Original Research Article

FIRE DISASTER EMERGENCY PREPAREDNESS OF SELECTED MARKETS IN SOUTH-SOUTH REGION OF NIGERIA

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ABSTRACT

Aim: The study assessed fire disaster emergency preparedness of selected markets in South-South Nigeria
Methodology: The study adopted survey research design and questionnaire for data collection among shop owner/space occupant across major markets in Rivers, Bayelsa and Cross-Rivers States. 384 respondents in form of shop/space occupants and owners in various markets were selected. The research hypothesis was analysed using Pearson Product Moment Correlation (PPMC).
Results: There were disagreement about market carrying out fire hazard and risk assessment (76.6%), conducting vulnerability assessment towards fire hazard causal agents (71.9%), response unit are well-equipped for their activities (64.3%), space occupants are drill towards fire hazard response (62.5%) and generally prepared towards fire disaster (72.1%). The factors limiting the practice of fire disaster preparedness were literacy level (24.7%), lack of resources (20.8%), reliance on market association (16.7%) and religious believe (16.4%). Majority of respondents indicated that the way forward is through involvement of other agencies (37.5%) and public enlightenment (27.3%). Preparedness practices such as "vulnerability assessment to identify causes of fire disaster and emergency response unit that respond to fire disaster", showed moderate correlation and significant (where r = 0.420, 0.394, and p = 0.000, 0.000) to fire outbreak in the market. Practice such as "emergency response unit uses the necessary equipment to contain fire outbreak from causing havoc, market engaged shop owners in preparedness practices", showed weak correlation and significant (where r = 0.394, 0.297, 0.250, 0.172, 0.158 and p = 0.000, 0.000) while "information about fire disaster is communicated to marketers" showed no correlation and not significant (where r = -0.057 and p= 0.262).
Conclusion: there are limited fire disaster preparedness activities across the markets places; hence, the need for collaboration among stakeholders to review various rules and regulation guiding the establishment of market places.

Keywords: *Fire Disaster, Disaster Preparedness, Market Fire, Emergency Management*

1. INTRODUCTION

Fire is one of the essential tools required by humans for their day to day activities, its occurrence in places where it is not required and in some cases beyond the capacity of its need becomes a danger (Abdulsalam, *et al*., 2016). Human activities such as burning, improper electrical works, high voltage electricity, in-door/outdoor explosions are some of the causes of fire disaster and these incidences are not restricted to a specific time or season (Popoola, *et al*., 2016). Furthermore, major cities of the world had their share of the massive inferno mishaps. In the 13th century, one of the two medieval fires of London also called the Great Fire of Suthwark, broke out and left about 5000 people dead while fleeing on the London Bridge (Popoola, *et al*., 2016), Greenfell Tower Fire, London in 2017 and Mumbai Kamala Mill fire in 2017 (Adeleye et al., 2020). Also, about 80% of all residential houses and almost all public buildings were destroyed when fire razed Reutlingen, Germany in 1726, displacing 1,200 families (Popoola, *et al*., 2016). Although, fire disaster still ravages some urban centres of the world in recent times, the level of damage is minimal and can be attributed to increase awareness and precautions as well as improved fire combating techniques (Popoola, *et al*., 2016).

In Nigeria, fire hazard has caused varying degrees of destruction in the lives and properties of the citizens. In 1998, fire disaster due to pipeline explosion claimed 1,082 lives in Jesse, Delta State; the highest number of casualties for a single fire event. While in 2002, another devastating fire outbreak through bomb explosions at the Nigerian Military Cantonment in Ikeja, Lagos claimed 800 lives and rendered many homeless (Popoola, *et al*., 2016). Adeleye, *et al* (2020) noted that incessant fire in Nigeria has cost the National economy about N6 trillion in the last 5 years, also noting cities like Lagos, Kano, Port Harcourt and Abuja as the major cities seriously affected while such impact cut-across various facilities, institutions and not excluding market. Popoola, *et al* (2016) reported increased incidents of fire outbreaks in many Lagos state markets between 2012 and 2014 while Ogunmosunle (2013) noted that 40% of fire incidents in Rivers state in the year 2012 took place in market places resulting to injuries, destruction of properties and deaths.

Many markets in Nigeria and specifically the South-South region of the country have witnessed fire disaster at one point in time and in some cases, it has become a recurring event in some of the markets.

Elenwo, *et al* (2019) reported market fire incidents recorded in Port Harcourt which include Creek Road and Mile Three Markets in 2014, Mile One Market which has had several fire incidences and the most recent was 2013, Rumuokoro Market 2017, Port Harcourt Slaughter Market fire 2017, and Fruit Garden Market in 2018. In related event, markets in South-South cities have witnessed fire disaster including the Watt Market fire in 2014 and Marian market in 2020 (occurred twice- July and August) both in Calabar Municipal of Cross River State (Okon & Njoku, 2018; Daily Post, 2020) and Swali Market in 2020 in Yengoa Bayelsa State (Uguru and Obukoeroro, 2020). The outcome of these events has resulted to loss of lives, injuries and destruction of properties worth billions of Naira (Popoola, *et al*., 2016; Elenwo, *et al*., 2019) and most of these high losses is associated with lack or insufficient fire disaster preparedness or prevention measures in many of the markets (Iyaji, *et al*., 2016; Adamu et al., 2020).

Disaster preparedness from fire disaster perspective is the readiness to respond to fire outbreak situation such that disaster does not occur and if such occurs, the impact is minimal. All measures and policies taken before an event occurs that allow for prevention, mitigation, and readiness constitutes disaster preparedness (Lelisa & Kifle, 2006). Fire disaster preparedness is defined as pre-fire disaster activities designed to increase the level of readiness or improve operational capability, for responding to a fire emergency (Murage, 2012). Disaster preparedness is one of the important elements in disaster risk reduction and it encompasses awareness, readiness to render appropriate responses and quick recovery (Ejeta, *et al*., 2015). Despite its importance, less has been done globally to improve the levels of disaster preparedness (Paton, 2003; Kihila, 2017). Disaster preparedness has nine (9) components; hazard, risk and vulnerability assessment, response mechanism and strategies, preparedness plans, coordination, information management, early warning system, resource mobilization, public education, training and rehearsals and community/location-based disaster preparedness. The ninth element, "Community/location-based disaster preparedness" (CBDP), should not be seen as a measure distinct from the other elements. Rather, CBDP is a process that encompasses and incorporates the first eight elements into a locally appropriate and locally "owned" strategy for disaster preparedness and risk reduction

The present study examined various fire preparedness measures and limiting factors to the practice of fire disaster emergency preparedness among the markets in South-South region of Nigeria.

2. MATERIAL AND METHODS

2.1 Study Area

The South-South Region of Nigeria is located on $4^0$21´ 43.2´´N, 7^0 40´ 52.8´´ N and longitude 5^0 8´ 42´´E, 9^0 30´7.2´´ E (Figure 1) protruding towards the Gulf of Guinea on the Atlantic coast of West Africa (Shittu, 2014). The region is a densely populated area in Nigeria. Its population is about 31 million people. The land mass extends over about 70,000 km^2, and make up 7.5 percent of Nigeria's landmass. The region consists of Akwa- Ibom, Bayelsa, Cross- River, Delta, Edo and Rivers states. It harbours more than 40 ethnic groups, which include: the Annang, Efik, Ibibio, Isoko, Ijaw, Ikwerre, Oron, Itsekiri, Urhobo, Ukwani, Kalabari, etc. Each of these ethnic groups has its own unique feature in terms of culture. The region is oil-rich by nature and has been the centre of international controversy over waste of natural resources, pipeline vandalism, devastating pollution, ecocide, and human right violations. The nation extracts over 2 million barrels of crude oil from the region in a day (Ekwo, 2011).

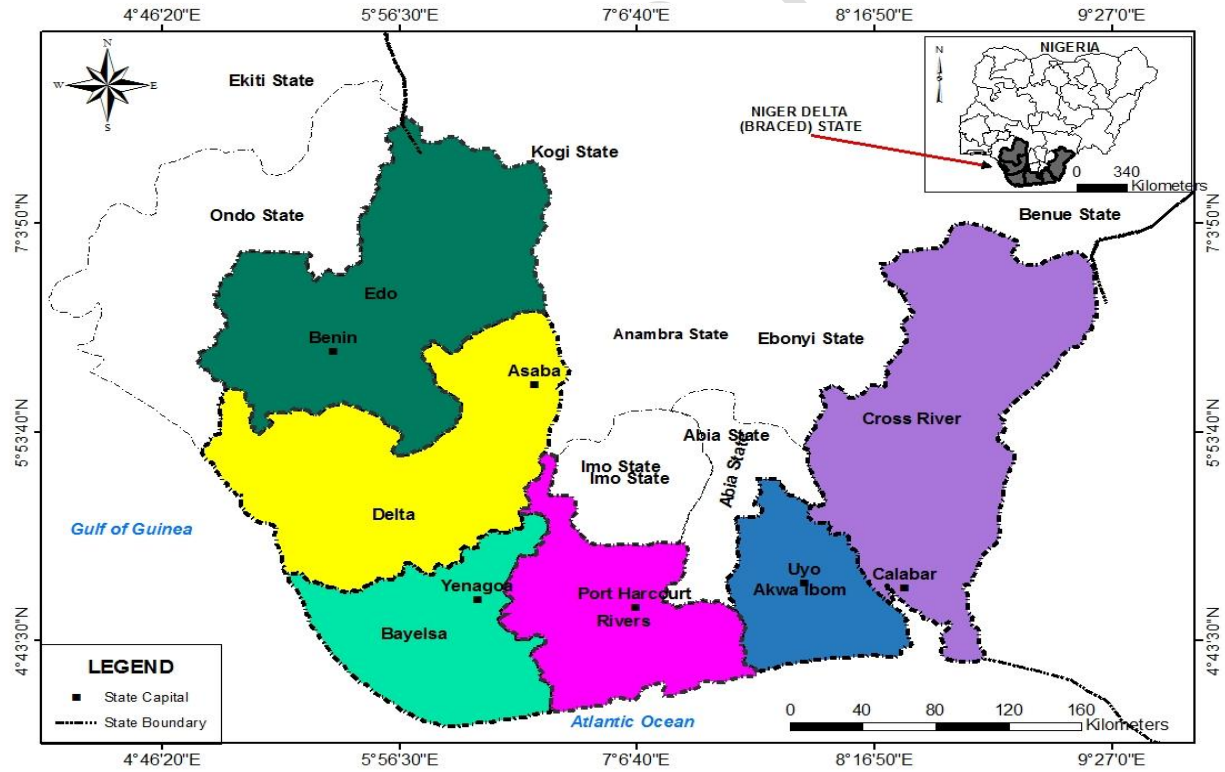

Figure 1: Overview of the South-South region of Nigeria showing the study areas

Research Design

The study adopted survey research design. The study population comprised of shop owners/space occupants from major markets from Rivers, Cross-Rivers and Bayelsa States. For proper coverage, the database of the registered shop owner/space occupants from each market was sourced from the markets associations (Table 1). With the aid of Taro Yamane, 400 sample size was sorted across the study area while the distribution of the sample size was based on the percentage (proportion) of registered shop owner/space occupants from each markets. Simple random sampling technique was adopted for selection of respondents. Out of 400 copies of questionnaire purposively administered, 384 copies were properly filled and fit for analysis which represents 96% of administered questionnaires.

Table 1: Population of Registered Shop Owners/Space Occupants

States	LGAs	Markets	Registered Shop Owners
Rivers	Port Harcourt	Mile One Market	363
		Mile three Market	412
		Creek Road Market	191
	Obio-Akpor	Rumuokoro Market	109
		Rukpokwu Modern Market	62
Bayelsa	Yenagoa	Swali Market	216
		Okaka Market	197
		Opolo Market	117
		Tombia-Etegwe Market	92
		Kpansia Market	111
Cross River	Calabar South	Watt Market	301
		Marian Market	294
	Akpabuyo	Esuk Mba Market	112
Total	**5**	**13**	**2577**

Questionnaire was used to elicit information from respondents. The questionnaire adopted for the study made use of Likert 5points scale, open-ended and closed-ended format. The study examined numerous instrument items to arrive at the final output of instrument (Questionnaire) for validity purpose while the reliability was done based test-retest method which obtained reliability coefficient (c) of 0.7.

Data Analysis

The retrieved questionnaire was coded and subjected to Statistical Package for the Social Sciences (SPSS) for proper analysis. The descriptive statistics tool such as frequency counts, percentages of response and chats were adopted for the analysis of study objective while study hypothesis was analysed using Pearson product moment correlation (PPMC) Analysis.

3 RESULTS AND DISCUSSION

3.1 Results

Table 2 considered various fire disaster preparedness related activities. The outcome indicated that 20.6% of those engaged in the study agreed that their market carry out fire hazard and risk assessment, 76.6% disagreed while 2.8% undecided. 25.8% of the engaged individuals agreed that the market conduct vulnerability assessment towards fire hazard causal agents, 71.9% disagreed and 2.3% were undecided. 32.1% agreed that the market possesses “emergency response unit”, 66.1% disagreed but such unit while 1.8% of the respondents were undecided. 33.6% of the engaged individuals agreed that the response unit are well-equipped for their activities, 64.3% of the engaged individuals disagreed while 2.1% was undecided. Among the other things, 22.2% agreed that shop/space occupants engaged in preparedness activities while 73.9% disagreed while 3.9% of the engaged shop/space occupants were undecided about such activities. 14.1% agreed that there is interaction between market unit of emergency response and government agency while 53.7% disagreed 32.3% of the respondents were undecided. The outcome deduced that 38.5% agreed that shop/space occupants receive information on fire hazard while 60.1% disagreed while 1.3% was undecided. On early warning system, 27.9% agreed that device such as fire alarms are around the market to notify occupants of possible outbreak, 69.2% disagreed about availability of such device while 2.9% of the occupants were undecided. The outcome indicated that 34.6% agreed that needed resources against fire disaster are easily and effectively made available while 61.2% and 4.2% of the engaged occupants disagreed and undecided respectively. The outcome indicated that 32.3% agreed on general sensitization on fire hazard response in the market, 58.9% disagreed on such activities while 8.8% was undecided. 32.3% of the respondents agreed that occupants are drill towards fire hazard response, 62.5% of the occupants disagreed while 5.2% of the occupants were undecided. The outcome of the investigation deduced that 19.0% agreed that readiness towards fire disaster is mainly for market association, 72.1% of the respondents disagreed while 27.3% was undecided.

Table 3 highlighted the factors limiting the practice of fire disaster preparedness. The outcome of the investigation deduced that 20.8% of the occupants engaged claimed lack of resources was one of the factor limiting the practice of preparedness towards fire disaster, 16.4% noted religious belief, 11.7%

claimed reliance on government, 24.7% noted literacy level while 16.7% and 9.6% of the respondents claimed reliance on market association and lack of market leadership towards fire disaster practice are the factor limiting the practice of preparedness towards fire disaster. From the outcome of investigation, 27.3% of the space/shop occupants involved in the investigation claimed public enlightenment is a way forward towards disaster preparedness practice, 7.3% claimed is through market-based disaster plan, 37.5% claimed is through involvement of other agencies while 22.4% and 5.5% of the space/shop occupants claimed the way forward is through cooperation among associated and others respectively.

Table 2: Fire Disaster Emergency Preparedness Measures

S/N	Fire Disaster Emergency Preparedness Measures	SA (%)	A (%)	D (%)	SD (%)	UN (%)	Total (%)	Mean
1	Our market carries out fire hazard and risk assessment	44 (11.5)	35 (9.1)	212 (55.2)	82 (21.4)	11 (2.8)	384 (100)	3.05
2	Our market carries out vulnerability assessment to identify causes fire disaster	64 (16.7)	35 (9.1)	235 (61.2)	41 (10.7)	9 (2.3)	348 (100)	3.27
3	Our market has it “Emergency Response Unit” that respond to fire disaster	34 (8.9)	89 (23.2)	157 (40.8)	97 (25.3)	7 (1.8)	348 (100)	3.13
4	Emergency Response Unit uses the necessary equipment to contain fire outbreak from causing havoc	47 (12.2)	82 (21.4)	179 (46.6)	68 (17.7)	8 (2.1)	348 (100)	3.24
5	Our market engaged shop owners in preparedness practices	56 (14.6)	29 (7.6)	56 (14.6)	228 (59.3)	15 (3.9)	348 (100)	3.14
6	There is coordination of response activities between the market Emergency Response Unit and Government fire-fighting agency	11 (2.9)	43 (11.2)	129 (33.6)	77 (20.1)	124 (32.3)	348 (100)	2.32
7	Information about fire disaster is communicated to marketers	53 (13.8)	95 (24.7)	133 (34.6)	98 (25.5)	5 (1.3)	348 (100)	3.24
8	There is an early warning system such as fire alarm in place which alerts about prominent fire outbreak.	59 (15.4)	48 (12.5)	190 (49.4)	76 (19.8)	11 (2.9)	348 (100)	3.18
9	Various fire fighting resources are quickly mobilized in the market to respond to fire outbreak	44 (11.5)	89 (23.1)	150 (39.1)	85 (22.1)	16 (4.2)	348 (100)	3.16
10	There is public enlightenment about the response procedures to fire outbreak in the market	74 (19.3)	50 (13.0)	149 (38.8)	77 (20.1)	34 (8.8)	348 (100)	3.15
11	There are training and practices which involve the shop/space occupants about how to respond to fire disaster incidents.	71 (18.5)	53 (13.8)	124 (32.3)	116 (30.2)	20 (5.2)	348 (100)	3.11
12	Preparedness towards fire disaster is majority for the market association.	37 (9.6)	36 (9.4)	172 (44.8)	105 (27.3)	34 (8.9)	348 (100)	2.84

NB: SA-Strongly Agree, A- Agree, D- Disagree, SD- Strongly Disagree and UD Undecided

Table 3: Factors Limiting the Fire Disaster Preparedness Practice

Variable	Frequency (n=384)	Percentage (%)
Factors Against the Preparedness Practice		
Lack of Resources	80	20.8
Religious belief	63	16.4
Reliance on Government	45	11.7
Literacy level	95	24.7
Reliance on Market Association	64	16.7
Lack of Market Leadership towards Fire Disaster Practice	37	9.6
Way Forward towards Disaster Preparedness Practice		
Public Enlightenment	105	27.3
Market-based Disaster Plan	28	7.3
Involvement of other Agencies	144	37.5
Cooperation among Association	86	22.4
Others	21	5.5

From Table 4, the hypothesis of the study was tested using the PPMC analysis. The hypothesis was tested based on the following statement:

$H_{0:}$ There is no significant relationship between the fire disasters emergency preparedness measures and fire disaster in the markets in South-South Nigeria.

H_1: There is a statistically significant relationship between the fire disaster emergency preparedness measures and fire disasters in the markets in South-South Nigeria.

In explaining the outcome from the multivariate tests of significance, the Pearson correlation (r) was used in ascertaining the possible relationship between the preparedness measures and fire disaster in the market while the p-value was adopted for the extent of levels of significant (where $P \leq 0.05$ reject null hypothesis).

Based on this, the variable such as “vulnerability assessment to identify causes of fire disaster and emergency response unit that respond to fire disaster”, showed moderate correlation and significant

(where r = 0.420, 0.394, and p = 0.000, 0.000) while the variable “public enlightenment about the response procedures to fire outbreak in the market” showed moderate correlation and not significant (where r = 0.44 and p = 0.386).

Variables such as “emergency response unit uses the necessary equipment to contain fire outbreak from causing havoc, market engaged shop owners in preparedness practices, early warning system such as fire alarm in place which alerts about prominent fire outbreak, training and practices which involve the shop/space occupants about how to respond to fire disaster incidents and preparedness towards fire disaster is majority for the market association” showed weak correlation and significant (where r = 0.394, 0.297, 0.250, 0.172, 0.158 and p = 0.000, 0.000, 0.000, 0.001, 0.002). Also, variable such as “coordination of response activities between the market emergency response unit and government fire-fighting agency, information about fire disaster is communicated to marketers and various fire-fighting resources are quickly mobilized in the market to respond to fire outbreak” showed no correlation and not significant (where r = -0.057, -0.121, 0.027 and p= 0.262, 0.17, 0.595).

Table 4: Tests of Significance Relationship for Preparedness Practices

S/N	Fire Disaster Emergency Preparedness Measures	Pearson Correlation	Sig. (2-tailed)	N	Remark
1	Our market carries out fire hazard and risk assessment	1		384	
2	Our market carries out vulnerability assessment to identify causes fire disaster	0.420	0.000	384	MC/ $H_{1\ Accepted}$
3	Our market has it "Emergency Response Unit" that respond to fire disaster	0.394	0.000	384	MC/$H_{1\ Accepted}$
4	Emergency Response Unit uses the necessary equipment to contain fire outbreak from causing havoc	0.297	0.000	384	WC/ $H_{1\ Accepted}$
5	Our market engaged shop owners in preparedness practices	0.314	0.000	384	WC/ $H_{1\ Accepted}$
6	There is coordination of response activities between the market Emergency Response Unit and Government fire-fighting agency	-0.057	0.262	384	NC/$H_{1\ Rejected}$
7	Information about fire disaster is communicated to marketers	-0.121	0.17	384	NC/$H_{1\ Rejected}$
8	There is an early warning system such as fire alarm in place which alerts about prominent fire outbreak	0.250	0.000	384	WC/ $H_{1\ Accepted}$
9	Various fire fighting resources are quickly mobilized in the market to respond to fire outbreak	0.027	0.595	384	NC/$H_{1\ Rejected}$
10	There is public enlightenment about the response procedures to fire outbreak in the market	0.44	0.386	384	MC/ $H_{1\ Rejected}$
11	There are training and practices which involve the shop/space occupants about how to respond to fire disaster incidents	0.172	0.001	384	WC/ $H_{1\ Accepted}$
12	Preparedness towards fire disaster is majority for the market association.	0.158	0.002	384	WC/ $H_{1\ Accepted}$

NB: MC- Moderate Correlation, WC-Weak Correlation, NC-No Correlation

(Source: Researcher's field work, 2021**)**

3.2 Discussion

The outcome indicated that there are limited fire disaster preparedness activities across the markets places across the South-South region of Nigeria. The finding showed similarity with study conducted by Agyekum *et al.,* (2016) where their correspondents showed limited readiness for fire disaster in business located area. Kihila (2017) outcome conform to present study where the participants of their study showed little or no fire disaster readiness among learning institution. Alimasunya et al., (2019) study showed similarity with the present study outcome where the learning institution in their study deduced inadequate preparedness towards fire disaster. However, the study of Adeleye et al., (2020) indicated that only health, commercial and hospitality buildings in the study showed appreciable level of preparedness toward fire disaster. The factors limiting the practice of fire disaster preparedness identified include literacy level, lack of resources, reliance on market association, religious belief, reliance on government and lack of market leadership towards fire disaster practice. The outcome showed consistency with the study conducted by Agbonkhese et al., (2017) where the setback noted in their fire disaster management practices included lack of resources, equipment and understanding of fire incidents management. Nasimiyu et al (2017) indicated the lack of education and erroneous belief as the hindering factors towards the practice of fire disaster preparedness. Abdulsalam et al., (2016) posited that prevention and mitigation practices were not taken with all level of seriousness in the study area, hence the lack of adequate response to fire disaster. Accordingly, it is advisable to execute various emergency preparedness, prevention and mitigation measures instead of carrying out costly response action to the aftermath of emergency. From the study, the way forward towards disaster preparedness practice suggested by the occupants include involvement of other agencies, public enlightenment, cooperation among associations and development of market-based disaster plan.

Preparedness measures such as “vulnerability assessment to identify causes of fire disaster and emergency response units that respond to fire disaster” showed moderate correlation and significant relationship with fire disaster in the markets while “coordination of response activities between the market emergency response unit and government fire-fighting agency, information about fire disaster is communicated to marketers and various firefighting resources are quickly mobilized in the market to

respond to fire outbreak" showed no correlation and no significant relationship with fire disaster in the markets.

Conclusion and Recommendation

Market fire incidents in major cities of Nigeria have led to destruction of goods worth billions of Naira with little or no resilience against the incidents both at present and possibly in the future. The essence of fire disaster preparedness is to ensure that fire incidents occurrence is minimized and if does occur, the impact is brought to minimal level. Considering this practice among various major markets, the study therefore concluded that there are limited fire disaster preparedness activities across the markets places across the South-South region of Nigeria. In this regard, the following recommendations were made;

i. There is need for government and other stakeholders to review various rules and regulation guiding the establishment of market places in order to give adequate needs for a proper functioning market.
ii. Government should collaborate with the Fire Service so as to establish a Fire Service Station outpost within the market, as a way of preparedness measure against market fire.
iii. Government should ensure that the building materials to be used by the Engineers in the construction of the markets should be fire rated so as to help contain the spread of fire during market fire.
iv. All markets should have a central control switch where all electric supply to all the shops in the market can be disconnected at the close of the market day in order to mitigate against market fire.

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