informal discussions that the relief material distributed by various agencies was not enough for the affected disaster victims and traders.

NEMA and LASEMA are responsible for assisting victims of disasters to pick their lives up again through their relief and recovery programmes. As reported by the market fire victims, 46% benefitted from relief materials from different sources. The sources of relief varies from LASEMA (41.67%), market associations (6.25%) and to relief from other sources such as friends, families and fellow traders (52.03%) see Table 3. The relief resource can be classified into two categories: monetary (from NEMA, LASEMA and traders' associations) and material relief: such as food, clothing materials, roofing sheets and mattresses (supplied by LASEMA).

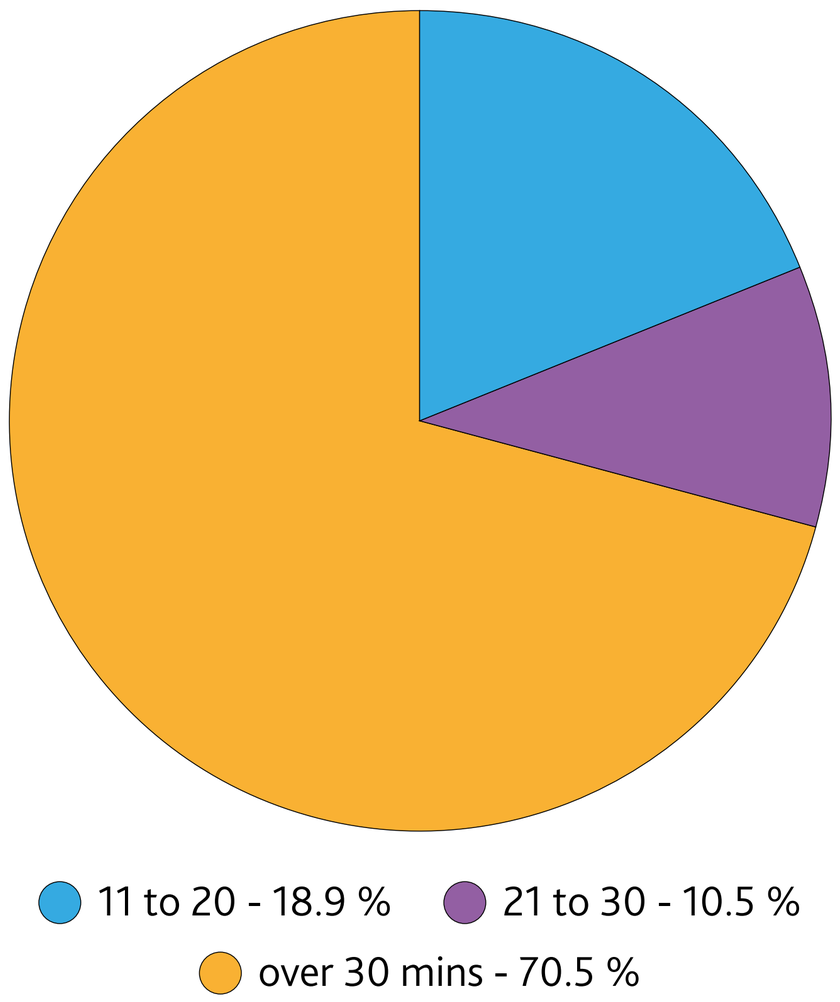


**Figure 3.** Response Time of the Fire Service
*Source: Authors' Analysis (2017)*

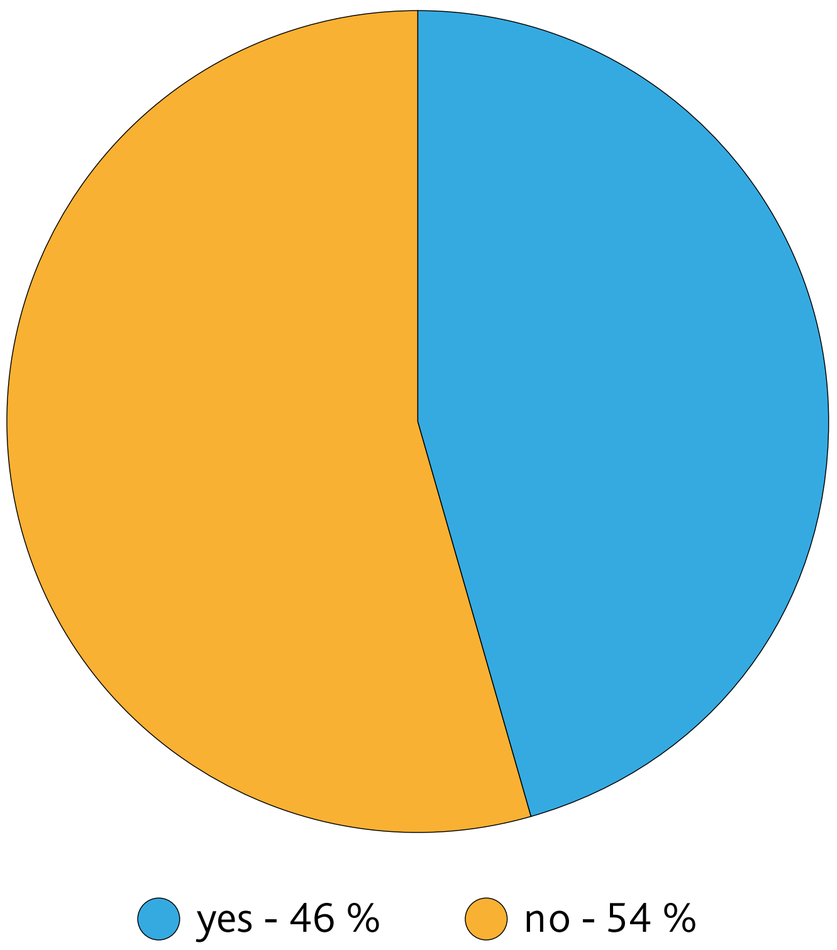


**Figure 4.** Receipts of Relief Materials
*Source: Authors' Analysis (2017)*

**Table 3.** Sources of Relief Materials

| Relief Sources | No. of Respondents | % |
|---|---|---|
| LASEMA | 40 | 41.67 |
| Market Association | 6 | 6.25 |
| Others Specify | 50 | 52.03 |
| Total | 96 | 100.0 |

*Source: Authors' Analysis (2017)*

The researcher further examined the time of access to relief. It was reported by some respondents (58.3%) that the relief was received in less than five (5) days, 10.4% received theirs between 6 and 10 days, 20.8% accessed relief between 16 to 20 days while 10.4% of the respondents claimed they had to wait for over 20 days to partake of the relief programme. These delayed receipts accounted for the low rating of the operations of LASEMA by the respondents. Only 19% of respondents deemed LASEMA service delivery effective (Figure 3).

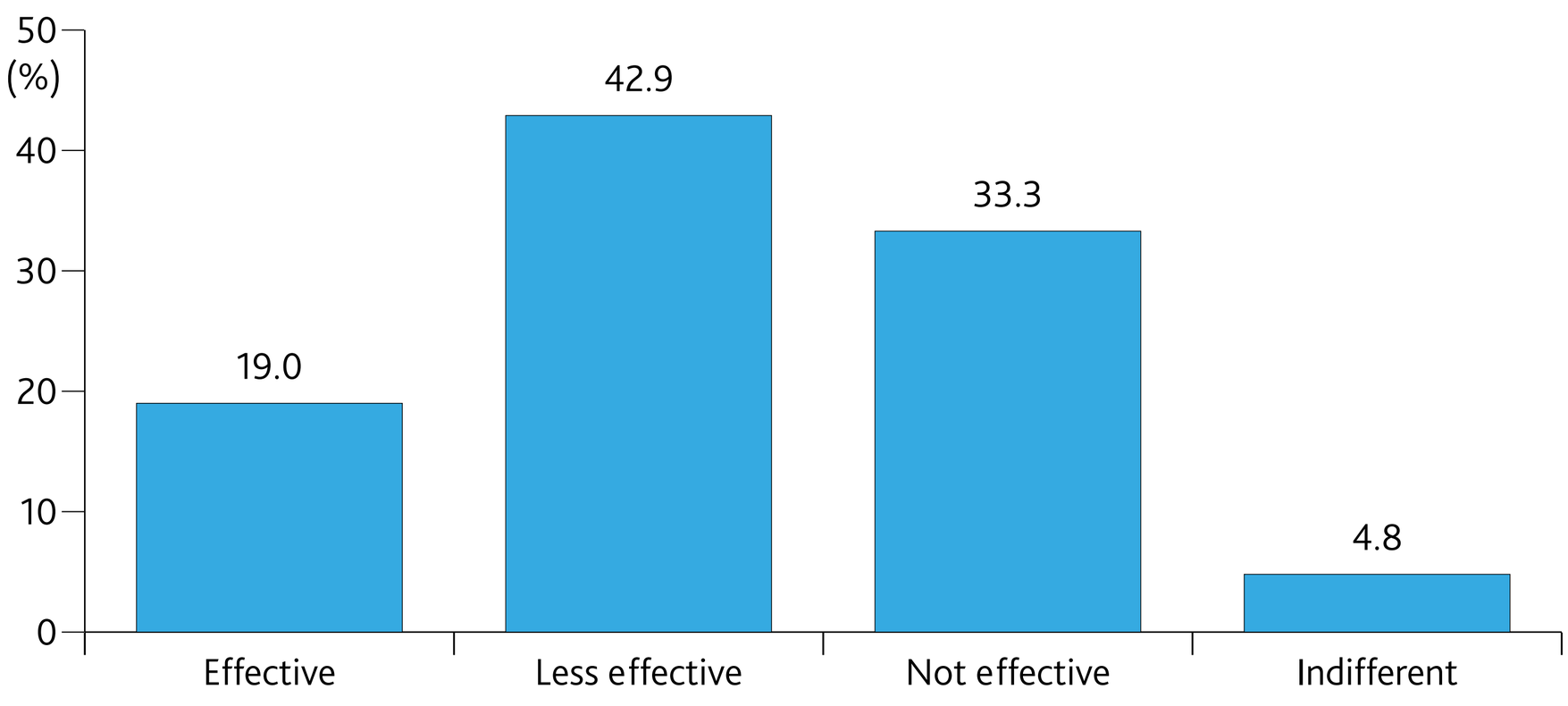


**Figure 5.** Level of LASEMA Operations
*Source: Authors' Analysis (2017)*

**Table 4.** Chi-Square Tests between Distribution of relief materials and LGAs

| | Value | Degree of Freedom | Asymptotic. Significance. (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | 160.033a | 14 | .000 |
| Likelihood Ratio | 220.665 | 14 | .000 |
| Number of Valid Cases | 210 | | |

*Source: Authors' Analysis (2017)*

The hypothesis tested is that the distribution of relief materials to affected markets does not differ significantly across LGAs), shows the Pearson Chi-Square value and the Likelihood ratio both returned values less than 0.05 which is the constant P-value of significance. This implies, that the calculated Chi-square value of 0.000 is significant. The implication is that variance exists in the distribution of relief materials to the sampled affected markets. There was no equitable distribution or relief materials as some areas enjoyed preferences and some traders were neglected. It can be inferred therefore, that the emergency agencies were more responsive and effective in their distribution of relief materials in some markets than in others. Field observation points that markets in the non-metropolitan Lagos, though fewer, enjoyed relief support more than the metropolitan areas. This could have some political undertone.

## Perception on Recovery from Market Fires

It was gathered from the field survey that recovery from market fires has been essentially partial and slow. This was evidenced by the claim of some (64.8%) the respondents that the affected parts of the markets still remain in ruins without any reconstruction. Most of the reconstructions done so far are self-funded by the affected traders or the market associations. The researcher observed that the slow reconstruction process can be traced to a measure of bias experienced in the disbursement of relief materials to traders. Despite the sluggish and self-funded reconstruction process, business activities was reported to have resumed (partially and fully) by 87.6% of the respondents, while 4.8% stated that none of the victims directly affected had returned since the incident. For those that had resumed trading and business, the recovery process took between a week and eleven months.

Delayed recovery could be attributed to ignorance or complacency about the significance of insuring one's business. This was alluded to by 85.7% of the respondents. Most (85.7%) of such victims lamented their continued financial shock and trauma associated with the inferno. All respondents acknowledged awareness of the importance of insurance cover however, only 14.3% had secured a policy while others claim it was expensive. In addition, some of the markets and traders are still prone to suffering a recurrence of fire outbreak as only 42.9% of the respondents identified significant measures such as installation of fire extinguishers and boreholes in markets to forestall another market fire. Other identified precautionary measures adapted by traders include disconnection of markets from power supply, ensuring all lights are put out and appliances are disconnected before leaving the market premises. The respondents however, craved the intervention of the government in making the markets more fire resistant.

The study tried to ascertain the significance of the observed difference in recovery rates amongst the different markets affected after the fire outbreaks. The hypothesis stated that

- $\mathbf{H_0}$: The duration of recovery from market fires does not differ significantly amongst markets;
- $\mathbf{H_1}$: The duration of recovery from market fires differs significantly amongst markets.

The Pearson Chi-Square value and the Likelihood ratio both returned values less than 0.05 which is the constant P-value of significance. Chi square value below 0.05 represents significance in the relationship and recommends acceptance of the alternative hypothesis $\mathbf{H_1}$. The implication is that the duration of recovery of traders from market fire incidences vary significantly amongst the markets surveyed. This variation could be attributed to the type of goods sold. It was observed that markets and traders that dealt in perishables, edi-

bles and general petty household items (food items, clothing, and kitchen utensils) took longer time to recover than markets/traders with more capital-intensive ventures such as motor spare parts, sawmills etc. This can be attributed to the financial stability of the traders dealing in capital intensive wares as such traders either have a robust bank account or access to credit facilities to bolster their financial shock.

**Table 5.** Chi-Square Tests between duration of recovery and different Markets

| | Value | Degree of Freedom | Asymptotic. Significance. (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | 630.000a | 60 | .000 |
| Likelihood Ratio | 434.992 | 60 | .000 |
| Number of Valid Cases | 210 | | |

*Source: Authors' Analysis (2017)*

Although why the recovery process to market fire disaster is varies globally (as reported also in Lagos market fire), Lindell & Prater (2003) reported that the timeline for recovery is dependent on a country's institutional capacity and resources available (Lindell & Prater, 2003) and also individual fire victims capacity. Thus, the need for emphasises on physical, social, economic and psychological recovery activities cannot be downplayed (Aning-Agyei, 2018). Studies have documented that recovery processes ranges from insurance, savings, financial institution support and retake off capital (Dercon, Hoddinott and Woldehanna, 2005; Strobl, 2008) in developed foreign agencies, family, friends and relatives, public government, non-Governmental Organisations and private actors philanthropic support (Gabralla, 2009; Joakim, 2011; Zagefka, & James, 2015; Okezie, 2021) in developing countries. This present a dichotomy of institutional and communal involvement in the recovery process. From the experiences of the market traders in the study area, there seems to be the limited capacity with regards to institutional (government) responsiveness to the financial and material recovery of market fire victim. The dependence on traders individual defined approaches often further expose them to poverty vulnerability and increase their shocks.

## Preventive Mechanisms Before and After Fire Outbreaks

The function of urban management experts during emergency cases extends beyond disaster prevention or monitoring but also includes post-disaster rebuilding processes and events. Post-disaster events, conditions, returning back to normalcy, and how individuals handle the disaster are a focus of disaster and urban mangers (Sanders et al., 2015).

In-depth interview and field observation revealed that there have been no concrete measures in place to prevent fire outbreaks within the markets sampled. Measures taken presently are more reactionary when the conflagration had begun and done the harm it could. Most of the markets are built without fire hydrants, fire extinguishers, water sprinklers etc as only 4.8% of respondents from the markets had ever used fire extinguisher during a fire outbreak. The absence of these features exposes markets to fire risk. Other measures identified included installation of fire extinguishers which have been installed for some (4.8%) markets at strategic positions and more responsive electrical management as many have disconnected from the national electricity grid and depend on the use of power generating sets. This has proved effective in some of the markets. For example, after the fire outbreak at Mammy market in the Ikeja Cantonment, the army has since disconnected the market from public electricity supply, controlled indiscriminate burning of refuse, and discouraged the storage of inflammable materials in the markets. These measures, according to the traders, have helped to make fire outbreaks a rarity in the markets since the last conflagrations.

## Coping and Adaptive Mechanism to Fire Outbreaks

Majority of the affected markets are yet to receive significant aid from the government after the recent fire outbreaks. However, many have lost hope in such aids and have charted coping courses on their own.

Based on the interview the researcher had with some of the victims, many of them had resorted to fortifying themselves better against any recurrence by keeping less valuable items only in shops. Fire outbreaks are unpredictable, but the level of damage can be reduced by the measures put in place. However, the measures observed so far does not appear to be able to forestall further losses during another fire outbreak.

Traders at the Irewole Sawmill in Ipaja and OkeAfa Sawmill at Ejigbo for instance, have adopted a change in their structural composition to better fortify their wares against fire outbreaks. According to the respondents, the wooden materials used previously for the construction of the shops made it easier for the inferno to destroy much goods before help arrived. Thus, they have resorted to using fired clay bricks at Irewole and cement blocks at OkeAfa Sawmills to construct some of the shops. This is definitely going to increase the time it takes for fire to burn or spread to other stalls.

# CONCLUSIONS

The study was set out to assess response and recovery measures taken by traders' market fires in Lagos state, Nigeria. The secondary data provided by the Lagos State Fire Service (2014) shows that there were over forty market fire across sixteen LGAs within the study period. The study established the fire incidence within the market mostly occurs at night and in most instances response to fire by responders are often limited. Why this study did not efficiently place emphasis on the efforts of the market traders, evidence shows poor disaster preparedness approach by the traders. Response to fire alerts by emergency responders have been observed limited. This is attributed to poor market design, poor fire response preparedness by the Lagos State Fire Service. This is mainly evident in situations where the responders get to the fire site or market with water that is not enough or empty fire trucks.

Recovery from losses incurred due to market fires have been observed to be slow in most cases while some others never recover. Full recovery can be said to be dependent on adequate response. The recurrence of the conflagrations in some markets have made it difficult for many traders to fully recover. Just as they are gathering momentum, fire strikes again. Now, there is the fear that market fire incidence is not any way near its end as significant efforts have not been made to check its recurrence. This is because many markets still look vulnerable to fire accidents in structure and equipping. Many more traders could still be thrown out of business by any recurrence of fire outbreaks and there's no telling how many will never recover from the loss.

Over reliance on the fire service to fight fire during outbreaks has resulted in extended losses to many markets as they have offered little and unreliable help sometimes. Market users must now look to immediate fire combating options and make response from fire stations a secondary option.

Traders bear the bulk of the burden of any losses incurred and have had to adopt coping and adaptive mechanisms which were still found to be grossly insufficient. Adequate response from the emergency institutions is not guaranteed and could not keep pace with the requirements of many victims of market fires where available. The situation looks bleak for traders except they form an alliance to protect their business centres against inferno invasion. A more proactive approach which would facilitate prevention of fire outbreaks in markets is preferable and should be considered above the reactionary strategies adopted. Measures that stress preparedness, prevention and mitigation which we believe is embedded in the upgrade of the city markets is proposed against the recurrence of market fire disaster in Lagos state.

# RECOMMENDATIONS

The recommendations adduced after critical assessment of the findings of this study can be divided into two sections: Policy and Practical/Technical recommendations. Just as the government has a responsibility of protecting the lives and properties of her citizens, the onus also rests on the citizens to ensure their lives and properties are in safer conditions while it awaits aid from the government.

## Policy Recommendations

On the account of policy recommendations, much of the work is on the government at all levels to embed and adopt fire disaster programs in market administrations. There is a need for government policy makers to shift attention from reactionary measures to policy actions that are more proactive on disaster prevention and impact reduction. Some of such policies are discussed below. Two of the cardinal tools of emergency management include: preparedness and mitigation. Programs that facilitate fire preparedness of traders and markets should be initiated and policies that ensure the sustainability of such should be drafted. This direction becomes imperative since no amount of recovery measures adopted would restore the particular lives and properties lost during fire disasters.

As discovered from the study, during fire outbreaks, most of the traders helplessly watch their investments go up in flames as they await firefighting aid since they know next to nothing about combating fire. Therefore, policies that address the preparedness of markets and traders to resist fire outbreaks becomes necessary. Policies should incorporate programs that train and equip traders with fire consciousness and preventive attitudes, firefighting mentality, skills and precautions, usage and precautions in the applications of firefighting implements. Fire drills should be conducted periodically to ascertain the knowledge acquired. The training programs should be conducted regularly to refresh and update the knowledge of market users. This would equip traders with requisite skills to combat fire outbreaks before aid from fire fighters arrive.

Power surge accounted for the cause of some fire outbreaks in markets. Thus, policies on prevention of fire incidence should include changes to power supply schedule to some markets. Markets that do not deal in perishables for example sawmills, could have a closing time in the evening when power supply is cut off from them till dawn. This would help prevent fire outbreaks due to power surge occurring at nights as this accounted for majority of the cases of market fires.

Recovery of losses incurred due to fire outbreak was reportedly slow amongst traders with little financial base. In fact, from the study, it was observed that some traders never recovered. Policies that aid quick recovery in case of losses to fire outbreak could be formed to provide a sort of financial shock-proof for traders in the event of market fire. This study recommends improved insurance education among traders to reduce the shock of losses to market fire. Traders should be given orientation on the benefits of insurance policies through regular sensitization programs. Insurance companies could also be mandated to provide cover for market traders by developing insurance policies that are affordable to them. An insurance policy document could be included amongst the documents required for a trader to operate in a market.

Traders are known for belonging to local cooperative associations in the markets for saving and borrowing purposes. This can be encouraged and made more formal by registering them with government agencies who can take oversight functions and forestall fraudulent practises that sometimes characterize such associations. Traders can always fall back on these cooperative societies to cushion the effect of any losses incurred.

## Practical/Technical recommendation

Practical steps need to be taken as well to forestall recurrence of fire outbreaks in addition to the policies adduced above. To prevent recurrence of fire outbreaks in markets, some measures are recommended for all markets are discussed below.

Market traders usually engage in illegal or unprofessional electrical connections to have power supply at their stalls. Such connections usually trigger fire during power surges. Thus, a remodelling or restructuring of markets is recommended which involves proper connection to power source of all stalls. A more responsive and stricter monitoring team of the power connection company could be assigned to do a periodic check on the connections in markets. Restructuring should also involve locating stores of inflammable products away from common stalls within market premises. There is also the need for each store to have a fire extinguisher in their respective stores.

All markets should have at least two to three water hydrants installed, depending on the size of the markets, at strategic locations. This would prevent the situation where the fire fighters run out of water while still engaging the fire. In addition, new fire stations should be constructed in locations where the markets have none close by as this would help reduce the response time to fire distress calls. The number of stations serving the state currently is inadequate and more stations would help significantly.

Furthermore, the services of the fire service have been described as dissatisfactory by many respondents during this study owing to their late response and inadequate equipment. Therefore, in other to improve the efficiency of the fire service, improved fire fighting vehicles should be purchased, fire hydrants should be strategically located in residential neighbourhoods, commercial areas (markets) and industrial areas. This provides unlimited access to water supply during firefighting. Presently there are no fire hydrants in most public places in Lagos State. This would contribute as well to reducing the response rate (in time) to fire distress calls.

One of the major reasons for extensive damage during most of the market fire incidences was the late arrival of the fire service at the scenes. Service station locations in relation to disaster sites were observed to be too far apart. This is due to the insufficient number of fire stations in the State to respond to fire scenes. Thus, to reduce response time to fire emergencies, all LGAs should have at least two well-equipped and functional fire stations. Presently, there are only a total of 13 Fire Stations in 11 LGAs out of 27 LGAs with Oshodi and Ikeja LGAs having two stations each. It was observed that reasons other than even distribution was considered in locating the existing stations going by the way they cluster around particular regions of the State while the largest LGA, Alimosho has none. Thus, the researcher recommends that more fire stations are constructed to reduce response time.

It was observed also that some fire outbreaks were discovered late. Therefore, it is recommended that the market premises have smoke detectors installed. Early detection of fire hazards before it escalates can make a huge difference in handling the fire and losses incurred. Some of the fire outbreaks were discovered when flames became visible from outside. The installation of smoke detectors in markets or stores could aid early discovery of fire before it escalates beyond easy control. When the alarm goes off, everyone can rally to put the fire out before it extends.

Another problem observed during this study was the accessibility of some markets. Some of the officials of the fire service claim they could not reach the point of the fire with their vehicle in some markets due to the structure of the market. Therefore, access roads within the markets should be improved to facilitate easy entry and exit especially during response to fire disaster for emergency responders.

The materials used for building markets have also contributed to the conflagration of some markets. For example, sawmills usually have stores or stalls made of wooden materials which is a good conductor of heat. Therefore, it is recommended that new markets stores and stalls are built with fire resistant materials which can withstand heat for a longer time such as fired bricks or steel. Existing markets can be upgraded toward resistant and improved response system and mechanism towards fire outbreak.

# REFERENCES


Adaramola, O., Popoola, A., Audu, A. and Adeleye, B. 2017, Risk factors and nature of disaster in the physical distribution and utilization of liquefied petroleum gas in Port-Harcourt city of Nigeria. *Journal of disaster risk management*, vol. 2, no. 1, pp.62-81.

Addai, E., Tulashie, S., Annan, J. and Yeboah, I. 2016, Trend of fire outbreaks in Ghana and ways to prevent these incidents, *Safety and Health at Work*, vol. 7, pp. 284-292

Agbola, S.B. and Falola, O.J., 2021. Seasonal and locational variations in fire disasters in Ibadan, Nigeria. *International Journal of Disaster Risk Reduction*, vol. 54, p.102035.

Aning-Agyei, P. G. (2018). *Managing post disaster recovery of market fire victims in Ghana* (Doctoral dissertation), University of Cape Coast: Ghana.

Bankoff, G. 2004. *The Historical Geography of Disaster: 'Vulnerability' and 'Local Knowledge' in Western Discourse*, Earthscan, London.

Blaikie, P., Cannon, T., Davis, I., and Wisner, B. 1994, At risk, *Natural hazards, people's vulnerability and Disasters.* Routledge, London.

Cheng, M., Chiu, K., Hsieh, Y., Yang, I., Chou, J. and Wu, Y. 2017, BIM integrated smart monitoring technique for building fire prevention and disaster relief. *Automation in Construction*, vol. 84, pp. 14-30.

Chhetri, S. and Kayastha, P. 2015, Manifestation of an analytic hierarchy process (AHP) model on fire potential zonation mapping in Kathmandu Metropolitan City, Nepal. *ISPRS International Journal of Geo-Information*, vol. 4, pp.400-417.

Cross, J. 2001, Megacities and small towns: different perspectives on hazard vulnerability, *Environmental Hazards*, vol. 3, pp.63–80.

Cutter, S., Boruff, B. and Shirley, W. 2003, Social Vulnerability to Environmental Hazards. *Social Science Quarterly*, vol. 84, no. 2, pp. 242–261.

Cannon, T., Twigg, J., and Rowell, J. 2003, *Social Vulnerability, Sustainable Livelihoods and Disasters*. Report to DFID Conflict and Humanitarian Assistance Department (CHAD) and Sustainable Livelihood Support Office.

Daily Newswatch. 2014. "Oko Baba razed by fire". Retrieved from www.mydailynewswatchng.com/oko-baba-razed-by-fire/ [Accessed on 19th March, 2017].

Dercon, S., Hoddinott, J. Y., &Woldehanna, T. 2005. Shocks and consumption in 15 Ethiopian villages 1999-2004. *Journal of African Economies*, vol. 14, no. 4, pp. 559-585.

Dickey, M. 2003, Relief Groups Seek Workers with Language Skills, Overseas Experience, and a High Tolerance for Chaos, *The Chronicle of Philanthropy*. Retrieved from http://philanthropy.com/article/Relief-Groups-Seek-Workers/52479/ [Accessed on 15th April, 2018].

Emergency Management Australia. 2004, *Emergency Management in Australia: Concepts and Principles - Manual 1.*

ESPON Hazards project. 2003, *The spatial effects and management of natural and technological hazards in general and in relation to climate change*. 1st Interim report of the European Spatial Planning and Observation Network (ESPON) project 1.3.1. Geological Survey of Finland.

Gabralla, A. K. 2009. *Islamic institution of charity and international disaster relief: a case study of Gift of the Givers Foundation in South Africa* (Doctoral dissertation). University od KwaZulu-Natal: South Africa

Gerald, J and Dorothy, R 2011, Examining linkages between disaster risk reduction and Livelihoods: Literature Review, Feinstein International center, Tufts University, USA.

Gernay, T., Selamet, S., Tondini, N. and Khorasani, N. 2016, Urban infrastructure resilience to fire disaster: An overview', *Procedia Engineering*,vol.16, pp.1801–1805.

Grant, C. 2012, *History: National Fire Protection* Association. Retrieved from www.wikipedia.org/national-fireprotectionassociation [Accessed 2 March 2015].

Guan, X., Wei, H., Lu, S., Dai, Q. and Su, H. 2018. Assessment on the urbanization strategy in China: Achievements, challenges and reflections, *Habitat International*, vol.71, pp. 97-109.

Güneralp, B., Lwasa, S., Masundire, H., Parnell, S. and Seto, K. C. 2017, Urbanization in Africa: challenges and opportunities for conservation, *Environmental Research Letters*, vol.13, no.1015002, pp. 1-8.

International Federation of Red Cross and Red Crescent Societies. 2009. World disasters report Focus on early warning, early action. The International Federation of Red Cross and Red Crescent Societies, Geneva. Available at: https://www.ifrc.org/en/publications--and-reports/world-disasters-report/wdr2009/

Joakim, E. 2011. Post-disaster recovery and vulnerability. In D. Etkin, & B. L. Murphy (Eds.), *Disaster and emergency management in Canada* (pp. 620- 630). Vancouver, Canada: CRHNet.

Jones, E. G., Dias, M. B., &Stentz, A. 2006. *Learning-enhanced market-based task allocation for disaster response*. Carnegie-Mellon University Pittsburgh, Pennsylvania.

Lagos State Government, 2011, Lagos State Fire Service. Retrieved from www.lagosstate.gov.ng/pagemenus.php?p=258andk=28 [Accessed on 19th March, 2016]

Langdon, G. 2011, *Fire Safety in Buildings*. A & C Black, London.

Lindell, M. K., Arlikatti, S., & Prater, C. S. 2009. Why people do what they do to protect against earthquake risk: Perceptions of hazard adjustment attributes. *Risk Analysis*, vol. 29, no. 8, pp. 1072-1088

Ma, Y., Shu, X., Shen, S., Song, J., Li, G. and Liu, Q. 2014, Study on network public opinion dissemination and coping strategies in large fire disasters. *Procedia engineering*, vol.71, pp. 616-621.

Morgan, J. 2016, The representation and experience of English urban fire disasters, c.1580–1640, *Historical Research*, vol.89, no.244, pp. 268-293

Mtani, I.W. and Mbuya, E.C. 2018, Urban fire risk control: House design, upgrading and replanning', *Jàmbá: Journal of Disaster Risk Studies*,vol.10, no.1, pp. 1-8.

Munasinghe, M. 2014, The urban environmental degradation and vulnerability of disaster, World Conference on Natural Disaster Reduction held in Sendai, Japan from 14–18 March 2015. Technical Committee Session C took place from July, 2014.

Nakagawa, Y. and Shaw, R. 2004, Social Capital: A Missing Link to Disaster Recovery. *International Journal of Mass Emergencies and Disasters*, vol.22, no.1, pp. 5 – 34.

Ngunyi, E. W. 2011. *Community organizing in achieving resilience to disasters: the case of fire disaster in Gikomba market* (Doctoral dissertation). University of Nairobi: Kenya.

Nigerian News and Stories. 2013. "Three injured and ₦500m goods destroyed in Lagos market inferno". Retrieved at http://naijaparrot.com/three-injured--n500m-goods-destroyed-in-lagos-market-inferno/ [Accessed 30th March, 2016].

Okezie, A. 2021. Tinubu donates N50m to Katsina market fire victims. Available at: https://thenationonlineng.net/tinubu-donates-n50m-to-katsina-market-fire-victims/

Okon, I., & Njoku, C. G. 2018. The Location of Fire Hydrants and Implications to Fire Disaster Management in Calabar, Cross Riv-er State, Nigeria. *IOSR J. Humanit. Soc. Sci*, vol. 23, pp. 42-55.

Oladokun, V. and Emmanuel, C. 2014, Urban market fire disasters management in Nigeria: A damage minimization based fuzzy logic model approach, *International Journal of Computer Applications,* vol.106, no.17, pp. 1–6.

Olatubara, C. 2007, Fundamentals of Housing. In Agbola,T.Egunjobi, L and Olatubara, C. O. (eds.) *Housing Development and Management: A Book of Readings, Department of Urban and Regional Planning*, University of Ibadan, Ibadan, Nigeria.

Oteng-Ababio, M., Sarfo, K. and Owusu-Sekyere, E. 2015, Exploring the realities of resilience: Case study of Kantamanto market fire in Accra, Ghana, *International Journal of Disaster Risk Reduction,* 12:311–318

Owusu-Sekyere, E., Adjuik, R. Y., &Wedam, E. 2017. The Central Medical Store fire disaster: a test for institutional compliance in disaster prevention in Ghana. *Sage open*, vol. 7, no. 2, pp. 2158244017699528.

Popoola, A., Adekalu, O., Audu, A. and Adeleye, B. 2016, Analysis of causes and characteristics of market fires in Lagos State, Nigeria. *International Journal of agriculture and rural development*, vol.19, no.1, pp. 2407-2421.

Pyne, S. 2012, *Fire in America: A cultural History of Wildland and Rural Fire* (paperback edition ed.). Washington: University of Washington press. Retrieved from www.wikipedia.org/glossaryofwildlandfireterminology

Sakamoto, J., Nakayama, J., Nakarai, T., Kasai, N., Shibutani, T. and Miyake, A. 2016, Effect of gasoline pool fire on liquid hydrogen storage tank in hybrid hydrogen gasoline fueling station, *International Journal of Hydrogen Energy*, vol.41, pp. 2096-2104

Sanders, D., Laing, J. and Frost, W. 2015, Exploring the role and importance of post-disaster events in rural communities, *Journal of Rural Studies*, vol.41, pp. 82-94

Schneider, S. H., Semenov, S., Patwardhan, A., Burton, I., Magadza C., Oppenheimer, M., Pittock, A., Rahman, A., Smith, J., Suarez, A., Yamin, F. 2007. Assessing Key Vulnerabilities and the Risk from Climate Change. In Parry, M., Canziani, O., Palutikof, J., Linden, P., Hanson, C. (eds), *Climate Change 2007: Impacts, Adaptation and Vulnerability.* Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge: Cambridge University Press, UK, pp 779–810.

Schmidt-Thomé, P. (ed) 2005, The spatial effects and management of natural and technological hazards in Europe – final report of the European spatial planning and observation network (ESPON) project 1.3.1. Geological Survey of Finland. 197 p.

Sutton, J., & Tierney, K. 2006. Disaster preparedness: Concepts, guidance, and research. *Colorado: University of Colorado*, 1-41.

UNDP 2004, *Reducing Disaster Risk: A Challenge for Development*, United Nations Development Programme, Bureau for Crisis and Recovery.

United Nations Development Programme (UNDP). 2011. Disaster-conflict interface: Comparative experiences. New York, NY: UNDP.

Victoria, L. 2007. Community Based Disaster management in the Philippines: Making a difference in people's lives. Center for Disaster Preparedness: Quezon City, Philippines

Villa, F., and McLeod, H. 2002, Environmental vulnerability indicators for environmental planning and decision-making: Guidelines and applications, *Environmental Management*,vol.29, no.3, pp. 335–348.

Wahab, B, and Falola, O. 2018. Vulnerable households and communities' responses to flood disasters, *Ibadan Journal of Sociology*, vol.7, no.1, pp. 47-75

World Fire Statistics Centre (WFSC). (2012). United Nations Report Endorsed and Data Tables. A Report Submitted to the United Nations Economic Commission for Europe (UNECE).

Zagefka, H., & James, T. 2015. The psychology of charitable donations to disaster victims and beyond. *Social Issues and Policy Review*, vol. 9, no. 1, pp. 155-192.

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