Assessment of Public Perception of Disaster Management in Lagos, Nigeria

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Abstract

Lagos metropolis is growing with a fast rate of urbanization. Disaster management in such areas requires a collaborative effort between service providers and the public. Inefficiencies in mitigation and response arise in the absence of such synergy. This study thus examined the perception and attitude of residents in Lagos State, Nigeria on disaster management. As a basis, emergency cases responded to by LASEMA from 2010-2022 were analyzed. The distribution of emergency service providers in the study area was also established. Data was acquired from the Lagos State Emergency Management Agency, GRID 3 portal, and a social survey conducted with the use of 203 copies of the questionnaire systematically administered. A total of 780 incidents were reported within the period for the selected sites, the highest number recorded from Ikeja, the state capital. Thirty-seven (37) state-owned hospitals, 9 fire stations, 4 LRU facilities and 38 police facilities were identified. Most of the residents interviewed perceived disaster management as solely the responsibility of government. About 32% of the respondents had experienced at least one emergency incident in the last five years, flooding being the most occurring. Less than 10% of these were however reported, the trust deficit in the capacity of service providers was blamed for this. Respondents' involvement in community disaster management was also less than 30%, while unresponsive government was identified as the challenge to being more pro-active. Improved community engagement and service delivery by providers amongst others, were recommended to address these issues.

Keywords: community engagement, disaster, perception, response

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Introduction

All disasters have the shared characteristic of being monumentally costly, either in lives, capital, or both. The total destructive capacity of disasters has increased along with the population and technological sophistication of the world's nations. Natural threats can be understood in a continuum including man-made disasters that are chemical, biological, nuclear, or technological in nature (Posner, 2004). This continuum has led to the professionalization of those in the field of emergency management, who work to mitigate, prepare, respond to, and coordinate recovery from disasters.

In the study of public participation in disaster prevention and mitigation, Pearce argues that public participation combined with community governance can contribute to achieving sustainable disaster mitigation goals (Pearce, 2003). The bottom-up disaster prevention and mitigation process helps refine the disaster mitigation strategy system, enhance people's understanding of disaster risks, improve overall disaster prevention and mitigation capabilities, and reduce disaster losses.

With the promotion of the importance of public power in disaster mitigation, how to promote public participation in community disaster risk management has become a current research hotspot, and individual risk perception (Peng et al., 2019), willing preparedness (Hu et al., 2022), and public participation in community disaster mitigation models (Samadar et al., 2017) have received increasing attention from research scholars.

Major catastrophic threats facing both the nation and Lagos state are real, but the fact that they are infrequent and unpredictable makes dedicated funding, public interest, and political movement difficult to manifest. One source of public apathy, not just in emergency management but in many operations of the government, is the essential disconnect the public has with the policy process in general. The indifference to governmental agencies has led to a relatively limited amount of citizen participation in activities encouraged by

emergency management, activities that should strengthen the overall resiliency of a community to disasters. When people talk about public participation, they tend to mean voting, but mere voting is inadequate.

Lagos State is a coastal city at risk of disasters including floods, epidemics and fire explosions. There is the issue of inland flooding which is caused by intense or prolonged rainfall which Lagos has of late been experiencing, coupled with high tide, storm surges caused by high winds and wave action which is dependent on wind speed and direction, local topography and exposure. These present challenges that can rarely be addressed solely by emergency managers without the active participation of the public.

There are serious problems for emergency managers in establishing consistent connections with the public. Though information campaigns have come a long way since the introduction of the World Wide Web, they are far from perfect. Three primary problems still dramatically affect emergency management and public safety. First, there is a low level of awareness by the public of the efforts of emergency managers in their respective communities. Second, the policy process is shaped with input from a relatively small group of actors creating problems in implementation. Finally, the centralized organizational structure of emergency management has prevented it from entering public consciousness. Despite the efforts of both state and local emergency managers, these three problems continue to hinder the emergency management community in reaching a high degree of community preparedness. This study thus examined the status of public perception of disaster management and the operations of the Lagos State Emergency Management Agency (LASEMA).

Lagos state government in bid to enhance emergency communication, floated the 112/767 emergency toll-free lines. These are managed by a call center within LASEMA. Call centers play a crucial role in emergency response, providing a critical point of contact for individuals seeking assistance during crises and disasters. They are a primary source of information and assistance

during emergencies. Studies like Almutairi et al., (2021) emphasize the central role of call centers in coordinating emergency response efforts, providing timely information, and assisting affected individuals. Ensuring the resilience and redundancy of call center operations is essential during emergencies. Earlier, Chhetri et al. (2018) had discussed the need for call centers to establish backup systems, diversify communication channels, and maintain uninterrupted services in times of crisis. Effective coordination and integration with emergency services are critical responsibilities of call centers. Han, Xue, and Li (2019) also investigated the integration of call centers with emergency services, aiming to improve emergency response coordination and communication.

Many crises go mostly unreported in poor countries because of the belief that the government's capacity to handle these problems is insufficient. In fact, Daramola and Ibrahim (2021) made a note of this in relation to fire events in certain residential neighborhoods where people had to rely on self-help while they waited a long time for fire engines to arrive. Popoola et al., (2016) also attributed inadequate monitoring of disasters to inadequate documenting of disasters.

One aspect of emergency response perception is the assessment of its effectiveness. Studies have shown that people's perceptions of how efficiently and effectively emergency response agencies operate significantly impact their overall satisfaction. Aldrich and Meyer (2015) discussed how trust and confidence in response agencies are fundamental to public perceptions of response effectiveness. Trust plays a critical role in how individuals perceive emergency response efforts. Comfort and Kapucu (2006) noted the importance of trust in emergency response, highlighting the influence of trust in emergency personnel, government agencies, and non-governmental organizations on response perception. The perception of community resilience in the face of disasters is a vital aspect of emergency response perception. Norris et al., (2008) also discussed how perceived community resilience is linked to

individuals' confidence in their community's ability to respond and recover from emergencies. Effective crisis communication is essential for shaping public perception during emergencies. Earlier, Covello and Allen (1988) had noted the impact of risk communication and the role it plays in shaping the public's perception of emergency response efforts. The emergence of social media has transformed the way people perceive and react to emergency response efforts. Starbird and Palen (2010) delved into the use of social media during crises and how it influences real-time perceptions. Thus, perceptions of emergency response are influenced by a complex interplay of factors, including trust in responders, the effectiveness of response efforts, crisis communication, community resilience, and media portrayals. Understanding these perceptions is critical for improving emergency management strategies and ensuring the public's safety and well-being during crises.

Community participation is a fundamental principle of CBDRR. Shaw et al., (2015) explored the role of communities in disaster risk reduction and the importance of their active involvement in the planning and implementation of response measures. Norris et al., (2008) discussed the role of social capital in disaster readiness and response, emphasizing the importance of community networks and connections. Community participation is especially critical in health emergencies, such as epidemics. Gagnon et al., (2016) focused on community engagement in public health emergencies, emphasizing the need for effective communication strategies and community involvement in response efforts. Effective risk-reduction strategies involve community communication and participation. Glantz et al.,. (2015) explored the challenges and opportunities in disaster risk reduction and community engagement, emphasizing the role of communication in risk awareness and resilience-building. Community-centered disaster response models prioritize community participation and input in decision-making.

In view of the foregoing, this study specifically assessed the nature of

emergencies responded to by LASEMA from 2010 -2022 in the state, distribution of emergency facilities within the study area, and the perception of residents on disaster management and operations of LASEMA.

Lagos State is located in the South–Western part of Nigeria, on the narrow plain of the Bight of Benin. Lying approximately on latitude 60 22'N and 60 2'N, and between longitude 20 42'E and 30 42'E, Lagos State is bounded in the North and East by Ogun State of Nigeria, in the West by the Republic of Benin, and stretches over 180 kilometers along the Guinea Coast of the Bight of Benin on the Atlantic Ocean. Its territorial extent and political jurisdiction encompass the city of Lagos and the four administrative divisions of Ikeja, Ikorodu, Epe and Badagry collectively referred to as IBILE and covering an area of 358,862 hectares or 3,577 sq. km. which represents 0.4% of Nigeria's territorial land mass of 923,773 sq. km. (https://lagosstate.gov.ng/)

Lagos State is the smallest state in Nigeria yet, it has the highest urban population, which is 27.4 % of the national estimate [UN-Habitat]. According to the 2006 National Census, Lagos State has a population of 9,013,534 in relation to the National count of 140,003,542. However, based on the UN-Habitat and international development agencies' estimates, Lagos State is said to have about 24.6 million inhabitants in 2015. Of this population, Metropolitan Lagos accounts for over 85% on an area that is 37% of the land area of the State, and the fact that Lagos population is growing 10 times faster than that of New York and Los Angeles, and more than the population of 32 African nations combined, the State population is expected to hit the 35 million mark in 2020.

Lagos State is made of five administrative divisions, which formed the basis for LGA selection, namely: Ikeja, Badagry, Ikorodu, Lagos [Eko] and Epe. The divisions were created in May 1968 by virtue of Administrative Divisions [Establishment] Edict No. 3 of April 1968. The Divisions are further divided into 20 Local Governments and 37 Local Council Development Areas respectively, in accordance with Nigeria's federal structure and the need to

bring governance, development and participatory democracy to the grassroots.

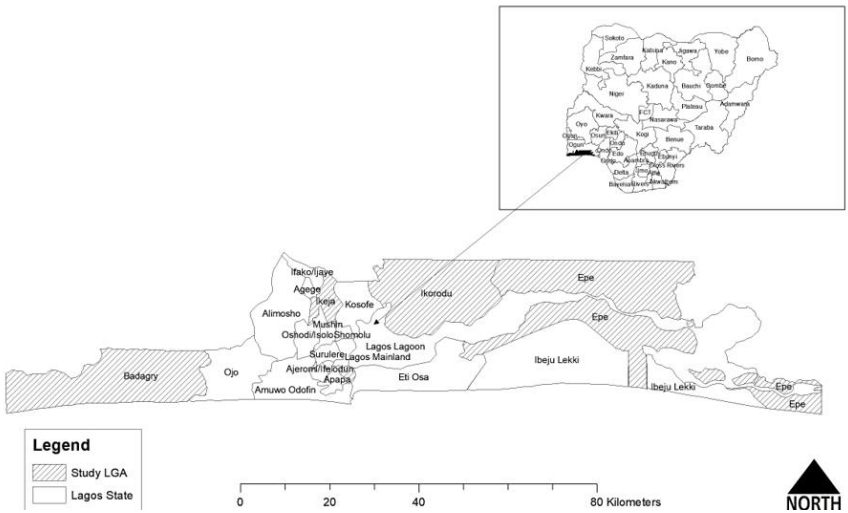

Fig. 1: Study area

Methodology

A pilot survey was done to familiarize with the study area and the characteristics of the proposed respondents. The questionnaire to be administered was tested and modified at this stage before arriving at a final format. The latitudinal and longitudinal positions of selected emergency response facilities were acquired using a GPS. For the study, the facilities studied on the field included health facilities, fire stations, Local Response Units (LRUs), and police stations. Other dataset including attribute data related to the emergency response facilities in the study area were also acquired. It encompasses details such as facility addresses, facility type, number of incidents, and other relevant attributes. In addition, data sources also included official records from entities like LASEMA, the Nigerian Police Force, the Federal Fire Service and Rescue Station, Lagos State Ministry of Works and Housing, and the Ministry of Health. These sources provided comprehensive information about the emergency response infrastructure. This was to validate the data acquired

from GRID3, an open-source dataset.

Questionnaires were administered to residents in the study area. Issues such as idea of disaster management, emergencies experienced recently and agencies contacted, involvement in community management, and knowledge and use of LASEMA facilities, among others, were covered in the questionnaire. The stratified sampling technique was used for the study where the administrative divisions were represented by the major LGA. Target streets were chosen based on geographical spread, and then respondents randomly chosen on selected streets. The selected LGAs have a total population of 1,481,961, hence with a confidence interval of 90% and a margin of error of 6%, a total of two hundred (203) copies of the questionnaire were administered in the areas. The sampling frame is presented in Table 1.

Table 1: Sampling frame for questionnaire administration

LGA	Frequency	%
Ikeja	41	20.20
Badagry	41	20.20
Ikorodu	40	19.70
Lagos-Island	40	19.70
Epe	41	20.20
Total	203	100.00

To assess the nature of reported emergencies in Lagos State from 2010-2022, incident data from LASEMA were acquired and analyzed by local government and type. Available emergency service agencies in the study area were mapped with the locational data acquired on the field, including few attributes. ArcGIS 10.8 software was used to conduct this task. The social survey of residents' perception included issues such as emergencies experienced in the last five years, understanding and involvement in disaster management, and contact with emergency agencies among others. These were analyzed using

simple percentages and crosstabulation.

Results and Discussion

Nature of reported emergencies in Lagos State from 2010 – 2022

The four major types of incidents responded to by the Lagos State Emergency Management Agency (LASEMA) within the study area from 2010 to 2022 were summarized (Table 1). A total of 780 incidents were recorded, the most predominant across all LGAs being road accident with a total of 411 cases.

Table 2: Incidents responded to by LASEMA from 2010 – 2022

	LGA	Frequency				Total
		Fire	Road accident	Building collapse	Flood	
1	Ikorodu	48	101	28	11	188
2	Badagry	5	5	1	0	11
3	Ikeja	100	182	27	1	310
4	Lagos Island	75	77	64	0	216
5	Epe	7	46	0	2	55
	Total	235	411	120	14	780

Source: LASEMA

Incident response was provided most in Ikeja LGA with a total of 310 cases. This is not unusual as this is the capital region of the state where significant emergency resources are located coupled with it being the seat of government and a hub of activities. The least cases were recorded at Badagry and Epe which are the fringes of the state.

Distribution of Emergency Facilities in the study area.

The distribution of emergency facilities within the study area was assessed, revealing the presence of 38 police facilities including stations and posts, 37 public hospitals including primary health care centers, general hospitals and

teaching hospitals, and 9 fire stations of the Lagos State Fire and Rescue Services. The regions are also serviced by 4 Lagos Response Units.

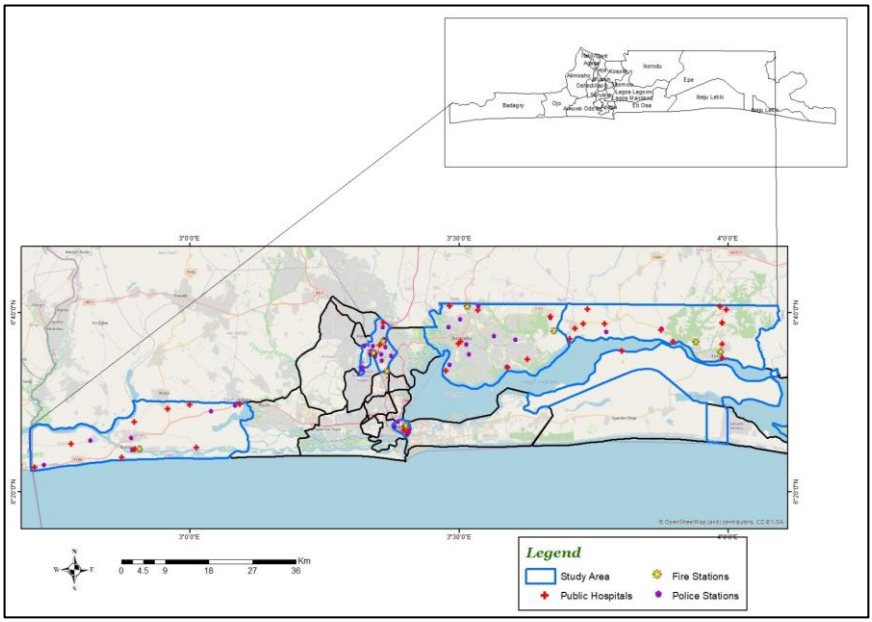

Fig. 2: Distribution of emergency facilities in the study area. Source: GRID 3, LSFRS.

There is at least one fire station in each of the five sample LGAs; while the hospitals were widely distributed even at the fringes (Epe and Badagry), the police stations were mostly concentrated in the central area (Ikeja).

Residents' perception of disaster management and LASEMA operations

The emergency incidents experienced by respondents in the last five years was assessed with flooding (31%) being the most common followed by robbery (26%) (Table 2).

Table 3: Emergency incidents experienced in the last five years

Emergency type	Badagry	Epe	Ikeja	Ikorodu	Lagos Island	Total	%
Flood	11	30	5	34	8	62	31
Fire	3	2	6	7	1	19	9
Building collapse	1	0	0	1	6	8	4
Accident	4	4	3	4	5	20	10
Robbery	18	4	3	7	21	53	26
Health emergency	0	1	0	1	11	13	6
Domestic violence	0	0	4	1	23	28	14

Source: Fieldwork, 2023

Checked across the LGAs, flooding was most significant in Ikorodu and Epe LGAs (Fig.3)

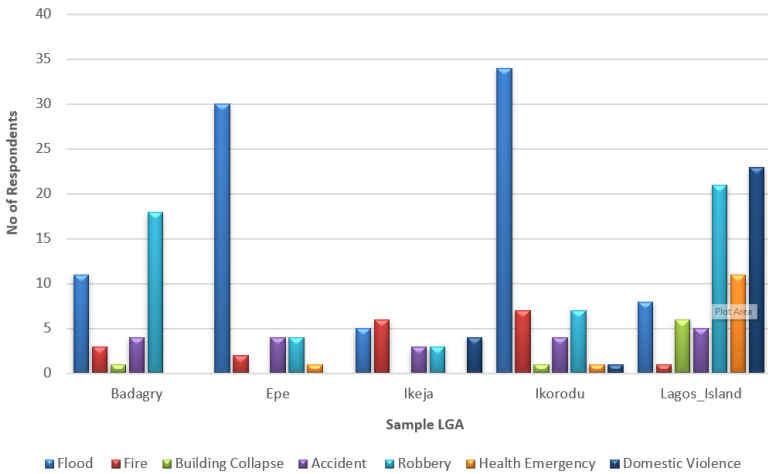

Fig. 3: Emergency incidents experienced in the last five years. Source: Fieldwork, 2023

Respondents in Lagos Island seem to have experienced more of these incidents accounting for about 37% of the total number of victims across the sampled LGAs. The prevalence of domestic violence in the LGA is worrisome as it was most significant among the respondents.

Respondents' understanding of disaster management was summarized into the following:

- Prevention and control of disasters
- Disaster avoidance
- Disaster mitigation
- Government help during disasters
- Prevention, response, and recovery

Those who shared their ideas mostly perceived disaster management as disaster response. The respondents mostly described it as fully a governmental responsibility with little personal contribution. This is due to their perception of disaster from the perception of flood and the inability to individually control it.

Respondents were asked to identify the emergency agencies called when the incidents occurred. Most of them resorted to self and community help due to trust deficiencies with the emergency services (Table 3).

Table 3: Agencies contacted during incidents

Agency Flood	LASEMA	LCDA	None
Badagry	1	0	8
Epe	0	0	28
Ikeja	1	1	4
Ikorodu	0	0	30
Lagos-Island	0	0	18
Agency Fire	LSFRS	POLICE	None
Badagry	1	1	0
Epe	10	0	2
Ikeja	0	0	3
Ikorodu	3	0	4
Lagos-Island	1	0	4
Agency Building Collapse	LASEMA	None	
Badagry	0	0	
Epe	2	1	

Agency Flood	LASEMA	LCDA	None
Ikeja	0	0	
Ikorodu	0	0	
Lagos-Island	0	10	
Agency Robbery	LCDA	POLICE	VIGILANTE
Badagry	1	2	0
Epe	0	4	0
Ikeja	0	2	3
Ikorodu	0	3	0
Lagos-Island	1	4	0
Agency Accident	FRSC	LASEMA	LASTMA
Badagry	2	0	0
Epe	0	2	0
Ikeja	0	1	0
Ikorodu	0	0	1
Lagos-Island	0	1	0
Agency Health Emergency	LASEMA	Private hospital	None
Badagry	0	0	0
Epe	0	0	11
Ikeja	0	0	1
Ikorodu	1	0	1
Lagos-Island	0	1	16
Agency Domestic Violence	LCDA	POLICE	None
Badagry	0	0	1
Epe	0	0	0
Ikeja	2	3	4
Ikorodu	0	0	0
Lagos-Island	0	0	19

Source: Fieldwork, 2023

Only those with cases of fire had more contact with the Lagos State Fire and Rescue service than those who restrained from any agency. The bulk of these were in Epe LGA where about 72% of respondents contacted LSFRS (Lagos State Fire and Rescue Services) while 18% resorted to other means.

Respondents' involvement in community disaster management was assessed and about 19% were active. Of the active ones, Ikorodu LGA had the highest share with about 29% (Figure 4)

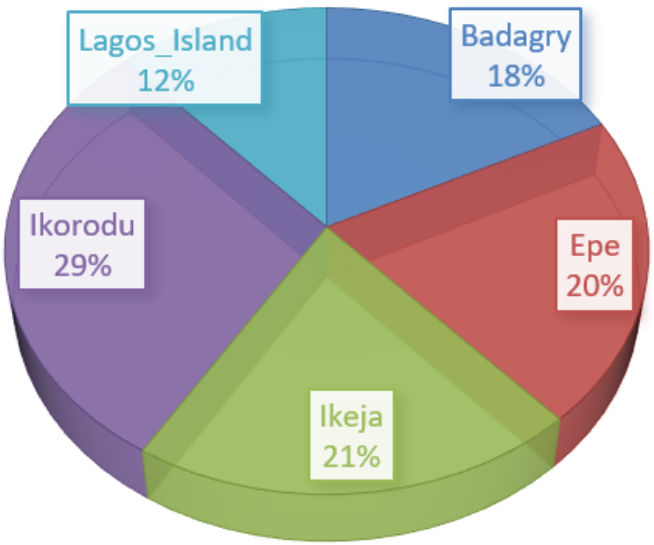

Fig. 4: Respondents actively involved in community disaster management. Source: Fieldwork, 2023

The nature of community involvement was summarized into the following:

- Drainage clearance/construction
- Fire control response
- Called emergency service
- Recovery support
- Vigilante participation
- CDA due payment

About 33% indicated their willingness to be more involved while the remaining 67% felt there was barely more they can do. Checked across the LGAs, respondents in Ikorodu LGA (40%) were the most willing and the least willing were from Badagry LGA (5%). (Figure 5)

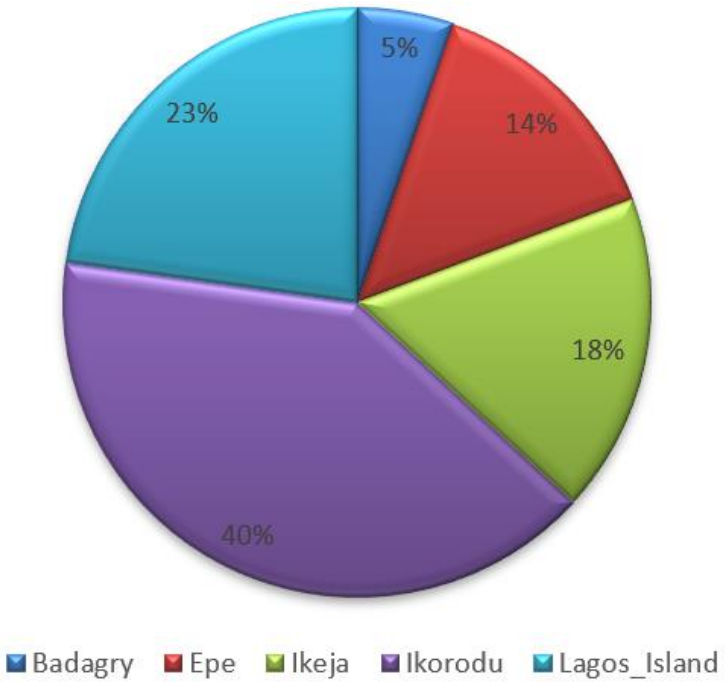

Fig. 5: Willingness to be more involved in community disaster management. Source: Fieldwork, 2023

Some challenges that could inform unwillingness to be more involved in community disaster management were identified and their significance evaluated.

Notable among all, is the high significance of the unresponsive government factor, followed by financial limitation and tenancy status (Fig 6)

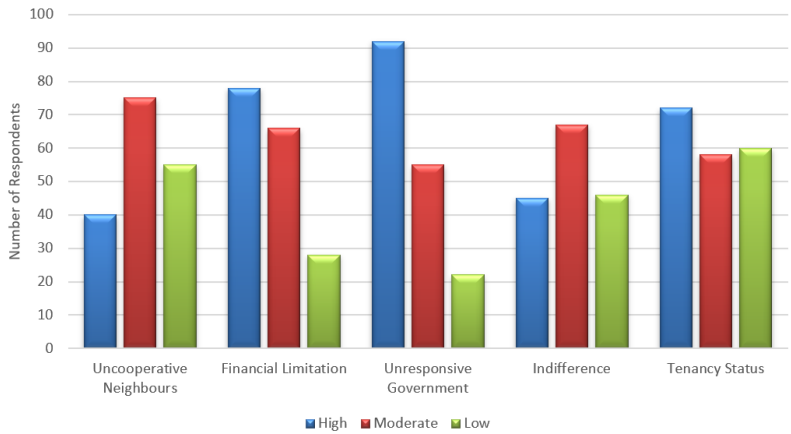

Fig 6: Significance of challenges to better involvement in disaster management. Source: Fieldwork, 2023

The significance of the unresponsive government variable can be attributed to the perception of the government as the sole bearer of responsibility, coupled with the trust deficit with their agencies. The influence of financial limitation reflects the little disposable income available to respondents in the light of current socio-economic realities. Their status as tenants and not house owners also restricts the amount of modification that is allowed to the structure while discouraging long term mitigation investments.

Residents' awareness of LASEMA was fair as about 41% of all respondents indicated they had heard of the agency. Low awareness was however recorded among respondents in Badagry and Ikorodu LGAs. (Fig 7)

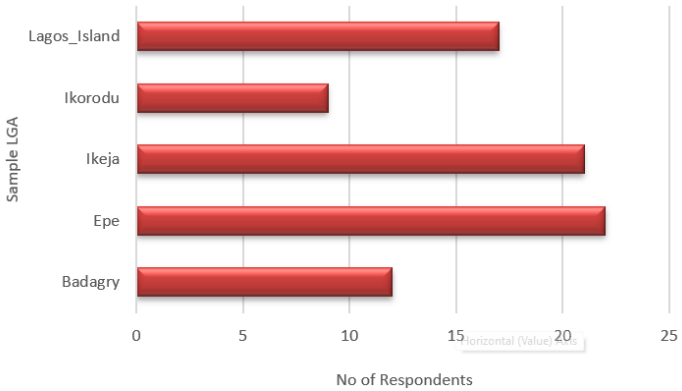

Fig. 7: Awareness of LASEMA. Source: Fieldwork, 2023

Respondents were asked to describe their thoughts on the role of LASEMA. Most of them thought the agency was solely for emergency response. Another section thought it was for disaster prevention and management while others thought they were for relief.

Despite the level of awareness, only 3% had ever contacted LASEMA at any time, mostly through 112/767 emergency number. About 22% indicated they had received communications from the agency either physically or through radio, television, or social media. Checked across the LGAs, respondents from Ikeja and Lagos Island were mostly reached while none in Badagry indicated to have received any sort of information from the agency.

About 48% of the respondents indicated knowledge of the 112/767 emergency number, yet among these, only 10% had ever used the facility. Those who used it, however, had mixed experiences, but on average the service was described as fair with much room for improvement.

About 20% were aware of the Local Emergency Management Committee in their region and about 8% had ever contacted them for any reason. This reveals a wide gap in communication that needs to be investigated, seeing as the LEMCs are supposed to be the major contact group with community members.

Disaster Management is a collaborative endeavour hence the perception of residents about what they require LASEMA to do for improved service delivery was examined. The issues raised revolve around the following:

- Carry out more robust publicity about their service delivery including the use of social media platforms
- Engage in more advocacy especially in disaster-prone communities
- Provide swifter response to emergency calls
- Set up more flood mitigation and control measures
- Set up outpost closer to the community level
- Collaborate with private sector companies to promote LASEMA's activities through SMS alerts
- Organize emergency training and drills in communities
- Facilitate local incentives for disaster management efforts

Conclusion

This research offers a thorough evaluation of the public's perspective and utilization of LASEMA across selected LGAs in Lagos. The results of the study provide significant contributions to our understanding of the level of knowledge, perspectives, and firsthand encounters of residents regarding emergency management and response. The varied perspectives on the role of LASEMA among the locals were noted. Although the agency is commonly associated with emergency response, it is important to elucidate its wider responsibilities, such as disaster prevention and management, in order to cultivate a more holistic comprehension of its operational scope.

In view of the foregoing, a few recommendations were made including:

1. Develop and implement targeted and comprehensive awareness campaigns to improve public knowledge about LASEMA's role and functions. These campaigns should utilize various communication channels, including social media, radio, television, and community outreach.

2. Enhance the accessibility of LASEMA's services by ensuring that the 112/767 emergency number is widely known and easily accessible to residents.

3. Establish community outposts or service centers closer to the community level to facilitate quicker response times and strengthen local engagement.

4. Collaborate with private sector companies to promote LASEMA's activities, including the use of SMS alerts to disseminate important information to the public during emergencies.

5. Organize regular emergency training and drills in communities to educate residents on disaster preparedness and response.

6. Facilitate local incentives for individuals and communities that actively participate in disaster management efforts.

7. Strengthen Local Emergency Management Committees (LEMCs).

8. Establish a feedback mechanism to gather input from the public regarding their experiences with LASEMA's services.

9. Regularly assess the impact of awareness campaigns, communication efforts, and community engagement initiatives.

REFERENCES

Aldrich, D. P. & Meyer, M. A. (2015). Social capital and community resilience. American Behavioral Scientist, 59(2), 254-269.

Almutairi, A. F., Al Nemer, A., Alhazmi, A. & Alkhaldi, T. (2021). The role of emergency dispatch centers in the COVID-19 pandemic in Saudi Arabia: A qualitative analysis. International Journal of Environmental Research and Public Health, 18(4), 18-27.

Chhetri, P., Arrowsmith, C. & Dawes, L. (2018). Exploring the use of emergency and disaster management cell phones for community disaster resilience. Procedia Engineering, 212, 251-258.

Comfort, L. K. & Kapucu, N. (2006). Inter-organizational coordination in extreme events: the World Trade Center attack. Natural Hazards, 39(2), 309-327.

Covello, V. T. & Allen, F. (1988). Seven cardinal rules of risk communication. US Environmental Protection Agency.

Daramola, A.O., and Ibrahim, L. (2021). Analysis of fire safety measures in residential buildings in Yaba LCDA, Lagos State, Nigeria. Journal of Disaster and Risk, 4(2), 135-144 DOI: 10.35341/afet.949030

Gagnon, E., O'Sullivan, T., Lane, D.E., and Paré, N. (2016). Exploring partnership functioning within a community-based participatory intervention to improve disaster resilience. Journal of Higher Education Outreach and Engagement, 20(2), 25-52.

Glantz, M. H., Jamero, M. L., Neri, J. A. C. & Pulhin, J. M. (2015). Communicating and learning about climate change and sea-level rise: Local initiatives in the Philippines. Climatic Change, 133(1), 185-200.

Han, X., Xue, J. & Li, W. (2019). Research on integrated development of emergency management and public health based on call center. Procedia Computer Science, 147, 135-139.

Hu, S., Yu, M., Que, T., Fan, G. & Xing, H. (2022). Individual willingness to prepare for disasters in a geological hazard risk area: an empirical study based on the protection motivation theory. Natural hazards: Journal of the International Society for the Prevention and Mitigation of Natural Hazards, Springer. 110(3), 2087 – 2711. DOI: 10.1007/s11069-021-05026-8

Norris, F. H., Stevens, S. P., Pfefferbaum, B., Wyche, K. F. & Pfefferbaum, R. L. (2008). Community resilience as a metaphor, theory, set of capacities, and strategy for disaster readiness. American Journal of Community Psychology, 41(1-2), 127-150.

Pearce, L. (2003). Disaster management and community planning, and public participation: how to achieve sustainable hazard mitigation. Natural hazards, 28(2-3).

Peng, L., Tan, J., Lin, L. & Xu, D. (2019). Understanding sustainable disaster mitigation of stakeholder engagement: Risk perception, trust in public institutions, and disaster insurance. Sustainable Development, 27(5), 885-897.

Popoola, A.A., Adekalu, O.B., Audu, A.A., Adeleye, B.M., and Jiyah, F. (2016) Analysis of causes and characteristics of market fires in Lagos state, Nigeria. International Journal of Agriculture and Rural Development, 19(1), 2407-2421.

Posner, R. A. (2004). Catastrophe: Risk and Response. Oxford University Press.

Samaddar, S., Okada, N., Choi, J. & Tatano, H. (2017). What constitutes successful participatory disaster risk management? Insights from post-earthquake reconstruction work in rural Gujarat, India. Natural Hazards, 85, 111-138.

Shaw, R., Shiwaku, K. & Kobayashi, H. (2015). Linking local indigenous knowledge, resilience, and sustainable development through community-based disaster risk reduction in a mountain area of Nepal. Sustainability Science, 10(2), 345-361.

Starbird, K. & Palen, L. (2010). "Voluntweeters": Self-organizing by digital volunteers in times of crisis. Proceedings of the 2011 annual conference on Human factors in computing systems, 1071-1080.