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THE EFFECTIVENESS OF DATA MANAGEMENT AND ICT IN ENHANCING DISASTER RISK REDUCTION AMONG ECONOMIC COMMUNITY OF WEST AFRICAN STATES (ECOWAS)

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ABSTRACT
In recent years, the world has witnessed an increase in both the frequency and severity of natural disasters. These disasters have had devastating effects on communities, thereby causing loss of life, displacement of people, and destruction of infrastructures. Globally, African countries are amongst the most vulnerable to the impacts of natural disasters with West Africa having increasing numbers of people faced with disaster risks associated with drought, desertification, floods, the spread of disease (as a result of unhealthy conditions and poor hygiene), desert locust plagues, food insecurity, coastal erosion, volcanic eruptions, earthquakes (tremors) and technological accidents, including transport and industrial accidents. In 2013, the United Nations International Strategy for Disaster Reduction (UNISDR) estimates put economic losses from 147 recorded disasters at about US$ 1.3 billion. The impacts of these hazardous events were aggravated by increasing urbanization, population growth and lack of appropriate human and material capacities to prevent, mitigate and respond to disasters due to a high incidence of poverty. The aforementioned may not be unconnected with the ineffectiveness of data management and ICT, two key elements that are very germane in enhancing disaster risk reduction. This study therefore examined the effectiveness of data management and ICT in enhancing disaster risk reduction among Economic Community of West African States (ECOWAS) and concluded that for ECOWAS to achieve disaster risk reduction, there is need to embrace data management and ICT for mitigation of disasters in the region. The study therefore suggested that Disaster management agencies should enhance data management practices by implementing a robust data accuracy, consistency, and completeness checks while Government and disaster management agencies should Improve Communication Systems, develop local systems for disseminating warning messages and ensure a two-way flow of communication.

KEYWORDS: *Data Management, ICT, Disaster Risk Reduction, ECOWAS, Effectiveness*

INTRODUCTION

Disaster is a serious disruption of the functioning of a community or society involving widespread human, material, economic or environmental losses and impact, which exceeds the ability of the affected or society to cope using its own resource (UNISDR, 2009). United Nations General Assembly (UNGA) in February 2017 as a scientific undertaking; specifically, defined disaster as "a process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation". Etkin (2015) also defined disaster as a natural or man-made hazard that has come to fruition resulting in an event of substantial extent, causing significant physical damage or destruction, loss of life or drastic change to the environment.

Natural disaster has become more frequent and intense in recent years, resulting in considerable loss of human life and devastation of physical capital. Natural disaster has been proven to make developing countries more vulnerable to economic shocks than developed ones, because of their inadequate capacity to deal with the financial and economic impacts of such occurrences (Jones, Manyena & Walsh, 2015). According to IFRC (2008), a natural disaster event is commonly defined as the impact of an extreme natural event on an exposed, vulnerable society. The organisation stated that the impacts of natural disasters on society and the environment are substantially larger in less developed countries. This they noted, is explained by the typically higher degree of vulnerability in developing countries with emphasis on factors which include high rates of poverty, high unemployment, distributional inequalities, socioeconomic exclusion of the poor from basic services, strong population growth, and lack of strong national and local institutions for dealing with natural disasters.

Significantly, ECOWAS developed a regional flood management strategy for its member countries and this strategy was reviewed and a roadmap was developed for its finalization. The 1st ECOWAS Hydromet Forum and Disaster Risk Reduction (DRR) Platform was held in September 2018 in Abidjan, Côte d'Ivoire, and this created a platform for more than 230 participants from West Africa and global partners to discuss status, challenges and opportunities of the hydromet and early warning signs in the region. Recently,the integration/mainstreaming of DRR measures into most of the ECOWAS sub-regional and member states' development policies, plans and strategies cannot be said to be significant. This is because most of the DRR elements observed in the development documents of the ECOWAS Commission and its member states do not adequately present the seriousness of the pressing need to

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tackle the negative impacts relating to human development and their associated hazard risks or the general vulnerability of the sub-region.

Consequently, all ECOWAS member states were advised to establish Disaster Risk Management (DRM)/DRR agencies such as National Emergency Management Agency (NEMA) for Nigeria, National Civil Protection Authority (Autoridade Nacional de Emergência e Proteção Civil-ANPC) for Togo and the National Disaster Management Organisation (NADMO) for Ghana, through appropriate partnership with government and development partners, private sector and civil society organizations to ensure effective implementation of DRR related policies, plans and programmes. Overall, these disasters highlight the importance of effective disaster management strategies in ECOWAS states to mitigate their impact and protect the population and environment.

Emergency management agencies play a crucial role in mitigating and responding to these disasters (UNISDR, 2009) However, the effectiveness of these agencies largely depends on proper data management practices and ICT compliance (Chen, 2013).It must be stated that disaster risk reduction is fundamental to the societies well-being in terms of social, economic, and political stability. According to Yab, (2011), disaster management is a complex series of activities which involves the risk assessment, prevention measures and preparedness to cope with future disasters and emergency response to a disaster, recovery and reconstruction. Therefore, it becomes expedient to ensure disaster risk reduction and this informs why Yab (2011) describes risk as "a situation or event where something of human value is greatly destroyed including both human and material resources.

According to Jones, Manyena & Walsh, (2015), risk is often defined in terms of a high probability of causing a costly outcome that grounds itself in mathematical terms referring to money, deaths or negative health. They pointed out that humans themselves have been put at stake and the outcome is uncertain thereby producing a state of uncertainty that entails both unpredictability and expectancy considering future occurrences. Based on the aforementioned, it has become imperative to seek for ways to mitigate the effect of this hazardous occurrences that seems to defile all possible solutions, hence the need to explore data management and ICT as a tool for disaster risk reduction and to achieve this, timely and reliable information is required for effective and efficient response in emergency situations (Wilson, Wilson & Wilson, 2014). It is common knowledge that failure in governance is the biggest single factor in driving disaster risk alongside climate change, poverty, and poor urban planning. Thus, data management and ICT are not only a relevant tool able to support the implementation of disaster risk reduction strategies, its efficacy also help to monitor such implementation. Data management and ICT efficacy plays a crucial role in improving disaster risk reduction and by utilising data, policy makers and stakeholders can make inform decisions during the emergency management process, thereby leading to optimal responses and quality prediction analysis.

Meanwhile, four stages of a 'disaster management cycle' have been identified: and these are, Mitigation and prevention, Preparedness, Response and Recovery (IFRC, 2008).Researchers have observed that Data Management and Information Communication Systems (DMICS) occur in all stages of "disaster management cycle" with different aims at each stage. According to Owolabi and Ekechi (2014), in the last two decades, it has been acknowledged that, while natural disaster cannot be prevented, the impacts can be mitigated. They submitted that one of the key components of mitigating disaster impact is Data Management and Information Communication Systems (DMICS) and that this requires effective and collective data management systematically planned around quick access to information and timely dissemination communication channels.

More recently, ECOWAS has been strengthening disaster risk management arrangements across all member states with focus on linking different aspects of the disaster management cycle with Support by development partners, and there is evidence the member states are making progress in developing and revising disaster – related policy frameworks (national DRR strategies, plans of action). Nevertheless, there is a growing recognition of the importance that a disaster data management and ICT strategy is required to guide and encourage emergency management personnel to gather and share the right data and information effectively. It is evident that a data strategy and information communication system is the foundation from which all good decisions are made; thus, having the right information available at the right time is crucial to good and timely decision making especially for emergency situations.

Concept of Disaster

The concept of disaster has been understood in different ways. Disaster, is a massive and sudden calamity due to the unfavorable position of a planet or star, implying "impossible to control," because it is caused by God's will (Etkin, 2015). In other words, disaster had been mostly considered as a naturally occurring disaster, resulting from external components, such as typhoons and earthquakes. Currently, it has matured to include technological and social disasters, reflecting the evolutionary circumstances of the contemporary society. According to Etkin, (2015), disasters are tragedies that overwhelm our communities, destroy our property and harm our population. 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 (International Strategy for Disaster Reduction (ISSD, 2018). 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

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e.g. industrial accidents and infrastructure failures. Disaster is the result of a hazard's impact on society, thus, the effects of a disaster is determined by the extent of someone or a community's vulnerability to the hazard.

Consequently, Hazards in themselves do not constitute disasters but are increasingly dynamic and with highly varying potential impacts.. Hazards can be classified into three broad categories:

i. Natural hazards
ii. Technological hazards
iii. Environmental degradation

It should be noted that all communities, be it rural or urban, is vulnerable to hazards. However, different regions will be more prone to certain types of hazards than others. Natural hazards are those triggered by climatic and geographical variability, which are at least partly beyond the control of human activity (Yab, 2011).Technological hazards represent dangers originating from technological or industrial accidents, dangerous procedures, infrastructure failures or certain human activities, which may cause the loss of life or injury, property damage, social and economic disruption, or environmental degradation. While degradation of the environment are processes induced by human behaviour and activities that damage the natural resource base or adversely alter natural processes or ecosystems. Potential effects of these are varied, and may contribute to an increase in vulnerability and the frequency and intensity of hazards.

Impact of Disaster

Disasters are often described as a result of the combination of the exposure to a hazard, the conditions of vulnerability that are present, and insufficient capacity or measures to reduce or cope with the potential negative consequences. Disaster impacts may include loss of life, injury, disease and other negative effects on human physical, mental and social well-being, together with damage to property, destruction of assets, loss of services, social and economic disruption, and environmental degradation (UNISDR, 2009). Disasters do not respect persons and the trail of destruction that they leave behind is a common occurrence. Their effect or impact is usually felt across all sectors in society, at the community or individual level, which has led to push for the more multi-sectored approach to prepare and respond to disasters. The impact of a disaster may either be a direct or indirect one, its effect trickling into most homes and families in the community. The more obvious physical impact of disaster leads to the socio-economic and emotional impact felt by the community. However, the intensity of the impact of any disaster is dependent on the preparedness level of the community or nation, while factors that increase the intensity of the effect of a disaster are poverty, environmental degradation, population growth, and lack of information and awareness about the disasters that exist in the area, and the potential risk they pose to the community at large (Srinivas, 2005).The foregoing underscores the need for effective Data management and Information communication technology(ICT) in tackling disaster occurrences headlong.

Concept of Data Management

Despite the recognition that Data management is key to curbing disaster, few Economic Community of West Africa States actively manage data as an asset from which they can derive ongoing value (Evans and Price, 2012). Deriving value from data does not happen in a vacuum or by accident. It requires intention, planning, coordination, and commitment. It requires management and leadership. Data Management is the development, execution, and supervision of plans, policies, programs, and practices that deliver, control, protect, and enhance the value of data and information assets throughout their lifecycles (Evans and Price, 2012). A Data Management Professional is any person who works in any facet of data management (from technical management of data throughout its lifecycle to ensuring that data is properly utilized and leveraged) to meet strategic organizational goals (Evans and Price, 2012). Data management professionals fill numerous roles, from the highly technical (e.g., database administrators, network administrators, programmers) to strategic business (e.g., Data Stewards, Data Strategists, Chief Data Officers).

Data management activities are wide-ranging. They include everything from the ability to make consistent decisions about how to get strategic value from data to the technical deployment and performance of databases. Thus data management requires both technical and non-technical (i.e., 'business') skills. Responsibility for managing data must be shared between business and information technology roles, and people in both areas must be able to collaborate to ensure an organization has high quality data that meets its strategic needs. Data and information are not just assets in the sense that organizations invest in them in order to derive future value. Data and information are also vital to the day-to-day operations of most organizations. They have been called the 'currency', the 'life blood', and even the 'new oil' of the information economy. Whether or not an organization gets value from its analytics, it cannot even transact business without data (Evans and Price, 2012).

Much ink has been spilled over the relationship between data and information. Data has been called the "raw material of information" and information has been called "data in context". Often a layered pyramid is used to describe the relationship between data (at the base), information, knowledge, and wisdom (at the very top). While the pyramid can be helpful in describing why data needs to be well-managed, this representation presents several challenges for data management (Evans and Price, 2012).Within an organization, it may be helpful to draw a line between information and data for purposes of clear communication about the requirements and expectations of different uses by different stakeholders.

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Data Management Principles

Data management shares characteristics with other forms of asset management. It involves knowing what data an organization has and what might be accomplished with it, then determining how best to use data assets to reach organizational goals. Like other management processes, it must balance strategic and operational needs. This balance can best be struck by following a set of principles that recognize salient features of data management and guide data management practice.

i. Data is an asset with unique properties: Data is an asset, but it differs from other assets in important ways that influence how it is managed. The most obvious of these properties is that data is not consumed when it is used, as are financial and physical assets (Evans and Price, 2012).
ii. The value of data can and should be expressed in economic terms: Calling data an asset implies that it has value. While there are techniques for measuring data's qualitative and quantitative value, there are not yet standards for doing so. Organizations that want to make better decisions about their data should develop consistent ways to quantify that value. They should also measure both the costs of low-quality data and the benefits of high-quality data (Evans and Price, 2012).
iii. Managing data means managing the quality of data: Ensuring that data is fit for purpose is a primary goal of data management. To manage quality, organizations must ensure they understand stakeholders' requirements for quality and measure data against these requirements (Evans and Price, 2012).
iv. It takes Metadata to manage data: Managing any asset requires having data about that asset. The data used to manage and use data is called *Metadata*. Because data cannot be held or touched, to understand what it is and how to use it requires definition and knowledge in the form of Metadata. Metadata originates from a range of processes related to data creation, processing, and use, including architecture, modeling, stewardship, governance, Data Quality management, systems development, IT and business operations, and analytics (Evans and Price, 2012).
v. It takes planning to manage data: Even small organizations can have complex technical and business process landscapes. Data is created in many places and is moved between places for use. To coordinate work and keep the end results aligned requires planning from an architectural and process perspective (Evans and Price, 2012).
vi. Data management is cross-functional; it requires a range of skills and expertise: A single team cannot manage all of an organization's data. Data management requires both technical and non-technical skills and the ability to collaborate (Evans and Price, 2012).
vii. Data management requires an enterprise perspective: Data management has local applications, but it must be applied across the enterprise to be as effective as possible. This is one reason why data management and data governance are intertwined (Evans and Price, 2012).
viii. Data management must account for a range of perspectives: Data is fluid. Data management must constantly evolve to keep up with the ways data is created and used and the data consumers who use it (Evans and Price, 2012).
ix. Data management is lifecycle management: Data has a lifecycle and managing data requires managing its lifecycle. Because data begets more data, the data lifecycle itself can be very complex. Data management practices need to account for the data lifecycle (Evans and Price, 2012).
x. Different types of data have different lifecycle characteristics: And for this reason, they have different management requirements. Data management practices have to recognize these differences and be flexible enough to meet different kinds of data lifecycle requirements (Evans and Price, 2012).
xi. Managing data includes managing the risks associated with data: In addition to being an asset, data also represents risk to an organization. Data can be lost, stolen, or misused. Organizations must consider the ethical implications of their uses of data. Data-related risks must be managed as part of the data lifecycle (Evans and Price, 2012).
xii. Data management requirements must drive Information Technology decisions: Data and data management are deeply intertwined with information technology and information technology management. Managing data requires an approach that ensures technology serves, rather than drives, an organization's strategic data needs (Evans and Price, 2012).
xiii. Effective data management requires leadership commitment: Data management involves a complex set of processes that, to be effective, require coordination, collaboration, and commitment. Getting there requires not only management skills, but also the vision and purpose that come from committed leadership (Evans and Price, 2012). Therefore, to achieve effective data management, the following variables suffices.

Data Quality

Data quality is the accuracy and reliability of data and it is observed that an inaccurate and outdated information can lead to erroneous decisions with severe consequences. It is also noted that vulnerable persons in communities may lack access to the technology required to benefit from data-driven disaster risk reduction.

Data quality plays a critical role in the realm of disaster management. High-quality data ensures that disaster response and recovery efforts are timely, accurate, and effective. Poor data quality can lead to misinformed decisions, inefficient resource allocation, and ultimately, exacerbated disaster impacts.

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Importance of Data Quality in Disaster Management;

1. **Accurate Risk Assessment**: High-quality data enables accurate risk assessment, helping to identify vulnerable populations and areas. This facilitates better preparation and mitigation strategies.
2. **Effective Response and Recovery**: Accurate data supports effective decision-making during the response phase, ensuring that resources are allocated efficiently and that relief efforts reach those in need promptly.
3. **Policy Formulation:** Reliable data is crucial for developing policies and strategies for disaster management. It helps policymakers understand the scope and impact of disasters and plan accordingly.

Data Governance

Data governance is the process of managing the availability, usability, integrity and security of data. Data governance promotes the availability, quality, and security of an organization's data through different policies and standards. These processes determine data owners, data security measures, and intended uses for the data. Overall, the goal of data governance is to maintain high-quality data that's both secure and easily accessible for deeper business insights. In the context of disaster management, effective data governance ensures that accurate, timely, and reliable data is available to make informed decisions during the preparation, response, and recovery phases of disasters.

Importance of Data Governance in Disaster Management

1. Enhanced Decision-Making: Proper data governance ensures that decision-makers have access to accurate and timely data, which is crucial for effective disaster response and recovery.
2. Data Integration and Sharing: It facilitates the integration and sharing of data across different agencies and platforms, promoting coordinated efforts during disasters.
3. Data Quality and Consistency: Ensures high data quality and consistency, which are essential for accurate risk assessment and resource allocation.
4. Regulatory Compliance: Helps organizations comply with legal and regulatory requirements related to data handling and privacy.
5. Disaster Preparedness: Supports better disaster preparedness by maintaining comprehensive and up-to-date data on vulnerabilities and risks.

Data Security

Data security is the process of safeguarding digital information throughout its entire life cycle to protect it from corruption, theft, or unauthorized access. It covers everything—hardware, software, storage devices, and user devices; access and administrative controls; and organizations' policies and procedures. Data security uses tools and technologies that enhance visibility of an organisations data and how it is being used. These tools can protect data through processes like data masking, encryption, and redaction of sensitive information. The process also helps organizations streamline their auditing procedures and comply with increasingly stringent data protection regulations. A robust data security management and strategy process enables an organization to protect its information against cyberattacks. It also helps them minimize the risk of human error and insider threats, which continue to be the cause of many data breaches. Data security is paramount in disaster management to protect sensitive information, ensure continuity of operations, and safeguard critical infrastructure during crisis situations. This detailed discussion will explore various aspects of data security in the context of disaster management, including its importance, challenges, best practices, technologies, case studies, and future directions.

Importance of Data Security in Disaster Management;

1. Protection of Sensitive Information: Ensures that sensitive data, including personal information and critical infrastructure details, are safeguarded from unauthorized access and malicious attacks (Yab, 2011).
2. Maintaining Continuity of Operations: Secure data systems enable organizations to maintain continuity of operations even during disasters, ensuring that essential services are not disrupted (Gupta, Altay, & Luo, 2017).
3. Prevention of Data Loss: Implementing robust data security measures helps prevent data loss due to natural disasters, cyberattacks, or system failures, minimizing the impact on operations and recovery efforts (Gupta, Altay, & Luo, 2017).
4. Preservation of Trust and Reputation: Protecting data integrity and confidentiality preserves public trust and organizational reputation, essential for effective disaster response and recovery.
5. Compliance with Regulations: Adhering to data security standards and regulations ensures legal compliance and minimizes the risk of penalties or fines.

Monitoring and Auditing

Data monitoring is the process of using tools and technologies to provide continuous visibility into who is accessing which data and how they are using it. Data monitoring tools support enterprise data security governance initiatives by providing real-time insight into data activity and data access, which is essential for enforcing compliance, policies and protecting sensitive data across the enterprise. Data auditing is a comprehensive assessment of all aspects of data gathering, storage, and usage, including internal data such as financial records and external data like customer and market trend information. Each of these areas includes risks to mitigate in a way that works for an organization. Effective monitoring of progress in achieving the global targets of the Sendai

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Framework and disaster- related Sustainable Development Goals, is predicated on the availability, accessibility, quality and applicability of multiple datasets. Monitoring and auditing are essential components of effective disaster management systems, ensuring the continuous assessment of preparedness, response, and recovery efforts. This detailed discussion will delve into the significance of monitoring and auditing in disaster management, exploring their roles, methodologies, challenges, best practices, technologies, and case studies.

Importance of Monitoring and Auditing in Disaster Management

1. Assessment of Preparedness: Monitoring and auditing enable organizations to assess their readiness for disasters by evaluating plans, resources, and training exercises (Hashmi, Ahmad, & Nawaz, 2021).
2. Real-Time Situation Awareness: Continuous monitoring provides decision-makers with real-time data on disaster events, impacted areas, and resource allocation needs, facilitating timely response efforts (Gupta, Altay, & Luo, 2017).
3. Evaluation of Response Effectiveness: Auditing response activities helps identify strengths, weaknesses, and areas for improvement, enabling organizations to enhance their response capabilities for future disasters (IFRC, 2018).
4. Resource Allocation Optimization: Through monitoring, organizations can track the utilization of resources during disaster operations, ensuring efficient allocation and preventing shortages or overages (IFRC, 2018).
5. Learning and Adaptation: Continuous monitoring and auditing foster a culture of learning and adaptation, where organizations can implement lessons learned from past disasters to enhance future preparedness and response (Gupta, Altay, & Luo, 2017).

User Training and Awareness

Becoming a data-aware organisation means being able to see data opportunities and risks and translate them to actions. This implies that there is need for an organisation to look at projects from the data point of view and engage the services of data specialists who can put that perspective into practice. However, this requires constant feedback between programme specialists and data specialists. There is no doubt that the availability and reliability of data-sets is a part of the challenges faced by authorities. Therefore, the sustainable efforts made by the scientific community, the governments, the international community and the other stakeholders for improving the availability, use and interoperability of disaster data is a core factor of the overall process for disaster risk reduction and increased resilience.

User training and awareness play a crucial role in disaster management, ensuring that individuals, communities, and organizations are equipped with the knowledge, skills, and resources to effectively prepare for, respond to, and recover from disasters. This comprehensive discussion will explore the significance of user training and awareness in disaster management, covering their importance, methodologies, challenges, best practices, technologies, and case studies.

Importance of User Training and Awareness in Disaster Management

1. Risk Reduction: Training and awareness programs empower individuals and communities to identify and mitigate risks, reducing the likelihood and impact of disasters.
2. Effective Response: Well-trained individuals can respond promptly and effectively during disasters, minimizing loss of life, injuries, and damage to property.
3. Community Resilience: Enhancing awareness and preparedness fosters community resilience, enabling communities to bounce back quickly from disasters and adapt to changing circumstances.
4. Resource Optimization: Adequately trained individuals utilize resources more efficiently during disaster response and recovery efforts, ensuring that resources are allocated where they are most needed.
5. Psychological Preparedness: Training and awareness initiatives also address psychological aspects, helping individuals cope with stress, trauma, and uncertainty during and after disasters.

Concept of Information Communication System (ICT-System)

Technological sophistication and advancement have long been recognized as critical elements of economic and social development. Thus, in the 21st century, policy makers have directed their attention toward the emphasis on and approach toward technology, including specifically information and communication technologies (ICT) across various systems of developed and developing countries (Chen, 2013). Information Communication Technology (ICT) is defined as “skills around computing and communications devices, software that operates them, applications that run on them, and systems that are built with them” (Wilson *et al*., 2014). Information and communication technology refers to: Information channels such as World Wide Web, online databases, electronic documents, management and accounting systems, internet, etc. Information dissemination channels such as email, electronic discussion platforms, e conferences and the use of mobile phones etc. Hardware and software used to generate, prepare, transmit and store data, such as computers, radio, TV, computer programs/tools, etc.” (Ostinsvig, 2006; Wilson *et al*., 2019).

The unprecedented impact of Information and Communication Technologies (ICT) on nearly every facet of human endeavour has continued to attract interests by individual and organizations to explore these technologies for specific cause. ICT is increasingly being used in promoting democracy and human rights issues: to mobilize and strengthen solidarity, increase communication among interest groups and share information more quickly. There is no doubt that ICT deployment in developing countries has sparked

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growth in citizens' ability to communicate and share ideas (Wilson et al., 2014). The enormous benefits of ICT lie in what it can be used for and how it can be used for the management of information. One of the benefits of ICT usage is its capacity to integrate information from different part of an organisation. While the key consideration is not in which technology to implement, but rather how to use and combine it with other channels of communication" (Wilson *et al*., 2019). The use of technology in disaster management is expanding; "Communications media, including the Internet, cell phones, radio and television, have witnessed astronomical growth People now listened to their radios, watched their televisions and awaited word on what they should do during and after disaster. For example, Radio and television broadcasts were often used to keep the public abreast during and after disaster (Ostinsvig, 2006, Wilson *et al*., 2019).

Meanwhile, new developments in information and communications technology are given credit for both improved risk assessments and real-time disaster management, "including applications of satellite remote sensing, Global Positioning Systems (GPS) and Geographical Information Systems (GIS) (Wilson *et al*., 2019). The revolutionary potential of ICTs lies in their ability to instantaneously connect vast networks of individuals and organizations across great geographic distances, and facilitate fast flows of information, capital, ideas, people and products. With the ICT, in particular computers, the Internet and mobile phones, the constraints on the place and time for interaction have eased considerably.

CONCLUSION

The frequency and severity of disaster events among Economic Community of West Africa (ECOWAS) member states is becoming a recurring decima with the attendant loss of lives and properties on an unprecedented scale that has left, families communities and the nations at large in a state of agony and helplessness. Though, most times, these disasters are natural, that does not in any way, isolate the necessity of the need for the government of ECOWAS member states to pay more attention to the use of Data and ICT for effective monitoring and information dissemination with regards to nipping in the bud, disaster risk occurrences. The proactiveness of agencies responsible for the reduction of disaster risk among ECOWAS member states through their in-depth knowledge of Data management and ICT can go a long way in enhancing disaster risk incidents reduction in their various country.

SUGGESTIONS

Base on the foregoing, the following suggestions are hereby made;

1. Strategic plan should be put in place to improve Data management in pre/post disaster emergency situations.
2. Data management and ICT should be incorporated in the day-to-day operations of emergency management agencies.
3. Organisations should embrace Data management and ICT for the purpose of enhancing proper supervision, policies, programmes and practices that deliver control, protect and enhance the value of Data and information dissemination.
4. Disaster management agencies should enhance Data management practices by implementing a robust data accuracy, consistency and completeness checks.
5. Government and disaster management agencies should improve communication systems, develop local systems for disseminating warning messages and ensure a two-way flow of communication.

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