

Fire Hazard Preparedness and Mitigation in Selected Market Centres in South-Eastern Nigeria

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Abstract:- Fire in commercial institutions is a public concern because of the increased incidences, injuries, and deaths of innocent immediate traders and stakeholders not to mention the destruction caused by the fire to the institution buildings such as the shops and other valuables. Preparedness to fire hazards will help to minimize loss of lives, property, and trading time. The purpose of this study was to investigate fire hazard preparedness and mitigation in selected markets centers in southeastern Nigeria. The study was guided by the following objectives; to analyze the frequency of fire disaster across the study area and to assess risk reduction strategies in these markets. The target population was the traders and other stakeholders in the markets. Simple random sampling was used to give every subject an equal chance to be selected. Data were collected using questionnaires which were administered to the respondents through the drop and pick a method and the site observation checklist. Data collected from respondents were analyzed through descriptive statistics. The results were presented using frequency tables, mean and standard deviation. Basing on the study findings, the majority of the respondents reported that fire occurs frequently in the markets which are mostly caused by fault electricity, renovation, and inappropriate storage of flammable materials. This indicated a high level of fire disaster unpreparedness. On safety plans, most markets have no evacuation plans. All these are signs of fire disaster unpreparedness. On training in fire safety, most workers and other stakeholders have not been trained on appropriate responses in case of fire outbreak and most of them may not know what to do in case of fire disaster leading to fire disaster unpreparedness. Basing on the study findings, the market management should consider adding more firefighting facilities like a sprinkler system, reliable water supply, fire boots, suits, helmets, hoods, gloves, sacks of sands in buildings, fire blankets, fire fighters' outfits, fire protective clothing, fire hydrants, fire escape ladder, and self-contained breathing apparatus so that they become proportional to the number of market buildings and people in the markets. It is also recommended that windows should not be grilled, and doors should open outwards. Also, market traders and stakeholders should be made aware of evacuation plans. Finally, all market traders and stakeholders should be trained on fire safety.

Keywords;- Traders, Hazards, Perception, Preparedness, Fire.

I. INTRODUCTION

Scientifically, fire can be defined as a chemical reaction of two or more combustible bodies either in liquid, solid, or vapor in combination with oxygen thereby creating heat or both heat and light. It is not out of place, to say that the incidence of fire outbreak has become the order of the day, fire hazard is any situation in which there is a greater than normal risk of harm to people or property due to fire. It is very alarming that fire-out breaks have risen to worldwide attention in recent times as an environmental and economic problem.

Generally, fire is seen as a potential threat to sustainable development and growth because of its effect on ecosystems, its contribution to carbon emissions, and its impact on biodiversity (Tacconi, 2013). Fire, when discovered provided man with the first means of advancement. It provided man the opportunity to choose his food by enabling him to cook. It expanded his living range by providing him with an external source of heat and light; the fire was so significant to a primitive man that made it one of the few elements (earth, fire, air, and water) which made up his world. More so, as the primitive man discovered fire, fire also revealed to him its awesome distinctive power, which people are experiencing today. The primitive man worshipped fire and used it but, also lived in fear and was scared of its distinctive nature. Fire outbreak is one identified hazard in the community that can cause disaster, it has destroyed both lives and properties in very high magnitude.

Indeed, the occurrence of disasters and emergencies in Nigeria has increased in frequency and intensity in the last decade and especially in recent times. Rapid population growth and urbanization and socio-political issues compounded by ethnic plurality have been resulting in fierce competition for scarce resources leading to deteriorating livelihoods, social marginalization, crime, and general insecurity (NEMA, 2006).

Fire disasters particularly have become so incessant that they now occur daily, even though the risk of fire outbreaks is higher during the dry season, it is very scary the number of fire incidents that have occurred in quick succession across the nation. The statistics for the year ended 2012 coming from various states in the federation are equally frightening (Adamu, 2013). In Rivers State, for instance, the government has announced that 73 persons suffered different degrees of injuries and that no fewer than

230 persons lost their lives in 222 fire incidents in the state in 2012 alone (Ogunmosunle, 2013). Another statement from the Oyo State Fire Service Department indicated that about N1bn worth of property was destroyed and a total of 38 people were killed in 607 fire incidents last year. In just the first two weeks of 2013, the department has received 46 distress calls over fire disasters in different parts of the state in which three persons were killed (Ogunmosunle, 2013).

In Nigeria traditional markets is a call point for all and sundry for business, the markets allow the buyer and seller to interact and bargain on the prices of the goods and services this is in contrast to the shopping mall/centres, supermarkets amongst others where the prices of goods and services are fixed with no opportunity for the participants in business to bargain. Due to the influx of a large number of people as a result of population expansion the markets have become a haven characterized by so many vices amongst these vices are traffic congestion, improper waste disposal, chaotic circulation patterns, these factors combine to

constitute considerable risk during fire outbreaks as a result of improper use of the facility.

Fire outbreaks in markets have led to the wanton loss of lives and properties worth billions of naira across the country, this ugly sinister isn't mostly due to the natural cause but man-made. In this study, various prevention and control strategies would be investigated and assessed to establish the extent of application.

II. AIM AND OBJECTIVES OF STUDY

This study aimed to analyze fire Hazard Preparedness and Mitigation in Selected Market centers in South-Eastern Nigeria.

To achieve this aim, the following objectives were pursued:

1. Analyze frequency of fire disaster across the study area
2. Assess risk reduction strategies in these markets

III. THE STUDY AREA

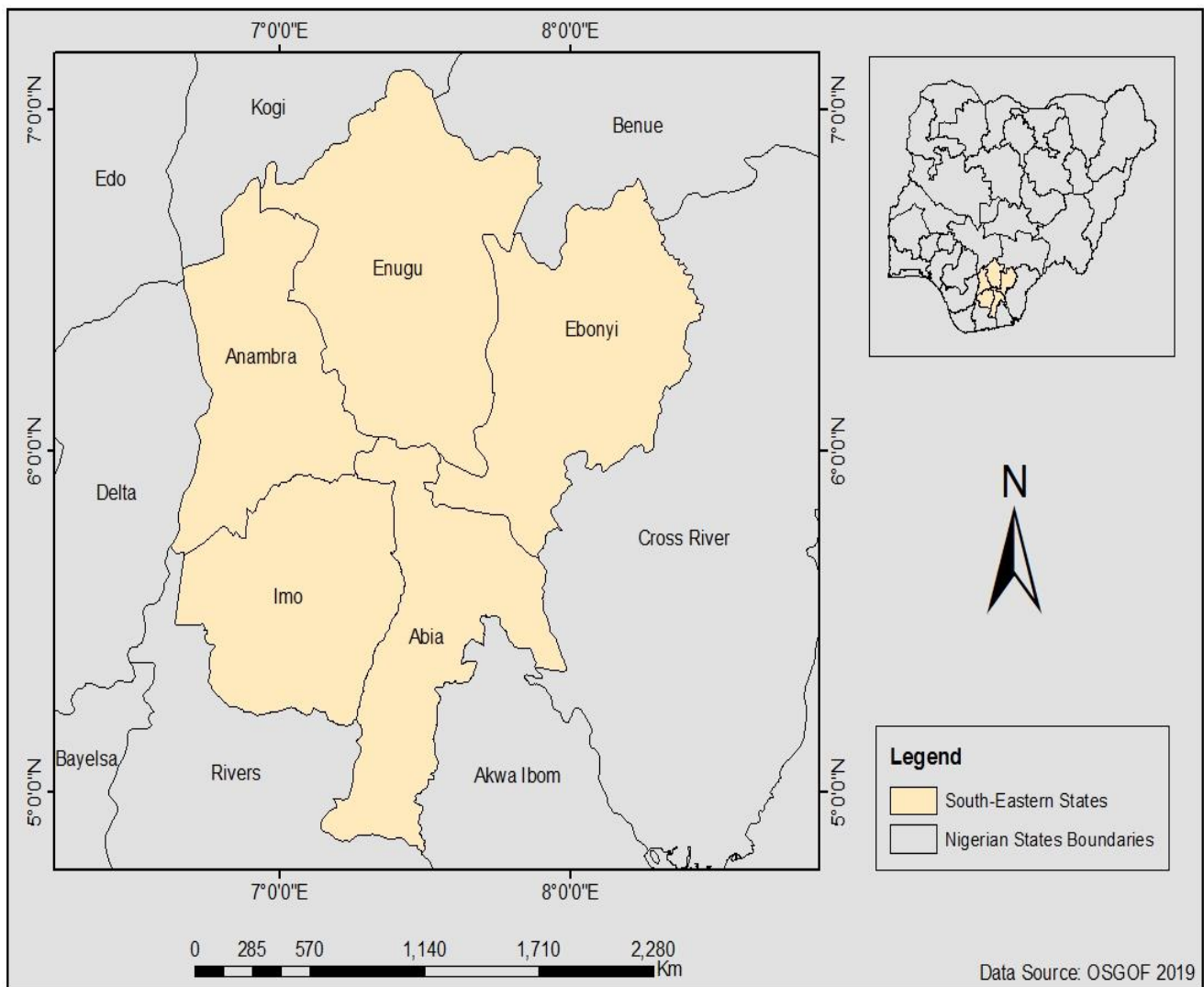


Figure 1: South-Eastern Nigeria

The area lies roughly between latitudes 5⁰ and 6⁰ north of the equator and between longitudes 7° and 8° East of Greenwich. It is bordered in the South by the Atlantic Ocean. Delta State lies to the West, the north Savanna States of Benue and Kogi to the North, and the sub-equatorial Cameroon Republic to the East. The population of Igbo land stated here is an accumulation of the five (5) states Abia, Anambra, Ebonyi, Enugu, and Imo only. The total population is about 40 million with the population density of 400km² (1,000/sq mi), with highest elevation of 1,000m (3,300ft) and lowest elevation of 0m (0ft) (population census estimate, 2015).

IV. MATERIALS AND METHODOLOGY

This study adopted a descriptive survey design. The study population consisted 31557 of male and female traders (i.e., shop owners) in the three selected states of the South-eastern Nigeria which includes Anambra, Abia, and the Imo

States with nine major markets purposively chosen by the researcher. The choice of male and female traders is based on the fact that the variables under investigation were particular to them and no other party could provide this information.

A sample size of 400 respondents was drawn from 9 selected markets using a stratified random sampling technique. The instrument used was a questionnaire developed by the researchers. The questionnaire was validated and the reliability was tested test-retest method, calculated with Pearson's product-moment correlation. This yielded a reliability index of 0.81. Mean scores.

The data generated were analyzed using SPSS. The research questions were answered using both mean and standard deviation and simple percentages. The results of the data analyses are presented below.

V. RESULT AND DISCUSSION

Table 1 Frequency of fire disaster across the study area

Options	Respondents per state	Frequency	Percentage distribution (%)
Highly Frequent	Anambra	54	16
	Abia	48	15
	Imo	40	12
Moderately Frequent	Anambra	38	12
	Abia	34	10
	Imo	28	9
Lowly Frequent	Anambra	23	7
	Abia	19	6
	Imo	17	5
No Frequency	Anambra	10	3
	Abia	9	3
	Imo	8	2
Total		328	100

Source: Researchers Fieldwork, 2021

The findings presented in table 1 shows that Anambra with 54,38(16%, 12%), Abia with 48, 34(15%,10%), and Imo 40, 28 (12%,9%) which represent 74% of the respondents reported that Fire disaster occurs frequently in their respective markets. In other words, 26% of the respondents from the three states have a contrary opinion regarding the question with each state scores which has Anambra 23, 10(7%, 3%), Abia 19, 9(19%, 3%), and Imo 17, 8(5%, 2%) of the respondents indicating their level of disagreement. From the result above, fire disaster occurs frequently in these markets.

Table 2: Activities that cause fire outbreak in markets

Statement	Respondents Per State											
	Anambra=125				Abia=110				Imo=93			
	SA	A	D	SD	SA	A	D	SD	SA	A	D	SD
Fault electricity	98 78%	17 14%	6 5%	4 3%	54 49%	36 33%	12 11%	8 7%	33 35%	41 44%	2 2%	17 18%
Smoking	21 17%	8 6%	22 18%	74 59%	29 26%	11 10%	42 38%	28 25%	19 20%	32 34%	26 28%	16 17%
Fire ignition	44 35%	61 49%	11 9%	9 7%	18 16%	32 29%	48 44%	12 11%	24 26%	29 31%	31 33%	9 10%
Renovation	45 36%	32 26%	25 20%	23 18%	60 55%	33 30%	12 11%	5 5%	29 31%	40 43%	10 11%	14 15%
Arson	65 52%	42 34%	11 9%	7 6%	72 65%	30 27%	3 3%	5 5%	33 35%	21 23%	20 22%	19 20%

Source: Researchers Fieldwork, 2021

The statistical presentation in table 2 summarizes respondents' view on the activities that cause fire outbreaks in your markets. Respondents were of the view that Fault electricity is one of the major causes of fire outbreak in the markets with Anambra ranked 1ST having the highest percentage rate of 92% followed by Abia with 90% and Imo with 74%. Item 2 i.e., the Smoking has the following percentage rate disagreement of 77% for Anambra, 63% for Abia while Imo respondents agreed with the item with the percentage score of 54% indicating smoking as one of the causes of fire outbreaks in their markets. They were of the view that the Fire ignition also causes fire outbreaks with a percentage rating of 84% for Anambra, Abia disagreed with 55% and Imo 51% agreement. Respondents across the states are of the view that Renovation causes fire in the markets with Anambra percentage rate of 62%, Abia 84%, and Imo 74%. Similarly, the respondents also agreed that Arson in the study area causes fire outbreak with the following percentage rating Anambra 86%, Abia 92%, and Imo 58% respectively.

Table 3: Impact of fire disaster that struck the market

Impact	Respondents Per State											
	Anambra=125				Abia=110				Imo=93			
	SA	A	D	SD	SA	A	D	SD	SA	A	D	SD
Market closure	99 79%	18 14%	5 4%	3 2%	64 58%	26 24%	12 11%	8 7%	43 46%	31 33%	9 10%	10 11%
Destruction of property	84 67%	22 18%	8 6%	11 9%	69 63%	31 28%	2 2%	8 7%	49 53%	26 28%	10 11%	8 9%
Physical injuries to individuals	44 35%	61 49%	12 10%	8 6%	16 15%	32 29%	50 45%	12 11%	24 26%	20 22%	40 43%	9 10%
Loss of life	23 18%	12 10%	45 36%	45 36%	12 11%	23 21%	60 55%	15 14%	14 15%	10 11%	40 43%	29 31%

Source: Researchers Fieldwork, 2021

From the Table 3, it can be seen that the participants were of the view that the effect of the disaster led to market closure which Anambra ranked 1ST with a percentage score of 94%, Abia ranked 2ND with 82% while Imo ranked 3RD with 79%. On properties, respondents across the three states agree with the item with the percentage scores of 85% for Anambra, Abia 91% and Imo 80%. Item 3 shows that respondents from Anambra with 84% agreed that physical injuries to individuals were felt while Abia and Imo disagree with the same item with percentage scores of 56% and 52%. For item 4, the responses of the respondents on the loss of life show their disagreement level with Anambra 72%, Abia 69%, and Imo respondents with 74% respectively.

Traders/ stakeholders' reaction to emergencies

To provide an answer to the stated question, data were collected from traders of the three States via the questionnaire. The analysis of the data collected is presented in table 4

The respondents were asked to state their views on the traders' reactions in case of disasters.

Table 4: Traders/ stakeholders reactions to emergencies

Reaction to Emergencies	Respondents Per State											
	Anambra=125				Abia=110				Imo=93			
	SA	A	D	SD	SA	A	D	SD	SA	A	D	SD
Panic and confusion	105 84%	17 14%	1 1%	2 2%	74 67%	26 24%	8 7%	2 2%	53 57%	21 23%	9 10%	10 11%
Curious onlookers	31 25%	74 59%	12 10%	8 6%	59 54%	28 25%	12 11%	11 10%	42 45%	25 27%	16 17%	10 11%
Quick response at the scene	9 7%	11 9%	31 25%	74 59%	12 11%	18 16%	22 20%	58 53%	7 8%	14 15%	29 31%	43 46%

Source: Researchers Fieldwork, 2021

The result shows responses of respondents on traders’ reactions to emergencies, it can be observed from the respondent’s responses that items 1 and 2 was accepted or agreed by the respondents from the three states that there were Panic and confusion and Curious onlookers with the percentage scores of (97%, 84%) for Anambra which ranked 1ST, (91%, 79%) for Abia which ranked 2ND while it was also accepted by traders from Imo which ranked 3RD with mean scores (79%, 72%). Items 3 was rejected or disagree by the market traders across the state that Quick response at the scene and Evacuation of goods or wares were not possible due to lack of training. This also implies that most market community members did not know what to do when disasters occur which would therefore subject them to the suffering that can be avoided.

Table 5: Opinion of traders on Risk reduction strategies

Statement	Respondents Per State											
	Anambra=125				Abia=110				Imo=93			
	SA	A	D	SD	SA	A	D	SD	SA	A	D	SD
Location of highly inflammable substances in your market	44 35%	61 49%	11 9%	9 7%	18 16%	32 29%	48 44%	12 11%	24 26%	29 31%	31 33%	9 10%
Storage of inflammable substances in your market	45 36%	32 26%	25 20%	23 18%	60 55%	33 30%	12 11%	5 5%	29 31%	40 43%	10 11%	14 15%
Removal of flammables where there is heat in the market	65 52%	42 34%	11 9%	7 6%	72 65%	30 27%	3 3%	5 5%	33 35%	21 23%	20 22%	19 20%
Handling of electrical equipment in the market	4 3%	6 5%	17 14%	98 78%	8 7%	12 11%	36 33%	54 49%	2 2%	17 18%	33 35%	41 44%
Ventilation for flammables in the market	21 17%	8 6%	22 18%	74 59%	22 20%	11 10%	29 26%	48 44%	16 17%	12 13%	19 20%	46 49%

Source: Researchers Fieldwork, 2021

Analysis on table 5 shows the opinion of the participants on Fire Hazard Preparedness and Mitigation in Selected Markets centers in South-Eastern Nigeria. Based on their perceptions, there are highly inflammable substances in the market attracted the percentage responses agreement of 84% and 57% by the Anambra and Imo respondents while Abia respondents disagree with the percentage score of 55% respectively.

Further, storage of inflammable substances in the markets attracted the percentage responses of 62%, 84% and 74% by the traders of Anambra which ranked 3RD, Abia ranked 1ST and Imo ranked 2ND. In item 3, the responses of the respondents on whether there is the practice of removing flammables where there is heat in the market as part of the risk reduction strategies were accepted by the Anambra respondents with percentage scores of 85%, Abia 92%, and Imo 58%. Item 4 attracted disagreement from most of the respondents across the three states regarding the handling of electrical equipment in the markets with Anambra 92%, Abia 82%, and Imo 79%. In item 5, respondents across the three states indicated their level of disagreement on Ventilation for flammables in the market with percentage scores of Anambra 77%, Abia 70%, and Imo 70% respectively.

VI. CONCLUSION AND RECOMMENDATION

Based on the findings of the study, it can be concluded that: Fire disaster occurs frequently in these markets. In addition, fault electricity was reported as one of the major causes of fire outbreak in the markets as well as Fire ignition and Renovation.

Little or low compliance to safety standards by traders leading to poor storage of inflammable substances and handling of electrical equipment in the markets.

Based on data collected and analyzed the researcher recommends that:

1. A study to establish the level of risk of fire disasters in markets should also be carried out.
2. Traders and the general public should be careful in handling flammable materials that could cause fire outbreaks, managing faulty electrical equipment and appliances should be seen as enemies as these make our shops more vulnerable to fire.
3. Market buildings should from time-to-time conduct vulnerability assessments to identify potential threats, and the recommendations of the assessment should be implemented.
4. Traders should comply with safety standards, rules, to help avert the incidence of fire outbreaks.

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