Information Communication Technology: A Better Tool for Disaster Management in Nigeria:
Citizen awareness and participations

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Abstract- **Disasters which may come as natural or man-made have realized boundless inconceivable annihilations to lives and properties. Seismic tremor, Flood, Volcanic Eruption, Tornado, Tsunami, Wildfire, Drought, Hailstorm, Heat Wave, Hurricane, Epidemic, Famine, Limnic Eruption, Mudflow, Solar Flare and different other debacles. Flood which is the most persistent in Nigeria had had over the last two decades more than 1.5 billion individuals murdered while more than 81 million other became homeless. It has been recognized in the most recent two decades that, while natural disaster cannot be totally avoided, the effects can be moderated through timely sharing of disaster warnings among the vulnerable populace. Information and communication technology should be considered critical infrastructure and given careful consideration in disaster management planning. This paper introduces a blueprint of the current condition of information and communications technology infrastructure in Nigeria as it identifies with disaster administration and management and also highlights issues for thought it likewise contains suggestions to guarantee that the potential of information and communications technologies in disaster management is fully realized. Section 1 is the introductory part section 2 is the objective, segment 3 presents related works, 4 presents issues on information and communications technology applications for disaster management in Nigeria, 5 significance of this paper, 6 exhibits the suggestions while the conclusion is introduced in segment 7.**

Keywords---Disaster management, information and communication technology.

I. INTRODUCTION

The inception of disaster goes back to the start of humankind and that clarifies why at whatever point the issues of disaster and calamity administration are said; they are generally examined in connection to humanity and its surroundings. Throughout the years, there have been lamentable events on the planet. Disaster happens all over the place, The Indian Ocean Tsunamis in Sri Lanka 2004 and Pakistan tremor 2005, the northern Japan quake 2014, Malaysian earthquake 2015, Tohoku earthquake and torrent 2011, Nigerian flood 2014, Boko-haram Bomb impact in Nigeria, Indian Heat wave 2015 and so forth.) it might be

common or man-made and when it strikes, it sees no difference amongst developed and underdeveloped countries. From America to Europe and Africa to Asia, there is no a piece of the world that has not encountered one type of calamity or the other. Environment and individual's security are obligation of the Government and disaster relief officers, framework for effectiveness of disaster warning system must be put in place.

Previously, disaster management planning had been centered on regions such as, power, water and sanitation, among others. Shockingly, there are numerous cases in which communication services are not measured as a need when there is absence of access to these essential services. Notwithstanding, it is regularly access to accurate information that encourages the reclamation of the services and calm societal turmoil after a calamity. In a disaster management planning, information and communication systems may not seem, by all accounts, to be as essential as access to clean water, nourishment and sanctuary, but access to relevant and timely information and communication helps promote more efficient disaster response [1] Therefore, for disaster management, thought must be given to uniting important infrastructure components and making arrangements for risk systemically. In order for information to be communicated, supporting s infrastructures, such as institutions and policies, must be available, accessible, and dependable.

Flooding which is the most repeating disaster in Nigeria is generally brought on by either climatic or non-climatic variables in this way prompting up river floods, flash floods, urban floods, sewage floods, glacial lake outburst floods and coastal floods[2].In the historical backdrop of flooding in Nigeria, the most exceedingly bad experience was recorded in the middle of July and October 2012 when 363 individuals lost their lives, 2.1million individuals across ten states were dislodged and 18, 282 were harmed [3]. The yearly repeat of flooding in Nigeria with terrible results serves to outline the country's ill-preparedness and lack of efficient disaster management plan by the government and the appropriate authorities. Especially, communication which is a vital piece of calamity management techniques has been seen to be inefficient

II. OBJECTIVE OF THE RESEARCH

The objectives of this paper is to present the application of ICT to develop an effective communication system through the information communication technology to help out in disaster response and management and development of the public as an additional means/sensor in communicating disasters information in Nigeria
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III. RELATED WORKS

A. Communication information technology

Generally, communication is a key device in the everyday transactions among individuals and it has especially been perceived as one of the necessities in conveying disaster and crisis circumstance to all partners in catastrophe administration procedure while promoting timely understanding of the issues at stake among the vulnerable populace. This clarifies why, in this paper, communication will be seen as the gathering, preparing, storage, recovery and transmitting of disaster related information to people and gathering of helpless individuals who need them to make quick move in order to pre-empt and alleviate a potential disastrous situation [4]

As indicated in [5], the approach of advanced camera and cellular telephones with camera offers the likelihood of making photos more open by distributing them online or sharing them utilizing using social networks and applications. Flickr and social networks sites like Facebook permits its members to store, sort, hunt and offer photographs and pictures by means of the Internet. This aids in information sharing in disaster management

The integration of the communications technologies has brought enormous possibilities to users. Through the Laptop, Palmtop, and Cell telephones, emails can be conveyed everywhere throughout the world, especially to persons in a debacle areas for safety. The 21st century has turned out to be spaceless and ageless, with the use of GPS. Anyone could be contacted at anyplace and at whatever time.. They can likewise be profitable, valuable and reliable friends in solving fuzzy or not clearly defined problems and issues.

In the world wide contest and especially in Nigeria, the media of communicating information have seen tremendous changes relating to development, innovation, scope, work force and administrative capacity. The satellite evolution technology has further increased the open doors and interoperability of both information and communication technologies therefore, making the gathering, handling, storage, recovery and dispersal of mass information from sender to beneficiary quicker and more reliable than it was ever before [6]

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B. Disaster management

The idea of disaster management can't be genuinely clarified without first explaining "disaster" for proper clarification. [7] explains that disaster is a sudden natural or man-made situation capable of provoking widespread human, material, socio-economic and environmental destruction far beyond what the affected communities can cope with.

All inclusive, the human and economic losses occurring from disasters are typically complex and unpredictable as it scarcely spears any segment. As indicated [2], somewhere around 1971 and 1995, flood which is the most recurrent of all disaster had influenced more than 1.5 billion individuals or 100 million yearly with 318,000 put to death and 81 million homeless. While remarking on the overwhelming effects of natural disaster, [8] notes that flood alone add to around 39 percent of worldwide casualty within the period. It has been noted that disaster obstruct and has incredibly damage on the health and wellbeing state of the individuals and extend worldwide neediness level as an aftereffect of harms to organizations and rural items.

C. Role of ICT in disaster management: The Nigeria contest

In minimizing disaster effects on helpless individuals, Communication is seen as the nexus that anchor the connections among the four components of disaster management, to be specific these are: mitigation, preparedness, response and recovery. As indicated by[9] and [10], there are 152 radio stations, 116 TV, 116 TV channels,
40 high quality TV channels, 143 daily papers and 25 magazines in Nigeria. Aside from daily papers radio and TV, the satellite innovation has additionally brought forth web, cell telephones, fax, email and other recently rising social networking sites all of which have demonstrated effectiveness in information dissemination and prompt feedback mechanism. In addition, articulate ladies, charismatic opinion leaders, powerful religious pioneers, theatre groups and mobile cinema, theater have been utilized and ought to keep on being utilized successfully in rural communities and other part of the country as information channels [11] and [12]. [6] concurred with this line of thought referring to the case of print media which they contended may not have as much effect among the rural populace who are basically illiterate and ignorant people; the same deficiency is seen in Television broadcast which may not be compelling as best message transporter to the grassroots where more than 70% of the populace live without access to electricity

D. Disaster management, Response and Recovery

Disaster response and recovery are the overall quick moves made by government, agencies and disaster management experts to meet the fundamental needs of disaster casualties until more permanent and sustainable arrangements are worked out [13]. The objectives, as indicated by [14] are to ensure the survival of significant number, restore key

services as fast as could reasonably be expected, repair and replace damaged infrastructure, reactivate the financial and economic activities in order to minimize recurrence. Response and response activities comprising of giving early cautioning to the individuals around the disaster prone regions, evacuation of casualties, inquiry and rescue, appraisal, logistics and relief and help distribution, securing the affected zone and individuals, restoration and reconstruction [15]

E. Disaster management people as sensor for communicating occurrence in Nigeria

It is remarkable that there were less than 20 million fixed telephone lines crosswise over Africa in 2000, however by 2012; there were almost 650 million cell telephone subscriptions (the world-bank group). [3] opine that disaster community is relied upon to enlighten citizen, caution people, and inform the whole group to upgrade the support stakeholders attempt in the disaster management procedures in order to make down to make quick moves to secure lives and property from natural and man-made dangers

It is of great importance to repeat here that the achievement of the four phases of disaster management is reliant on effective, clear and prompt spread of disaster information dissemination not only amidst disaster manager but to be spreadth as well as to all the important disaster vulnerable people.

As seen in [14] disaster communication can be grouped into two sections, the first is the part which incorporates technologies and advancements that encourages free stream of information on radio and TV, phones (fixed and mobile), short message service, messages, online networking site (face book, twitter, blog) and their satellites emotionally supportive network is an extremely helpful part of communicating occurrence. For a country like Nigeria that witness rehashed frequencies of flooding, disaster cautioning includes telling the residents of disaster inclined regions of the approaching disaster, the evaluated expense to lives and property and the basic requirement for them to take precautionary measure in the event so that it could be evaded.

There must be steady information sharing between emergency operation centers, emergency broadcast frameworks and cutting edge emergency responders and the communities [16] Particularly, the information managers must recognize and convey to general society past measures that wasn't fruitful in trying to moderate the effect of natural disaster.

It should highlight the desperation of moving from the unsafe territory and safeguard lives and property. Alleviating measures must be indicated, such as economic enhancement. In the supposition of [15], the disaster information must have the capacity to sensitise the government to the requirement for political and legislator intervention where needed, cautioning and getting awareness across to relief organisations and the vulnerable populace of necessary important actions

In Nigeria, distinctive stations are accessible for conveying and communicating disaster messages, the conventional electronic media, (radio and TV) and the print media (daily papers and magazines) are exceptionally effective in imparting disaster cautioning to a substantial and different heterogeneous crowd in any case, this is not without a few disadvantages.

Daily papers and magazines can't have much effect at the grassroots level where more than 56% of the populace are illiterate, they can neither read nor compose.. What about communication in the day or night when the radio and TVs are off nobody knows what go on? The amount of populace will determine what media channels must be utilized in order to achieve the intended targeted people to so as to deliver mass impact [17]. In [11] and [12], apart from the conventional mass communication organs and the present day satellite-supported media said above, there are other well arranged indigenous communication means which are utilized to disperse information to the mass provincial and urban people in times of crisis. These are women pioneers, party pioneers, religious pioneers, trade union pioneers and so on

In this modern day of advanced information and communication technologies when there are stable mobile phones that are regularly utilized by all populace as reliable and efficient communication means like cell telephones, quick cautions messages can be dispatch by making calls and sending pre-decided short message service (SMS) to more than a few individuals.

IV. DISCUSSION

A. *Emerging ICT Applications for disaster management in Nigeria*

With quickly extending utilization rates, social network applications have accomplished a central role in the online experience of users around the world. From numerous points of view, users conduct has moved from the surfing of website pages to surfing sites and applications which are centered around allowing individuals to communicate with one another and give real time information on their area. In that capacity, these technologies speak to an essential vector for the information better dissemination. In times of emergency in Nigeria social media can stand as a powerful and effective broadcasting component and in addition serve as impetus for citizen reactions in form of response. Recently in Japan the tsunami disaster that occur covering a wide scale, brought about broad utilization of instant message based social application such as, Twitter. Moreover, in Japan, after a tremor called earthquake, another application (Line) was introduced which makes further utilization of parcel exchange systems. The application experienced quick uptake, underscoring the estimation of social media applications and their transformative impact on communication. Since these systems are less resource consuming than other advances, they offer a convincing choice which ought to be considerably considered in managing disaster [1]

Propelled readiness and preparation is fundamental and essential in a nation like Nigeria so as to exploit these equipment, making social networking an essential piece of e- versatility planning and disaster management [1]

Numerous disaster management organizations have sought after the invention of applications for cell phones and all mobile devices so as to give a reasonable and secure communication mechanism for coordination with the general population. These arrangements influence the portability and flexibility of convenient gadgets. While more costly to create than utilizing the existing innovation, these methods offer a convincing choice which ought to be deliberately considered. [1]

With this, debacle planning ought to encourage a systemic reaction that incorporates preparing and educating human to build up for key times of crisis, for example, ICT controllers, policymakers, legislators and security specialists responsible for ensuring protection worldwide should always be at alert. Additionally, collaboration of government and the private sectors is important keeping in mind the end goal to legitimately oversee the management of ICT infrastructures with the involvement of resilience building, mechanical control frameworks, identity management, Internet root name server administration and regulation of spam. Trainings exercises should likewise address non-State characters like non-governmental associations, the educated community and the specialized technical groups [4]

Different disaster happens in diverse countries of the world at distinctive events beyond national and worldwide borders regardless of the weather it's a developed, developing or under developed country. In recent decade, the world saw the Tsunami, seismic tremors, sea tempests, violent winds, dry seasons and a few other common disasters. Neither man nor man technology could keep them from happening however their effect can be managed and minimized through the ICT [18]. ICT assumes a vital role of forecasting calamity, expecting, communicating and disseminating disaster information to occupants and citizens, and guaranteeing them a fast communication system after the disaster to both government and non-government organizations for help materials. Through ICT, viable disaster risk reduction measures can be executed [19]

V. SIGNIFICANCE OF THE STUDY

This study has made some unobtrusive commitments to knowledge, which are deserving of note, (As Nigeria is Currently known as the quickest developing telecoms Nation on the planet with around 76 million connected lines, which is around half of the whole populace of the nation [6]

Firstly, that Nigeria as a multi-ethnic and multilingual society with more than 250 dialects and 173m or more populace [6] requires more than print and electronic media to viably convey disaster messages to the rural communities of large portions of people which are the most vulnerable in times of disasters and crisis. Accordingly, in contemporary time of satellite innovation and an extensive variety of information and communication organs, disaster correspondence could only be effective by utilizing other media of information which are social network sites (face book, You tube, Internet, twitter, blog, PC mixed media and CD-ROMS), and indigenous media which are gong, town proclaimer, pioneers, houses of worship etc

Furthermore, this study has concentrated on the utilization of information communication infrastructures for emergency awareness as it serves as instruments to encourage disaster officials' use of "social sensors" for crisis awareness. Moreover this study recommend that a couple of people in Nigeria can develop as dynamic "information center points," serving as information representatives and serving as information broker as the wellsprings of information falls [20] Dynamic users with historical successive commitments can serve as trusted source of information in times of emergency occasions where precision is a need

VI. RECOMMENDATIONS

As Nigeria has founded the National Emergency Management Agency (NEMA) with her primary responsibilities as coordination and facilitation of disaster management efforts, with a view of reducing loss of lives and property and to safeguard lives from hazards [21] and some other responsibilities as: preparing and mitigation of disaster; creating the awareness, mobilizing and deploying emergency worker and putting in order all the necessary facilities for response; assessing and estimating disaster damage and requests; Managing Disaster Management funds; Publication of necessary Information to the press and citizen to their enlightenment; and policy/guidelines formulations for citizen in the country, it is therefore in the opinion of this paper

That an expanded utilization of ICT instruments in of the nation and its environ by the expert and disaster management organizations are profoundly prescribed for the improvement of a effective communication framework to help in the time of disaster management and preparedness [22][23]

That keeping in mind that amplifying the ICT infrastructural utilization for disaster management, Coordination between national PC information base, crisis response groups and disaster management organizers ought to incorporate forecast
,disaster cautions, and responses in the system so as not to underestimate another form of disruptive event. [1]

That Information sharing among the government parastatals, disaster management offices, non-government associations, the private sectors, groups of community people and the media hence need emerges for regular routine to pre-determine disaster and rebroadcast among concerned people and communities keeping in mind the end goal for making them take necessary and common comprehension of each other's duties in saving lives

NGOs (Non-governmental organisations) and global organizations ought to give supportive advice of retraining the general public and masses in the area which disaster has been forecasted to happen making them see reason to conveying the information to others through their social media and applications

That there is the dire urgent requirement for specific retraining of environment and safety journalists on the most recent pattern in covering the coming event. There ought to be provision for information sharing among the government, the public and private sectors amid times of emergency as a feature of disaster management arrangement.

That the international standard listed below as defined by The International Telecommunication Union (ITU)[24] should be considered before and after disaster occurrence i.e.

- Following the International Emergency Preference Scheme (IEPS), which guarantees that calls made by those included in coordinating and arranging HELP and RELIEF OPERATIONS get special treatment on public network
- ITU thinks of it as crucial to guarantee that women are additionally occupied with disaster response programs, in light of the fact that in numerous groups, women frequently are the essential communicators and essential guardians and are more prone to adhere by notices and arrangement for disasters.[24]

It is basic subsequently that the Nigerian Governments and disaster help organizations include women in their disaster readiness programs [1] that the Public and Private Partnership (PPP) activity is proposed for ideal result to avert disasters.

VII. CONCLUSION

From the above, we can conclude two vital actualities. One is that the frequency of risk does not automatically lead to disaster and loss of live, and that though natural disaster can't be avoided however their social and economic effects on lives and property can be impressively minimized. The new technology innovations has made it conceivable and convenient to significantly identify any form of disaster, recognition of disaster-prone zones and conveying successful cautioning message about the danger to vulnerable communities in adequate time so that the occupants could take essential measures to prevent or avoid the negative effects. While so many developed countries have recorded noteworthy achievement in disaster management, the underdeveloped ones like Nigeria have not gained much achievement.

REFERENCES

[1] Economic And Social Commission For Asia And The Pacific Committee On Information And Communications Technology," Information And Communications Technology As Critical Infrastructure For Enhanced E-Resilience And Disaster Risk Management" Fourth Session Bangkok, 14-16 October 2014,
Item 6 Of The Provisional Agenda*

[2] E. Collins and L. Sampson "The Impact of Climatic Change on Insuring Flood Risks" Australia: Institute of Actuaries(2007), p.1-38..

[3] National Emergency Management Agency National Disaster Management Framework (NDMF) Accessed 10/10/2013
http://www.preventionweb.net/files/21708nigerianati onaldisaste rmanagement.pdf

[4] R. Samarajiva K ,Malathy P.S Anderson and Z Ayesha. "National Early Warning System: Sri Lanka. A Participatory Concept Paper for the Design of an Effective All-Hazard WarningSystem".http://www.lirneasia.net/2005/03n ational- early-warningsystem (2005)

[5] S. B Liu. L Palen, J Sutton., A.L Hughes and S. Vieweg. "In Search Of Bigger Picture: The Emergent Role Of Online Photo Sharing In Times Of Disaster". Proceedings Of The 5th International Iscram Conference. Usa (2008)., Pp149.

[6] Owolabi and O.Neil, "National Disaster Management in Nigeria", Accessed date: April 2009, Available at: ochaonline.un.org/OchaLinkClick.aspx?link=

ocha&docI

[7] CBSE, Natural Hazards and Disaster Management. Preet Vihar, Delhi: (2006).

[8] G.T Miller "Environmental Sciences: Working with the Earth.
New York": Wadsworth Publishing Company. (1999).

[9] J. O. Wogu "The Relevance of Information and Communication Technology to National Development: the Nigerian Experience. International Journal of Communication" No. 4Nsukka: Communication Studies Forum. (2006).

10] J. Odeh "How Media Can Enhance Democracy. The Guardian", (2007, November 22) p. 65.

[11] D. Wilson "Communication and Social Action", Port-Harcourt: Footstep Publications (1997).

[12] O.J. Kalejaye, O.A. Atofojomo, and A.T Odunlami "History of Nigerian Mass Media, Lagos: African Resource Communication" (2006)..

[13]C. Warfield, Khan and Khan. "The Disaster Management Cycle" Accessed on 8/10/2013
http://www.gdrc.org/uem/disasters/i-dm.cycle.html

[14] VUSSC, "Introduction to Disaster Management. Canada: Virtual University for Small States of the Commonwealth" (2012)
www.col.org/sitecollectiondocuments/disaster_man agement_ver sion.pdf

[15] M.E Hodgson and Palm, R. "Attitude towards Disasters: A GIS Design for Analyzing Human Response to Earthquake Hazards, Geo-Information System, July-August, (1992).p. 41-51

[16] S. Yodmani, S. and D. Hollister "Disasters and Communication Technology: Perspectives from Asia. Paper Presented at the Second Tampere Conference on Disaster communication",(2001)..

[17] A. Lanihun, "Communicating for Development Purposes: Gender Perspective". In Soola, E.O (ed.) Communication for Development Purposes, Ibadan: Kraft Books Limited. (2003)

[18] Apt-Itu "Meeting on Role of Ict For Disaster Reduction", 28 February 2005, Bangkok, Thailand, Access Date: April, 2010, Available At: Http://Www.Itu.Int/Wsis/Docs2/Pc3/Plenary/Apt-Itu-Disaster-Relief.Pdf