The Imperatives of Disaster Management in South East Nigeria: Addressing the elephantine issues

[1.] **Ude Adaora Margaret**
Email: adachukwu1977@gmail.com

[2.] **Prof. Barr Walter Ezeodili**
Email: walter.ezeodili@esut.edu.ng

[3.] **Eneh Maximus Ikenna**
Maximus.eneh@esut.edu.ng
Orcid Id: https://orcid.org/0009-0008-4658-5813
[1,2,3] Department of Public Administration
Enugu State University of Science and Technology Enugu Nigeria

Abstract

Disaster has become endemic in Nigeria and the South East Region is not an exemption. Time and time again, reports are circulated in the social media, national dailies and other media platforms on incidences of flood, fire outbreak and other related disasters that threaten human existence. The ugly situation motivated this study which is primarily to examine the imperatives of disaster management in the South East Nigeria with a view to addressing the elephantine problems. The study adopted qualitative research method and specifically, content analysis was used as mode of analysis. Findings revealed that the South East region does not apply strategic methods in managing disaster in the region and recommendations were made in line with the findings.

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1. Introduction

Early warning systems (EWS) are critical in disaster management as they significantly enhance the ability to prepare for and respond to natural hazards, thereby reducing loss of life, property damage, and economic disruption. EWS integrate various technologies and data sources to provide timely and accurate information about potential hazards such as hurricanes, earthquakes, floods, and tsunamis. These systems enable governments, organizations, and communities to take proactive measures to mitigate the impacts of disasters. Recent advancements in EWS have demonstrated their effectiveness. For instance, the implementation of improved EWS in Indonesia has led to a significant reduction in casualties and damage during recent earthquakes and tsunamis. According to a 2023 study by the United Nations Office for Disaster Risk Reduction (UNDRR), countries with well-developed EWS have seen up to a 50% reduction in disaster-related mortality rates over the past decade (UNDRR, 2023). Furthermore, a 2022 report by the World Bank highlighted that investments in EWS yield a high return, with benefits outweighing costs by a ratio of up to 10:1 (World Bank, 2022). The relevance of EWS in disaster management is underscored by their ability to provide critical lead time for evacuation and other emergency measures, ultimately saving lives and reducing economic losses.

The current state of early warning systems (EWS) in Nigeria has seen notable progress, yet there remain significant challenges that need to be addressed to enhance disaster management effectively. Nigeria, being vulnerable to various natural hazards such as floods, droughts, and epidemics, has recognized the importance of EWS in mitigating the impacts of these disasters. Recent initiatives have focused on improving the country's disaster preparedness and response capabilities. For example, the Nigerian Meteorological Agency (NiMet) and the National Emergency Management Agency (NEMA) have been working to enhance their forecasting and dissemination capabilities. In 2023, NiMet launched a new climate prediction system designed to provide more accurate weather forecasts and early warnings, which is crucial for agricultural planning and flood prevention (NiMet, 2023). Despite these advancements, there are still gaps in the system. A 2022 report by the International Federation of Red Cross and Red Crescent Societies (IFRC) highlighted the need for improved infrastructure, better data collection, and more effective communication channels to ensure that early warnings reach the most vulnerable communities (IFRC, 2022). Additionally, there is a need for greater public awareness and education to ensure that communities understand and act upon early warnings. Hence, while Nigeria has made strides in developing its EWS, continued investment and improvements are essential to fully protect its population from the adverse effects of natural disasters.

The implementation of early warning systems (EWS) in South East Nigeria carries significant implications for disaster management, offering critical benefits and posing notable challenges. This region, frequently affected by floods, landslides, and erosion, can greatly benefit from advanced EWS to mitigate these natural hazards. Recent developments have demonstrated the potential of EWS to transform disaster management in South East Nigeria. The Nigerian Hydrological Services Agency (NIHSA) has enhanced its flood forecasting capabilities, providing timely warnings that enable communities to prepare and evacuate when necessary. In 2023, NIHSA's advanced flood early warning system played a crucial role in minimizing the impact of severe flooding in the region, highlighting the system's effectiveness (NIHSA, 2023). Despite these advancements, the region faces several challenges in fully realizing the benefits of EWS. Infrastructure deficiencies, limited funding, and inadequate communication networks hinder the effective dissemination of early warnings to remote and vulnerable communities. A 2022 study by the African Centre for Disaster Studies emphasized the need for improved community engagement and education to ensure that early warning messages are understood and acted upon (African Centre for Disaster Studies, 2022). Moreover, there is a critical need for collaboration between government agencies, local authorities, and international partners to enhance the efficacy of EWS. The integration of traditional knowledge with modern technology can also play a vital role in making EWS more accessible and relevant to local communities. In sum, the implementation of EWS in South East Nigeria holds immense potential for improving disaster management. Continued investment in infrastructure, education, and community engagement is essential to overcome existing challenges and fully leverage the benefits of EWS, ultimately protecting lives and reducing economic losses in the region. Hence, the integration of EWS across various disaster scenarios in South East Nigeria enhances preparedness, response, and resilience, ultimately saving lives and reducing the socio-economic impact of disasters.

1.1 Statement of the Problem

Early warning systems (EWS) play critical roles in disaster management by providing timely and accurate information to individuals, communities, and authorities, enabling proactive measures to mitigate the impacts of natural and man-made hazards. Under normal circumstances, EWS help identify potential hazards and assess associated risks, allowing for the implementation of preventive measures to reduce vulnerability and exposure, by monitoring environmental indicators, EWS detect emerging threats and provide advance warning, offering valuable lead time for preparedness and response actions. EWS raise awareness among communities about potential risks, empowering individuals to take proactive measures to protect themselves, their families, and their assets. Timely warnings enable authorities to mobilize resources, activate emergency plans, and coordinate response efforts, ensuring a swift and effective response to disasters. By facilitating early evacuation, sheltering, and resource allocation, EWS help minimize casualties, property damage, and economic losses associated with disasters. EWS contribute to building resilience by fostering a culture of preparedness, adaptation, and learning from past events, enhancing the capacity of communities to cope with future disasters. In essence, early warning systems are indispensable tools in disaster management, saving lives, protecting livelihoods, and enhancing the overall resilience of societies to hazards and emergencies

Today in South East, several challenges hinder their effective implementation across various disaster scenarios. Inadequate meteorological and hydrological monitoring infrastructure limits the availability and reliability of data necessary for accurate forecasting and early warning dissemination, particularly in remote areas prone to flooding and erosion. Limited access to communication networks and low literacy rates impede the timely delivery of early warnings to vulnerable communities, hindering their ability to take proactive measures in response to threats such as fire outbreaks and disease outbreaks. Limited funding and human resources for EWS development and maintenance constrain the capacity to monitor, analyze, and disseminate early warnings effectively, exacerbating the challenges of disaster preparedness and response. Inadequate community engagement and awareness about disaster risks and response measures undermine the effectiveness of early warning systems, leading to delays in evacuation and suboptimal preparedness for events such as conflict outbreaks and erosion management. Lack of coordination among government agencies, NGOs, and community organizations impairs the seamless integration of early warning systems into disaster management strategies, resulting in fragmented response efforts and reduced effectiveness in mitigating disaster impacts. Addressing these challenges requires concerted efforts to invest in infrastructure development, enhance communication networks, allocate sufficient resources, strengthen community engagement, and improve interagency coordination to ensure the effective implementation of early warning systems for disaster management in South East Nigeria.

1.2 Objectives of the Study

i. Ascertain the effect of early warning systems on flooding incidents in South East, Nigeria.
ii. Identify the effect of early warning systems on fire outbreak in South East, Nigeria.

1.3 Qualitative Hypotheses

i. Early warning systems does not have a significant effect on flooding incidents in South East, Nigeria.
ii. Early warning systems have no significant effect on fire outbreak in South East, Nigeria

2. Review of Related Literature

2.1 Conceptual Review

2.1.1 Early Warning System

Early warning systems (EWS) are crucial mechanisms designed to detect potential hazards, providing timely and effective information that enables individuals, communities, and organizations to prepare and act in advance, mitigating the impact of disasters. These systems encompass a range of technological, social, and organizational components, functioning to predict and communicate the onset of natural, technological, and human-induced hazards. An effective early warning system comprises four key elements: risk knowledge, monitoring and warning services, dissemination and communication, and response capability (Glago, Kafu, & Sedegah, 2019). Risk knowledge involves understanding the nature and scope of potential hazards. Monitoring and warning services focus on the continuous observation of hazard parameters and timely forecasting. Dissemination and communication ensure that warnings reach the vulnerable populations in an understandable and actionable manner. Finally, response capability ensures that communities and organizations are prepared to act on the warnings received to reduce harm and loss. The efficacy of early warning systems depends on the integration and coordination across various sectors and the active participation of at-risk communities. Advances in technology, such as satellite remote sensing, geographic information systems (GIS), and social media, have significantly enhanced the capabilities of early warning systems, enabling more precise and timely warnings (Zschau & Küppers, 2013).

Early warning has been defined as “the provision of timely and effective information, through identified institutions, that allows individuals exposed to a hazard to take action to avoid or reduce their risk and prepare for effective response” (UNISDR, 2004). Early warning systems define the technological infrastructure that can assist in carrying out these tasks. A technological infrastructure has been installed as a means of supporting data processing and forecasting natural disasters; it is based on expert models in early warning systems. However, these systems need to go beyond this infrastructure, by taking account of how risks are understood and providing information for an early warning system. This is because these factors might be required for triggering actions that can prevent or mitigate a disaster. Early warning systems are widespread within the field of disaster management and act as an important alternative to supporting disaster preparedness and response. Picozzi *et al*. (2015)

devised an early warning system for earthquakes which provides alert messages within about 5 to 10 s for seismic hazard areas, while Alfieri *et al*. (2012) analyzed a European operational warning system for water-related disasters.
Another line of inquiry has been to use information from crowdsourcing platforms - e.g. Twitter and Open Street Map - to provide updated information for early warning systems. In their work, Chatfield and Brajawidagda (2013) have demonstrated that social media messages could act as a supplementary source of information in disaster detection. The use of crowdsourcing was also explored in the work of Meissen and Fuchs-Kittowski (2014). This work employs crowdsourcing either as input data for further model processing or as input data for checking the plausibility of prediction model outputs or to augment the overall picture of the hazardous situation. There has also been some work on disaster management that is aimed at modeling the tasks of the decision-makers. Within this group, McEntire and Myers (2004) have outlined the tasks and procedures that should be carried out to prepare communities for disasters. Blecken (2010) introduced a reference task model, which supports humanitarian organizations in modeling and optimizing their supply chain management.

According to Keyserlingk and Kopfmuller (2006) the "concept of early warning" was first developed during the Cold War in the field of national military intelligence to enhance the capacity of predicting potential (ballistic) attacks. At the level of United Nations System, early warning was introduced as an instrument to forecast natural disasters such as droughts earthquakes among others. Nowadays, early warning is employed to predict or respond to both natural disasters and violent conflicts. Thus, early warning efforts do not intend to suppress conflicts, but to respond to the trajectory of a conflict. The objective of conflict in early warning and crisis prevention initiatives in this sense is to prevent the use of violence.
The term **early warning system** will be used to describe an "initiative that focuses on systematic data collection, analysis and/or formulation of recommendations, including risk assessment and information sharing, whether they are quantitative, qualitative or a blend of both, (Keyserlingk and Kopfmuller, 2006). As a corollary to early warning, the term **early action** has been coined to refer to either 'preventive actions' or 'early response actions'. The term is not limited in its range. It covers processes of consultation, policy-making, planning, and action to reduce or avoid armed conflict. These processes include diplomatic/political, military/security, humanitarian and development/economic activity **early response** is a category of pro-active and re-active measures to reduce tensions and block conflict escalation. It involves early action focus on early prevention and early action. It can also take place at the intra-state level, inter-state and multilateral level.

2.1.2 Early warning systems (EWS) Predictions

Early warning systems (EWS) are vital tools in disaster risk reduction, providing timely alerts to enable individuals, communities, and organizations to prepare for and mitigate the impacts of natural and human-induced hazards. The development and evolution of EWS have been driven by advancements in technology, increased understanding of disaster risks, and the necessity to enhance resilience in vulnerable populations. The concept of early warning systems has its roots in ancient practices where people relied on natural signs and traditional knowledge to predict hazards. For instance, in many coastal communities, unusual animal behaviors were historically interpreted as signs of impending tsunamis. However, the modern iteration of EWS began to take shape in the mid-20th century with the advent of technological innovations such as radar, satellite imagery, and seismographs (Basher, 2006). Technological advancements have been a cornerstone in the evolution of EWS. The development of satellite remote sensing and geographic information systems (GIS) in the late 20th century significantly enhanced the ability to monitor and forecast natural hazards. Satellite remote sensing allows for real-time observation of weather patterns, volcanic activities, and other geological events, providing crucial data for early warning (Zschau & Küppers, 2013).

The integration of computer modeling and data analytics has further improved the accuracy and reliability of hazard predictions. These models can simulate various disaster scenarios and assess potential impacts, enabling more effective planning and response strategies. Advances in artificial intelligence (AI) and machine learning are now being leveraged to process vast amounts of data and generate predictive analytics, enhancing the precision of early warnings (Buchanan, 2020).

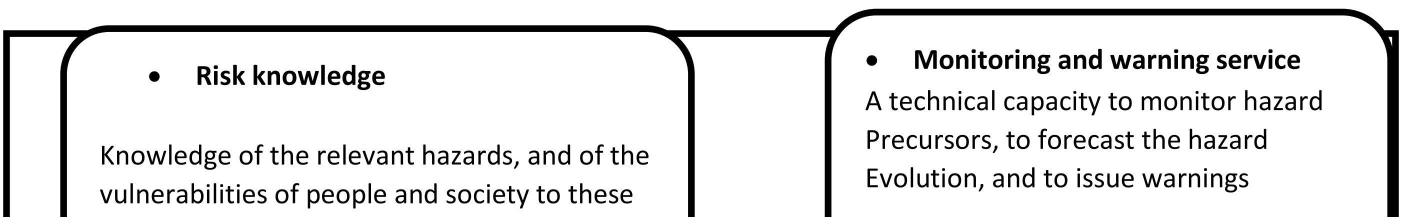
2.1.3 Early Warning Systems and their Elements

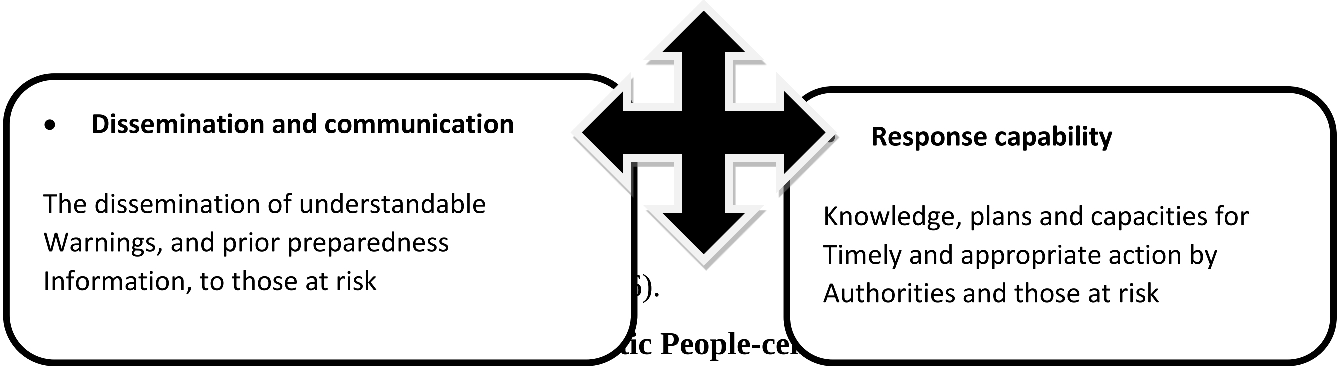
The expression ‘early warning’ is used in many fields to mean the provision of information on an emerging dangerous circumstance where that information can enable action in advance to reduce the risks involved. Early warning systems exist for natural geophysical and biological hazards, complex socio-political emergencies, industrial hazards, personal health risks and many other related risks. In the present setting, we are concerned with geophysical hazards storms, floods, droughts, landslides, volcanic eruptions, tsunamis, etc and related hazards that have a geophysical component, such as wild-land fire, locust plagues and famines (UNISDR, 2006).

In the current UN-ISDR terminology, early warning is defined as ‘the provision of timely and effective information, through identified institutions, that allows individuals exposed to a hazard to take action to avoid or reduce their risk and prepare for effective response’ (UNISDR, 2006). The concerns of early warning researchers and practitioners therefore span the natural and social sciences and theoretical and practical matters (Zschau and Ku¨ppers 2002; Early Warning Conference II, 2004).

To be effective and complete, an early warning system needs to comprise four interacting elements (UNISDR-PPEW 2005), as shown in figure 1.6, namely: (i) risk knowledge, (ii) monitoring and warning service, (iii) dissemination and communication and (iv) Response capability. While this set of four elements appears to have a logical sequence, in fact each element has direct two-way linkages and interactions with each of the other elements. The second element, the monitoring and warning service, is the most well recognized part of the early warning system, but experience has shown that technically high-quality predictions by themselves are insufficient to achieve the desired reduction in losses and impacts.
The human factor in early warning systems is very significant (Twigg, 2002). Failures in early warning systems typically occur in the communication and preparedness elements. This was true of Hurricane Katrina which affected New Orleans in late August 2005, though in this case there was the additional failure in respect to risk knowledge, namely a lack of full public and political appreciation of the core vulnerability of the inadequate levees and the consequences of their structural failure or overtopping by storm surges.

In the case of the December 2004 Indian Ocean tsunami, there were major failures in all four elements (Phil and Trans, 2006). It should be noted that in order to sustain the four elements over the long run, it is necessary to have strong political commitment and durable institutional capacities, which in turn depend on public awareness and an appreciation of the benefits of effective warning systems. Public awareness and support is often high immediately after a major disaster event such moments can be capitalized on to strengthen and secure the sustainability of early warning systems.





Source: Author's conceptualization, 2024

The most common current view of early warning systems comprises a 'warning chain', a linear set of connections from observations through warning generation and transmittal to users. In the meteorological community, the term 'end-to-end' warning system is often used. The end-to-end concept aims to make forecasts and warnings more relevant and useable to end-users, and has evolved partly in response to the commercialization imperative in many national meteorological services, as well as through efforts to make better practical use of the probabilistic and weakly predictive seasonal forecasts of the El Nino phenomenon (Zschau & Küppers, 2013).

It emphasizes the necessity to have all the links in the early warning chain in place and systematically connected. At the heart of all early warning systems is some sort of model that describes the relevant features of the hazard phenomenon and its impacts, particularly their time evolution. The model provides the means to make projections of what might happen in the future and therefore what actions might be desirable in response. Models may be as elaborate as the physics-based global numerical weather prediction models, or as straightforward as 'common knowledge' mental models (e.g. that the noisy approaching tsunami wave will arrive in a few minutes) Phil and Trans, (2006).

They may be slowly evolving, as in a drought model where the loss of soil moisture may occur over months, or very rapid, such as in an earthquake where the differential speed of electromagnetic signals relative to seismic waves can be used to automatically shut down a distant sensitive system a few seconds before damaging stresses occur. Models also underlie the other parts of the warning system, such as the likely impacts of a hazard, the way warnings are communicated and acted on, and the dynamics of evacuation processes, but these vulnerability and response process models are generally much less developed than the geophysical process models (Adeleye et al, 2020). All models are driven by a specification of an initial state, which must be obtained by observations (or from the output of an upstream observation-driven model). Observation systems can be expensive to install and operate and are often rather inadequate, especially in poorer countries. The initial state is, therefore, always imperfectly known, owing to imperfect spatial representation, instrument error and absence of data on some relevant factors. These uncertainties of the initial state propagate through the models, and together with errors in the model physics and representations thereof and random noise factors, result in uncertainty in the model estimates of future conditions.

Warnings are, therefore, inherently probabilistic, even if based on sound physics and presented in a format. Of note are forecasts of seasonal climate anomalies, which are strongly affected by system noise and uncertainty, and can only be represented in probability terms, and where it must be left to the end-user to judge the possible consequences of the projected possible climate outcomes (Zschau & Küppers, 2013). A very different example to illustrate these issues is that of tsunami early warning systems. Currently, tsunami warnings mostly are based on simple statistical relationships with precursor seismic observations, but these latter observations do not allow accurate prediction of the oceanic response, and so the false warning rates are high and the probability characteristics are poorly known. Usually, the warnings are provided only in categorical forms that usually require immediate response action. However, developments in ocean observation systems and in ocean wave propagation and coastal inundation models are in place to improve this situation in the near future (UNDRR, 2020).

2.1.4 Characteristics of Early Warning Systems

Glantz, 2003) provides that, there are eight characteristics which contribute to successful early warning systems these characteristics are:

Continuity in Operation: The focal point of these systems is to identify potential dangers early. There must be constant monitoring of indicators (Glantz, 2003), Continuity, the warning system should withstand the impact of the disaster.

Timely Warning: A lack of timely warning may defeat the purpose of the early warning system. Although there are substantial differences in warning times e.g. droughts may provide months of warning whereas floods may provide minutes of warning, there should be prompt and efficient responses to these warnings.

Transparency: This ensures that all members of society are involved and the system is not biased to sponsors, political parties and privileged groups (United Nations, 2006).

Integration: This system cannot operate successfully by itself. It needs to be a part of the larger system and this may be community oriented, government oriented or culturally oriented (Glantz, 2003; and United Nations, 2006),

Human Capacity: There must be the required expertise to ensure successful operations (Glantz, 2003),

Flexibility: There should be some form of capacity planning to cater to expanding systems and/or new indicators (Glantz, 2003),

Catalysts: These are the indicators/triggers which will be monitored for impending disasters. The system will only be as good as the accuracy of the triggers in identifying potential danger (Glantz, 2003; and UNISDR, 2004).

Apolitical: The benefits of this system must be realized and this should not be compromised for the sake of fame (Glantz, 2003).

The success of early warning signals is also dependent on the reaction of the people after the warning is issued. This means there needs to be awareness by the people of the risks they are exposed to. The community should be aware of the necessary actions to minimize the threats and loss or damage. It is essential that community leaders understand the advisories received and should be able to advise, instruct and lead the population in a manner which will increase safety and reduce damages and losses.

This aspect is probably crucial as the appreciation of psychological, community and individual processes in stressful times are more important than technology (UNISDR, 2004). The structure of the advisories and warnings should be one which considers the culture and social aspects of the society and is comprehensible and accessible to all affected or potentially affected. It is important that the population does not under or overestimate the intended severity of the warning.

Other factors which contribute to successful responses to early warning signals are sufficient lead time, accuracy, understanding and belief in the warning, the understanding of the reality of a threat, confirmation of the warning from other sources and knowing how to react and being prepared (World Meteorological Organization, 2020). Early warning systems are developed with a hazard in mind. In many cases, multi hazard early warning systems are advantageous as they are cost effective, sustainable and individual warning systems share common features (PPEW, 2006). Essentially, triggers are continuously monitored for approaching predefined thresholds. When this happens, a warning is issued for the hazard to those who are at risk.

2.1.5 Classification of Early Warning Systems for Natural Hazards

In the last decade, EWS have undergone a rapid technical development and are applied to prevent damage imposed by different natural hazard processes (Grasso and Singh, 2009). The improvement of EWS technology has been strongly supported in international Projects, such as the Hyogo Framework ((WMO, 2020) and is financially supported by governments and NGOs. Modern EWS are designed according to project specific needs and are commonly installed as prototypes with a low degree of standardization. In practice, EWS are unambiguously referred to as alarm, alert, early warning or early alert, detection, forecasting, monitoring and warning systems. Although a sophisticated classification for EWS could not be found in the literature, several institutions developed definitions for the terms alarm, alerts, warnings, prediction and forecast (Villagr_an de Leon *et al*., 2013). In Switzerland, alarms are directly issued to endangered persons or public, in contrast to warnings which are issued to inform responsible authorities about potential risks (FOCP, 2013).

Alarms are acoustic or optical signals issued to protect endangered persons from imminent or existing hazardous conditions. Warnings are issued by EWS when the possibility of a catastrophic event exists in the near future, either if the event is occurring, is imminent or has a very high probability (Villagr and de Leon *et al*., 2013). Those warnings include recommendations or orders to take actions, such as evacuations (Hamilton, 1997). Alerts are not the same as alarms; they are low-level warnings and typically used to summarize several warnings.

2.1.6 Components of Modern Early Warning Systems

A comprehensive early warning system consists of four critical components: risk knowledge, monitoring and warning services, dissemination and communication, and response capability (UNDRR, 2020).

Risk Knowledge: This involves understanding the types, frequencies, and magnitudes of potential hazards. It encompasses hazard mapping, vulnerability assessments, and historical data analysis. A solid foundation of risk knowledge is essential for developing effective early warning systems. Risk knowledge is a critical component of early warning systems (EWS), providing the necessary foundation to identify, assess, and understand potential hazards and vulnerabilities. This knowledge underpins all aspects of disaster risk reduction and is essential for effective early warning and response.

Hazard Identification: This involves recognizing the types of hazards that could impact a region, such as earthquakes, floods, hurricanes, or human-induced threats. Accurate hazard identification relies on historical data, scientific research, and local knowledge (UNDRR, 2020).

Vulnerability Assessment: Understanding who or what is vulnerable to identified hazards is crucial. This includes assessing the susceptibility of populations, infrastructure, and economic activities. Vulnerability assessments help prioritize areas for monitoring and intervention (Wisner et al., 2012).

Risk Mapping: Creating detailed maps that illustrate hazard zones and vulnerable areas aids in visualizing potential impacts. These maps are invaluable for planning and decision-making, allowing for targeted early warning dissemination and resource allocation (Zschau & Küppers, 2013).

Historical Data Analysis: Analyzing past disaster events provides insights into patterns and trends, helping to predict future occurrences and impacts. Historical data enhances the accuracy of risk assessments and supports the development of robust EWS (Basher, 2006).

Comprehensive risk knowledge enables the development of tailored early warning messages and preparedness plans. It ensures that warnings are specific, relevant, and actionable, thereby increasing the likelihood of timely and effective responses. Without solid risk knowledge, EWS cannot achieve their full potential in reducing disaster risks and saving lives (UNDRR, 2020).

Monitoring and Warning Services: Continuous monitoring of hazard indicators and timely issuance of warnings are central to EWS. Technologies such as Doppler radar for weather monitoring, seismic networks for earthquake detection, and satellite systems for tracking hurricanes are integral to these services. Monitoring and warning services are critical components of early warning systems (EWS), providing real-time data and timely alerts that are essential for disaster risk reduction. These services involve continuous observation of hazard indicators, data analysis, and the dissemination of warnings to at-risk populations.

Real-time Data Collection: Monitoring systems use advanced technologies such as satellite remote sensing, seismic networks, and meteorological stations to gather real-time data on potential hazards. These technologies enable the continuous tracking of weather patterns, seismic activities, and other environmental changes (WMO, 2020).

Data Analysis and Hazard Detection: The collected data is analyzed using sophisticated models and algorithms to detect early signs of hazards. For instance, Doppler radar systems are used to monitor and predict severe weather events like hurricanes and tornadoes, while seismographs detect and measure earthquake activities (UNDRR, 2020).

Timely Warning Dissemination: Once a potential hazard is detected, timely and accurate warnings are crucial. Effective communication strategies ensure that warnings reach the intended recipients through various channels, including mass media, mobile networks, and social media. Clear and actionable messages are essential to prompt appropriate responses from communities and authorities (IFRC, 2020).

Monitoring and warning services play a vital role in reducing the impact of disasters. Early detection and warning allow for proactive measures, such as evacuations, resource mobilization, and emergency response planning. For example, the Pacific Tsunami Warning System has significantly improved tsunami detection and warning capabilities, leading to timely evacuations and reduced loss of life in coastal regions (UNESCO/IOC, 2009). While monitoring and warning services are highly effective, they face challenges such as technological limitations, data accuracy, and ensuring warnings reach all vulnerable populations. Recent advancements in artificial intelligence (AI) and machine learning are enhancing the capabilities of monitoring systems, allowing for more accurate predictions and timely warnings (Buchanan, 2020). Monitoring and warning services are indispensable components of EWS, providing the necessary tools to detect hazards and disseminate timely alerts. By leveraging advanced technologies and effective communication strategies, these services significantly contribute to disaster risk reduction and resilience building.

Dissemination and Communication: Ensuring that warnings reach the intended recipients in a timely and understandable manner is crucial. This component involves the use of various communication channels, including mass media, mobile networks, and community-based organizations. Clear and actionable messages are essential to prompt appropriate responses. Dissemination and communication are pivotal components of early warning systems (EWS), ensuring that timely and accurate warnings reach at-risk populations, enabling them to take appropriate actions to mitigate disaster impacts. Effective communication strategies are essential for ensuring the success of EWS.

Multi-channel Approach: Utilizing diverse communication channels such as radio, television, mobile phones, social media, and community networks ensures that warnings reach a broad audience. This approach is critical for reaching different demographic groups and overcoming barriers such as language and literacy (UNDRR, 2020).

Clear and Actionable Messages: Warnings must be clear, concise, and actionable to prompt immediate responses. Messages should provide specific instructions on what actions individuals and communities should take to protect themselves and mitigate risks (IFRC, 2020).

Community Engagement: Engaging local communities in the dissemination process enhances the effectiveness of warnings. Community leaders, local authorities, and grassroots organizations play a crucial role in disseminating information and encouraging preparedness actions tailored to local contexts (Glantz, 2009). Effective dissemination and communication increase public awareness, understanding, and response to warnings, thereby saving lives and reducing the impact of disasters. For instance, during hurricanes and tsunamis, clear and timely warnings allow for orderly evacuations and preparations, significantly minimizing casualties and property damage (UNESCO/IOC, 2009). Challenges in dissemination and communication include reaching remote and marginalized communities, ensuring message comprehension across diverse populations, and adapting to rapidly evolving communication technologies. Advances in mobile technology and social media have revolutionized EWS by enabling faster and more widespread dissemination of warnings (Buchanan, 2020). Dissemination and communication are critical components of EWS, facilitating the rapid and effective distribution of warnings to vulnerable populations. By leveraging diverse communication channels, ensuring message clarity, and fostering community engagement, EWS can enhance disaster preparedness and resilience.

Response Capability: This involves the readiness and capacity of communities and organizations to act on early warnings. It includes emergency preparedness plans, resource allocation, training, and public awareness campaigns. Community participation and education are vital to enhancing response capabilities. Response capability is a crucial component of early warning systems (EWS), encompassing the preparedness, capacity, and ability of individuals, communities, and organizations to effectively respond to early warnings and mitigate disaster impacts. This component focuses on translating early warnings into actionable responses that save lives and reduce damages.

1. **Emergency Preparedness**: Preparedness involves planning, training, and exercises to ensure readiness for various hazards. Communities and organizations develop emergency response plans that outline roles, responsibilities, and actions to be taken upon receiving early warnings (IFRC, 2020).
2. **Capacity Building**: Building local capacity through training programs, workshops, and drills enhances the ability of responders to implement response plans effectively. Training focuses on skills development, coordination, and communication within response teams (UNDRR, 2020).
3. **Community Engagement**: Engaging communities in preparedness activities fosters ownership and ensures that responses are culturally and contextually appropriate. Community participation in planning and decision-making builds trust and resilience, enhancing overall response capability (Glantz, 2009).

Response capability ensures that early warnings translate into timely and effective actions, such as evacuations, resource mobilization, and medical assistance. For example, in the context of hurricanes or floods, communities with strong response capabilities can evacuate vulnerable populations and protect critical infrastructure before disaster strikes, minimizing casualties and damages (NOAA, 2021). Challenges in response capability include limited resources, infrastructure gaps, and coordination issues among response agencies. Advances in technology, such as real-time data analytics and mobile communication platforms, enhance coordination and decision-making during emergencies (Buchanan, 2020). Response capability is essential for maximizing the effectiveness of early warning systems. By investing in preparedness, capacity building, and community engagement, EWS can ensure that early warnings lead to prompt and coordinated responses that save lives and enhance disaster resilience.

2.1.7 Early Warning Mechanisms

Throughout history, human beings have sought to warn and be warned of future calamities. From shrill-voiced soothsayers to cold war military strategists, the objective has always been to accurately predict impending dangers, usually in order to avoid them or, at least, to be better prepared for them (Dorn, 2013, cited in Nwaneri & Uwakwe, 2017). In contemporary conflict prevention and management strategies, early warning mechanism and response has been introduced as an instrument. Indeed, it is gradually becoming a prerequisite for conflict preventive and management actions. Where prevention fails, early warning serves a later purpose. By being aware of the nature and antecedents of an escalation of violence, conflict management practitioners can consciously plan, if not to stop it, then to mitigate its effects and to shorten its duration. Early warning refers to “the communication of information on a crisis area, analysis of that information and the development of a potential, timely, strategic response options to the crisis” (Adelman, 1998). According to Haye (2014), early warning is basically concerned with prevention, mitigation or management of violent conflicts within a geographical landscape. Haye went on to distinguish between early warning system and intelligence system. He argued that early warning is not concerned with a direct threat to the gatherer or analyzer of the information, or those contemplating a response. According to Onuoha et al (2006), Early Warning is a process of reading specific indicators as signals and patterns of signals, and translating those patterns into kind of anticipation of the likelihood of the emergence or escalation of violent conflict. It entails the trends, sparks and triggers of conflict that can provide data for forecasting the emergence of conflict. Providing further insight on the definition of early warning,

Matveeva (2006) posited that early warning include three elements, namely: knowledge and hazard mapping, monitoring and forecasting impending events, processing and dissemination of understandable warnings to political authorities, security agencies and other relevant stakeholders, as well as adoption of appropriate and timely action in response to such alerts. Kumar Rupesinghe identifies 'three generations' of early warning systems: The first generation early warning systems were the systems where the entire early warning mechanism (including conflict monitoring) was based outside the conflict region. The second generation amended this approach by basing the monitoring mechanism in the conflict zones, namely by having the field monitors to gather primary event data. The analysis, however, continued to be conducted outside the conflict region. The third generation early warning systems are entirely located in the conflict regions. They integrate early warning and early response together as simultaneous processes (Kumar, 2005). There are a variety of theoretical and practical approaches to early warning and response. Austin Alexander noted that in order to identify the causes of conflict, predict the outbreak of violence and mitigate the conflict, an early warning system should contain six core mechanisms: data collection, data analysis, assessment for warning or identification of different scenarios, formulation of action proposals, transmission of recommendations and assessment of early response (Alexander, 2003). Similarly, Nwaneri and Uwakwe (2017) identified the component of early warning including collection of information using specific indicators**,** analysis of information: attaching meaning to indicators, setting it into context, recognizing crisis development, formulation of best and worst case scenarios and response options and communication to decision makers.

Early warning mechanisms (EWMs) are crucial in disaster management, enabling timely responses to mitigate the impact of natural and human-induced hazards. These systems involve continuous monitoring, data analysis, and the dissemination of warnings to at-risk populations. EWMs comprise four essential elements: risk knowledge, monitoring and warning services, dissemination and communication, and response capability (UNDRR, 2020). Risk knowledge involves understanding potential hazards through data collection and analysis, while monitoring and warning services use advanced technologies like satellite remote sensing, seismic monitoring, and meteorological forecasting to detect early signs of disasters (WMO, 2020). Dissemination and communication ensure that warnings reach vulnerable populations promptly and effectively. This includes using various communication channels, such as mass media, mobile networks, and social media, to deliver clear, actionable messages (Glantz, 2009). Response capability encompasses preparedness measures, training, and community engagement to ensure timely and appropriate actions during a disaster.

Recent advancements in EWMs leverage artificial intelligence (AI) and machine learning for predictive analytics, enhancing the accuracy and timeliness of warnings (Buchanan, 2020). These technologies process vast amounts of data, identifying patterns that improve hazard predictions. Despite their benefits, EWMs face challenges like technological limitations, inadequate infrastructure, and socio-economic disparities that hinder effective dissemination. Addressing these issues requires technological innovation, increased funding, and community engagement to build resilient EWMs. Hence, EWMs are vital for reducing disaster risks and enhancing resilience. By integrating modern technologies and fostering community participation, these systems can significantly improve disaster preparedness and response.

2.1.8 Disaster Management

The concept of disaster management cannot be meaningfully explained without first isolating 'disaster' for proper clarification. According to CBSE (2006), disaster is a sudden natural or man-made situation capable of engendering widespread human, material, socio-economic and environmental destruction far beyond what the affected communities can cope with. when disaster occurs with widespread impacts, it is not unexpected that the affected communities might be compelled to seek assistance from government and international agencies. This is where disaster management becomes pertinent, to respond to adverse situations that overstretch the resources available to a community to cope with the adverse situation. As a management concept, it is a process of attending to negative circumstances by governments, humanitarian agencies and individuals working together to reduce the potential losses resulting from disaster situation by developing policies and plans that can mitigate the effects, prepare for disasters and outline the procedures involved in responding to the victims in order to ensure quick recovery from the impacts (Ogunde, et al 2018).

A disaster is a swift, catastrophic event that seriously disrupts the functioning of a community or society and causes human, material, and economic or environmental losses that exceed the Community's or society's ability to cope using its own resources (IFRC, 2012). The combination of hazards, vulnerability and the inability to reduce the potential negative consequences of risk results in disaster. As a result, disasters influence the mental, socio-economic, political as well as the cultural state of the affected area. Hence, disasters are considered as the consequence of inappropriately managed risk. These risks are the product of a combination of both hazard/s and vulnerability. Therefore, hazards that strike in areas with low vulnerability are less likely to become disasters, as is the case in uninhabited regions (James et al., 2013). Disasters are generally grouped into two types, namely anthropogenic or human-made and natural. Anthropogenic or human-made disasters are associated with human action or inaction. Examples of such disasters include: technological failures, industrial accidents, oil spills, transportation accidents and nuclear explosions/radiation.

Disaster management involves a systematic approach to mitigate the impact of hazards through preparedness, response, recovery, and mitigation efforts. It encompasses planning, organizing, coordinating, and implementing measures to prevent or minimize the effects of disasters on communities and environments. Effective disaster management integrates risk reduction strategies with early warning systems, emphasizing the importance of resilience and adaptive capacity in facing natural and human-induced crises. Recent advancements emphasize holistic approaches that integrate technological innovations, community participation, and policy frameworks to enhance disaster resilience (UNDRR, 2020). This approach ensures timely response and recovery while promoting sustainable development goals and reducing vulnerabilities to future disasters (IFRC, 2020). By focusing on proactive measures and adaptive strategies, disaster management aims to protect lives, safeguard infrastructure, and build resilient communities capable of withstanding and recovering from adverse events (Glantz, 2009). A disaster is a serious disruption of the functioning of a society, causing or threatens to cause, widespread human, material, or environmental losses which exceed the ability of affected community to cope using only its own resources (South Africa, 2002). Disasters can be sudden (flash floods) or progressive (drought). Disasters are caused due to the interaction of humans with their environment. A disaster is a function of the risk process. It results from the combination of hazards, conditions of vulnerability and insufficient capacity or measures to reduce the potential negative consequences of risk (ISDR, 2002). Extreme natural phenomena do not in themselves constitute hazards. It is only when such phenomena occur in an environment where they pose a threat to human life, property, infrastructure or the environment that they can be classified as hazards. Similarly, in the case of technological developments, it is only when such developments pose a danger e.g. industrial accidents, infrastructure failures. In essence, a disaster is the result of a hazard's impact on society. So the effects of a disaster are determined by the extent of a community's vulnerability to the hazard.

2.1.9 Flooding incidents

Flooding incidents refer to the overflow of water onto normally dry land, caused by various factors such as heavy rainfall, rapid snowmelt, storm surges, and failure of natural or man-made water control structures like dams and levees. These events can result in significant damage to infrastructure, displacement of populations, and loss of life. Flooding can occur in several forms, including riverine flooding, which happens when rivers overflow their banks; coastal flooding, resulting from sea level rise or storm surges; flash flooding, which is characterized by rapid water level rise following intense rainfall; and urban flooding, often caused by inadequate drainage systems in cities. Flooding incidents are exacerbated by climate change, which increases the frequency and intensity of extreme weather events. Effective flood management involves early warning systems, robust infrastructure, and emergency preparedness to mitigate impacts (Smith, 2013; IPCC, 2014; FEMA, 2020).

2.1.10 Fire outbreak

Fire outbreaks refer to the sudden and uncontrolled occurrence of fire, which can spread rapidly, causing widespread damage to property, ecosystems, and posing serious risks to human life (IFRC, 2020). These incidents can be triggered by natural causes such as lightning strikes, volcanic activity, and spontaneous combustion, or by human activities including arson, electrical faults, and negligence with flammable materials. Fire outbreaks can occur in various environments, including forests (wildfires), urban areas (structural fires), and industrial sites (industrial fires). The intensity and impact of fire outbreaks are influenced by factors such as weather conditions, availability of combustible materials, and the effectiveness of fire prevention and response measures. The consequences of fire outbreaks are often devastating, leading to loss of life, displacement of communities, destruction of habitats, and economic losses. Effective fire management involves early detection, rapid response, public education, and robust infrastructure to prevent and control fires (Pyne, 2010; FAO, 2011; NFPA, 2020).

2.1.11 Disaster Risk Reduction (DRR)

Disaster Risk Reduction (DRR) is a term used for techniques that focus on preventing or minimizing the effects of disasters. The term has been adopted by the United Nations, which has developed an international strategy on promoting disaster risk reduction as it has been shown to be very cost effective (Haddow et al., 2021). Initiatives that are focused on disaster occurring (flood protection works, known as dykes, levees) or enhance the community's ability to respond to an emergency (ensuring three days food and water). As a disaster is a product of a severe event and people, changing either will have an effect on any disasters that occur. Further examples of initiatives include increasing knowledge and creating legal and policy frameworks (Buchanan, 2020).

The term "Disaster risk reduction" refers to a wide sector of work on disaster management including: mitigation, prevention, risk reduction, preparedness, and vulnerabilities. UNDP defines disaster risk reduction as the conceptual framework of elements considered with the possibilities to minimize vulnerabilities and disaster risks throughout a society, (Haddow et al.,

2021) to avoid (prevention) or to limit (mitigation and preparedness) the adverse impacts of hazards, within the broad context of sustainable development. The traditional focus of disaster management strategies have been the delivery of relief after a disaster. Even though disaster relief is an important issue, this approach alone does not proactively address the need to reduce the human and environmental impact of future disasters. There is growing realization that countries and communities need to place more emphasis on a holistic approach to disaster risk reduction- an approach that involves risk assessment, risk reduction, early warning and disaster preparedness if the social, economic and environmental costs of disasters are to be effectively reduced.

According to the UN/ISDR, 2002, "Disaster reduction policies and measures need to be implemented, with a two-fold aim: to enable societies to be resilient to natural hazards while ensuring that development efforts do not increase vulnerability to these hazards". Disaster risk can be calculated as the interaction between the probability of hazard occurring and the vulnerability of a community to the hazard, together with the capacity of the community to cope with and recover from a disaster.

The basic approaches to Disaster Risk Reduction (DRR) by UNDP (2008) are as follows:

a. Understand the hazard where and when and why it is likely to occur.
b. Know which areas of the community are most vulnerable to hazards, and what capacities and capabilities are available to cope with disasters.
c. Develop knowledge and information resources to enable the risks to be identified and potential impacts to be adequately assessed. Ensure political commitment to disaster risk reduction at various levels through policy development, legislation, organizational development and promoting community action.
d. Increase education and raise awareness of the risks and motivate for changes in collective behavior to reduce risks.
e. Understand and take action to mitigate or relieve the socioeconomic conditions that create or increase the vulnerability of a community.
f. Implement environmental management, physical and technical measures to reduce risks to communities.
g. Increase the coping capacity of communities through better communications, improved resources, etc.
h. Have a disaster preparedness plan in place. This plan should cover both emergency management and recovery from disaster.
i. Develop hazard monitoring systems and early warning indicators.

DRR must be a priority of poverty reduction and development initiatives to ensure sustainable development in Nigeria. Everybody is exposed to natural hazards and hence to disaster risks. The level of exposure and ability to cope with disaster is however, varied. One can say that poverty is a major factor increasing disaster risk by increasing a community's vulnerability to disasters and reducing its coping capacity. However, poverty and disaster form a negative feedback cycle. If a disaster strikes, the level of poverty increases, leading to increase in disaster risk (Haddow et al., 2021).

For sustainable development to be achieved in Nigeria DRR should be factored into poverty reduction policies, strategies and initiatives at all levels. Poverty stricken communities are far more vulnerable to disasters, and disasters in turn create even greater poverty. Hence, by factoring DRR in poverty reduction, poor communities can receive greater protection, the negative spiral of poverty can be broken and poverty reduction efforts are made more sustainable to enhance development in Nigeria.

Effective approaches for community leaders to implement DRR activities are to ensure that:

a. Participation and transparency in decision making
b. Promotion of gender concerns and needs
c. Empowerment and
d. Accountability

These are values that form the cornerstones of good governance and responsibility leader.
Development patterns that ignore poverty and disaster risk reductions which are not friendly to the environment moves toward vulnerable hazards. Such as the unsustainable use of forest resources and over exploitation of crude oil in the Niger Delta leads to over exploitation and degradation, this increases the vulnerability of the users to disasters (Onah, 2005). Sustainable development should protest against the impacts of natural and human induced hazards (Haddow et al., 2021). It is balanced between the uses of natural resources to meet current needs of a population while at the same time preserving these resources for future generations. Sustainable development reduces disaster risk by causing an upward spiral of environmental protection and development. Sustainable development ensures DRR, which in turn ensures investment and growth.

2.1.16 Phases of modern disaster management

There are four phases of modern disaster management approach known as the comprehensive emergency management (CEM), a framework first developed in 1979 by the National Governor's Association during its study of emergency preparedness. This according to Federal Emergency Management Agency (FEMA). (2017) was viewed as a four-stage process centered on an emergency event or disaster. The temporal stages before the disaster occurs are identified as mitigation and preparedness, while those after the disaster are identified as response and recovery. Therefore, emergency management is a holistic approach to handling disasters before and after their occurrence.

Mitigation: A hazard mitigation strategy is a coordinated and consistent set of goals, policies, and tools for reducing or minimizing human and property losses from hazards and resulting disasters. Its efforts attempt to prevent hazards from developing into disaster altogether, or reduce the effects of disasters when they occur. The mitigation phase differs from the other phases because it focuses on long-term measures for reducing or eliminating risk. Coppola (2011) argues for packaging mitigation measures with development management programs into coordinated strategies in order to address effectively the opportunities and problems of integrated hazard mitigation. Thus, implementation of mitigation strategies can be considered a part of the recovery process if applied after a disaster occurs.

Mitigating measures can be structural or non-structural. Structural mitigation aims to reduce this damage and eventually save lives. Structural mitigation is a science that requires the expertise of civil engineers. It includes both the new buildings, roads, canals, Dams, and other infrastructure and the strengthening and retrofitting of old structures. It uses technological solutions, like flood levees. Non-structural measures include legislation, land-use planning (e.g. the designation of nonessential land like parks to be used as flood zones), and insurance. Mitigation is the most cost efficient method for reducing the impact of hazards, thus it is not always suitable (Coppola, 2011).

Mitigation includes providing regulations regarding evacuation, sanctions against those who refuse to obey the regulations (such as mandatory evacuations), and communication of potential risks to the public. Personal mitigation is mainly about knowing and avoiding unnecessary risks. This includes an assessment of possible risks to personal/family health and to personal property. A typical example of mitigation would be to avoid buying property that is exposed to hazards, for instance in a flood plain, in area of subsidence or landslides. Home owners may not be aware of a property being exposed to a hazard until it strikes. Specialists can be hired to conduct risk identification and assessment surveys.

Purchase of insurance covering the most prominent identified risks is a common measure. Personal structural mitigation in earthquake prone areas includes installation of an Earthquake Valve to instantly shut off the natural gas supply to a property, seismic retrofits of property and the securing of items inside a building to enhance household seismic safety. The latter may include the mounting of furniture, refrigerators, water heaters and breakables to the walls, and the addition of cabinet latches. In flood prone areas houses can be built on poles, as in much of southern Asia. In areas prone to prolonged electricity black-outs installation of a generator would be an example of an optimal structural mitigation measure. A precursor activity to the mitigation is the identification of risks. The higher the risk, the more urgent the hazard specific vulnerability are targeted by mitigation and preparedness efforts.

Preparedness: While preparedness is aimed at preventing a disaster from occurring, personal preparedness focuses on preparing equipment and procedures for use when a disaster occurs, for example planning. Preparedness measures can take many forms including the construction of shelters, installation of warning devices, creation of back-up life-line services such as power, water, sewage and rehearsing evacuation plans.

In the preparedness phase, emergency managers develop plans of actions against when the disaster strikes. Some preparedness measures are:

a. Communication plans with easily understandable terminology and methods

b. Proper maintenance and training of emergency services, including mass human resources such as community emergency response teams.

c. Development and exercise of emergency population warning methods combined with emergency shelters and evacuations plans.

d. Stockpiling and maintain disaster supplies and equipment

e. Development of organizations of trained volunteers among civilian populations.

Organizations like Community Emergency Response Teams and the Red Cross are ready sources of trained volunteers. The latter's emergency management system has high ratings worldwide. Another preparedness measure is casualty prediction, the study of how many deaths or injuries to expect for a given type of event. This gives planners an idea of what resources need to be in place to respond to a particular kind of event. Emergency Managers in the planning phase should be a particular kind of event. Emergency Managers in the planning phase should be flexible, and all encompassing-carefully recognizing the risks and exposures of their respective regions and employing unconventional means of support.

Response: This phase of an emergency may commence with search and rescue but in all case the focus will quickly turn to fulfilling the basic humanitarian needs of the affected population. This assistance may be provided by national or international agencies and organizations (Virtriana, et al, 2023). Effective coordination of disaster assistance is often crucial, particularly when many organizations respond and local emergency management agency (LEMA) capacity has been exceeded by the demand or diminished by the disaster itself. The response phase includes the mobilization of the necessary emergency services and first responders in the disaster area. This is likely to include a first wave of core emergency services, such as fire fighters, police and ambulance crews. Organizational response to any significant disaster- natural or terrorist borne –is based on existing emergency management organizational systems and processes: the Federal Response Plan (FRP) and the Incident Command System (ICS) (Schumacher, 1973). On a personal level the response can take the shape either of a shelter in place or an evacuation. In a shelter-in- place scene, a family would be prepared to fend for themselves in their home for many days without any form of outside support. In an evacuation, a family leaves the area by automobile or other mode of transportation, taking with them maximum amount of supplies they can carry, possibly including a tent for shelter. If mechanical transport is not available, evacuation on foot would ideally include carrying at least three days of supplies and rain-tight bedding, a tarpaulin and a bedroll of blankets being the minimum (Sufri, et al, 2020).

Recovery: Aim of the recovery phase is to restore the affected areas to its previous state. It differs from the response phase in its focus. Here efforts are concerned with issues and decisions that must be made after immediate needs are addressed. Recovery efforts are primarily concerned with actions that involve rebuilding destroyed property, re-employment, and the repair of other essential infrastructure (Shah, et al, 2022). An important aspect of effective is taking advantage of a "window of opportunity" for the implementation of mitigative measures that might otherwise be unpopular. The recovery phase starts after the immediate threat to human life has subsided. During reconstruction, it is recommended to consider the location or construction material of the property. The most extreme home confinement scenarios include war, famine and sever epidemics and may last a year or more. Then recovery will take place inside the home (Rofiah, Kawai, & Hayati, 2021).

Planners for these events usually buy bulk foods and appropriate storage and preparation equipment, and eat the food as part of normal life. It is the Federal government that often provides the most technical and financial assistance for recovery efforts in the United States.

2.1.17 Emergency management and sustainable development

In Nigeria, for effective emergency management that ensures sustainable development the following should be in place;

Adequate fund: Finance is the life wire of every organization. Emergency management is cost effective and to cope with it, manpower, equipment, relief materials and logistics are needed. Unfortunately, disasters are uncertain with respect to both their occurrence and outcome (Rofiah, et al, 2021).

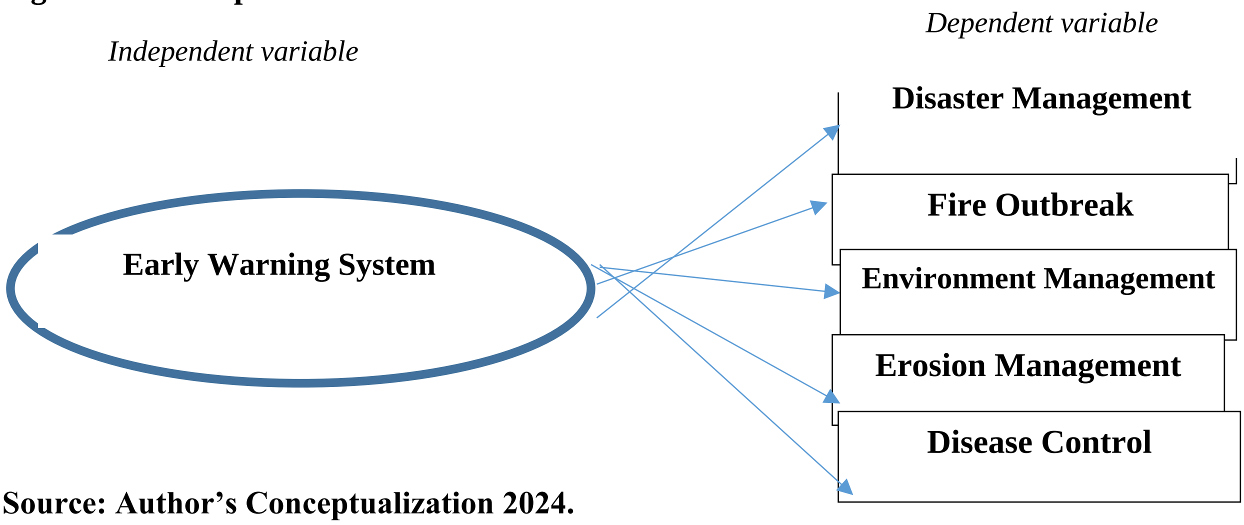
Teamwork: According to Todaro and Smith (2009) and Belbin (1981) team work is very essential in emergency management. As Smith claims that groups/team make better decisions than individuals. They are important because they are generally considered to outperform individuals. This is what Belbin called corporate performance.

Buscher and Monensen (2007), call it collaboration which means that people actively work together to assess a situation such as talking, jointly investigating which is needed in emergency management. McKenn (1994) identifies seven main factors which are held to determine group cohesion. These include shared attitudes and goals; the amount of time spent together; the extent of the group's isolation from other groups; the level of perceived threat; the site of the group, and its negative effects on interaction: the presence of stringent group entry requirements; and the levels of perceived rewards for the group.

Training/capacity building: Skill acquisition is an important tool in emergency management. Training should be provided by local, state, federal and private organizations which ranges from public information and media relations to high-level incident command and tactical skills such as studying a terrorist bombing site or controlling an emergency scene.

Emergency managers should be trained in a wide variety of disciplines that support them throughout the emergency the emergency life-cycle. Professional certifications such as Certified Emergency Manager (CEM) and Certified Business Continuity Professional (CBCP) are becoming more common as the need for high professional standards is recognized by the emergency management community especially in the United States which can be adapted in Nigeria (Rana, Asim, Aslam, & Jamshed, 2021).

Figure 2.1 Conceptual Framework



Source: Author's Conceptualization 2024.

3. Methodology

The study is qualitative in nature and mode adopted is content analysis. However focus group discussion guide and in-depth interview complemented the data elicited from the secondary sources.

4. Findings

(a) Government of the South East is not strategic in preventing and managing flood disasters. Flood has accounted for huge losses in agricultural production in the South East Region.

(b) Government of the South is not proactive in preventing fire outbreak, thereby accounting for the high number of fire outbreak recorded in the region within the last five years.

5. Recommendations

(a) Flood management involves multi-dimensional and strategic approaches to manage, therefore the South East governments should adopt new strategies to ensure that floods are effectively managed to ameliorate losses.

(b) Government of the South East should organize a town hall meeting to agree on methodologies to be adopted in the region to avert future fire disasters.

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