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ANALYSIS OF RAINSTORM DISASTERS AND MANAGEMENT IN ADO EKITI, NIGERIA

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ABSTRACT
The continuous interaction of man and the environment has progressively created an intricate complexity which now constitutes the most challenging environmental problem of mankind in this 21st century, particularly the natural disaster which is rampant in developing countries. The various human activities in these developing countries and Nigeria in particular have also made many Nigerian cities to experience vulnerable rainstorm disaster. This Paper therefore takes note of the impact of wind/rainstorm disaster on the socio economic system of Ado Ekiti including the responsible factors with the alleviation approach of mitigation measures as gap to fill. Hence, the study which is empirical in nature, made use of oral interview and questionnaire to collect data on environmental, physical and socio economic factors responsible for rainstorm disasters in Ado Ekiti which are subjected to descriptive analysis. Findings indicated that many old residential buildings particularly the roof structures and electricity poles are much rated vulnerable to rainstorm disaster. The people affected most are equally low income group while government has spent a lot as relief package for them. The study concludes that it is high time we approach rainstorm disaster with practical solutions and good policy that will serve as an appropriate mitigation to rainstorm disasters rather than giving relief packages yearly to the disaster victims.
KEYWORDS: *Climate Change; Urbanization; Wind/Rainstorm; Disaster; Mitigation*

1. INTRODUCTION

Generally, disasters by definition are dramatic, sudden and unscheduled events of human induced actions or natural hazards that have a significant change in circumstances over a relatively short time and causing considerable material damages which interrupt the normal functioning of an economy and of society in general (Otero and Marti, 1995) It is equally noted that disasters don't just occur; they are usually triggered by man's varying influences or developmental activities which can even lead to loss of life and property (Tall et al 2013).

The hazardous phenomenon of different types and magnitude has global dimension. Amongst the various types are meteorological, hydrological, chemical, industrial, technological hazards. In Nigeria, meteorological hazards which are prominently associated with weather and climate include tropical storms, hurricanes, cyclones and typhoons. As a matter of fact the storm which is a symptom of climate change can be defined as a very strong wind accompanied with little rain or snow It is equally considered as regular feature of our weather system in Nigeria simply because there is hardly any year that disaster caused by rainstorm is not reported across the country.

Rainstorm and its projected impact on the environment and socio economic system now constitute the most important environmental problem which the adverse affects cut across human and natural recourses that mankind faces as we begin 21st century.(United Nations 2009) For instance, the occurrence constitutes destruction of many houses and trees; brings psychological trauma and economic losses to many people. At the same time the occurrence creates unforeseen or unbudgeted expenditure on the part of the government and

individuals as financial embarrassments to the victims.

The global explosive rate of urbanization and the increasing threat of natural disasters gave room for a paradigm shift in the approach to disaster management that was used to be of post disaster relief and rehabilitation to pre disaster prevention and preparedness of sustainable live hood However, the level of compliance is very low in Nigeria. It is against this background that this study is designed to examine the level of compliance with particular reference to the impacts of wind/rainstorm in the study area of Ado-Ekiti, with special emphasis on destroyed buildings and social infrastructure between 2007 and 2017.

2 CONCEPTUAL FRAMEWORK AND LITERATURE REVIEW

2.1 Conceptual Framework:

This study is hinged on both Disaster Concept (DC) and Disasters Reduction Management (DRM). The disaster concept is the product or the combination of hazard a potentially damaging physical event and vulnerability of the insufficient capacity or measures to reduce the potential chances of risk. See fig 1 below

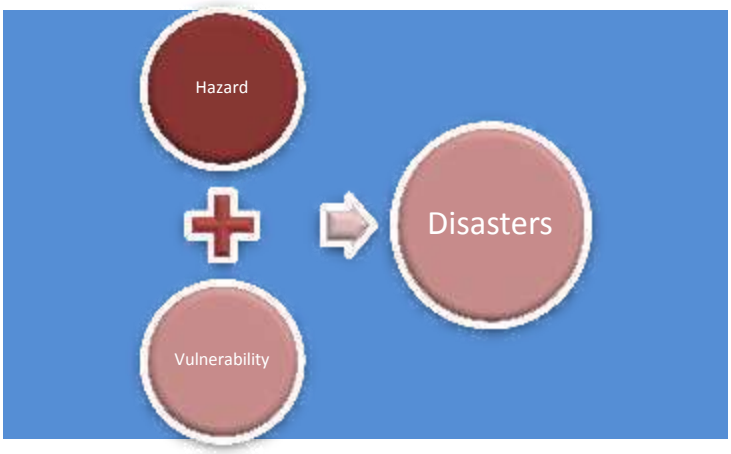

Figure 1: Disaster Concept.

However, Disaster Risk Management is the sum total of all activities, programmes and measures which can be taken up before, during and after a disaster with the purpose of avoiding a disaster, reducing its impact and recoveingr from its losses. These are classified into three stages as follows:

Pre-disaster stage is an assessment stage to identify and diagonise the likely risk to avoid and limit the adverse impact through preventive measures and mitigation There is also the need for adequate preparedness to ensure effective response through awareness campaigns, preparation of disaster management plans and strengthening of existing weak structures.

Disaster occurrence and response stage is designed as a temporary measure to minimise suffering in terms of evacuation of people and properties from the threatened location and provision of immediate assistance for the affected victims.

The post disaster stage is all about recovery and reconstruction with a view to restore infrastrucure and services. At the same time to ensure proper relocation and ressttlement

All these stages are identified with eight major elements namely,development, prevention, mitigation preparedness disaster impact response rehabilitation and reconstruction.All the elements operate as a circular system as shown Figure 2.

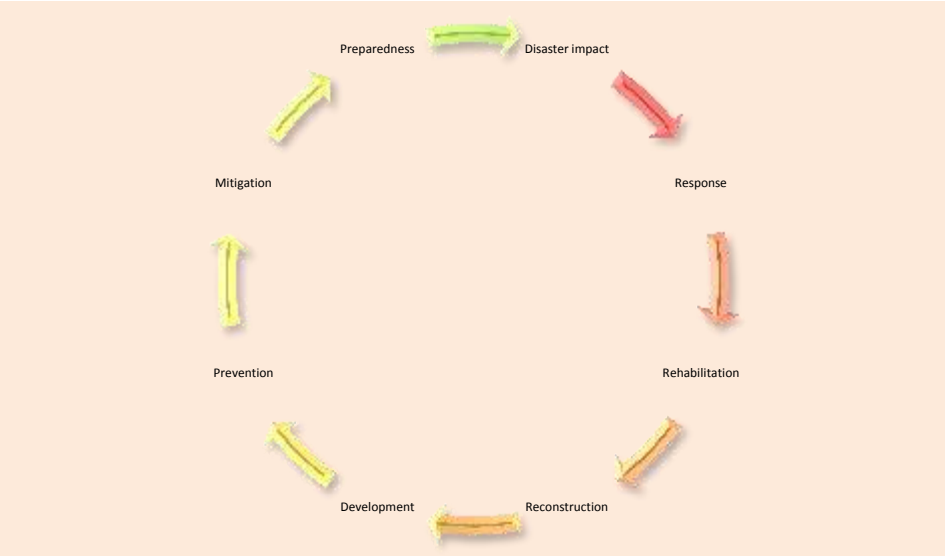

Figure 2: Disaster Risk Management

2.2 Review of Literature:

Disasters are as old as human history. The old phenomenon that continues to occur without warning is perceived to be on an increase in their magnitude, complexity, frequency and economic impact throughout the world. Globally, the number of natural disasters is increasing in both intensity and frequency (4,000 between 2003 and 2012, compared with 82 in 1901-1910.(UNDP 2014) It is also noted that during the second half of the 20th century, more than 200 worst natural disasters occurred in the different parts of the world.(India Ministry of Home Affairs 2011) In 2014, there were 980 natural disasters (Loss events) worldwide,of which 41% were meteorological (storms), 42% were hydrological (floods), 9% were climatological (heat waves, cold waves, droughts, wildfires) and 8% were geophysical events (earthquakes and volcanic eruptions (Munich Re 2015).

Generally, risk of natural disasters come from, high population density increasing poverty and inequality, crowded living conditions and the siting of residential areas close to hazardous industry or in places exposed to natural hazard as well as failures in governance.(World Bank 2005)

In the last few decades, there have been high rate of urbanization across the globe which has not been evenly distributed. Available records clearly stated that the yearly average of absolute number of urban dwellers were 57millions between 1990 and 2000 and jumped to 77millions between 2010 and 2015.The records also showed that 43 per cent (2.3 billion) of the world's population lived in urban areas in 1990 and this had grown to 54 per cent (4 billion) in 2015 (UN Habitat 2016). With the current pace of growth, the world's population living in urban areas in 2018 is 55 percent of 4.2 billion total world population which is expected to reach 66 percent of almost 6.7 billion world population by 2050, (UN DESA 2018), As a matter of fact, developing countries has the highest growth rate between 1995 and 2015 with the least in developed parts of the world of which Africa being the most rapidly urbanizing is about 11 times more rapid than Europe (UN Habitat 2016).

The failure to prepare for this unprecedented and inevitable urban explosion amounts to serious poverty and inequality worldwide. This made global poverty to become an urban phenomenon of which in the year 2002, 746 million people (15.1 percent) were living on less than $2.00 a day (Ravallion 2007), Available record revealed a global decline of urban poverty rate to 11.6 percent at less than US$1.90 a day with Africa continent having the highest rate of 33.6 percent in 2008. (World Bank in 2013)

The level of poverty makes inequality to remain high in many developing countries around the world. For instance, explained that between 2008 and 2013 developed countries experienced reduction of inequality as against developing countries that tend to exhibit higher levels of inequality due to roughly evenly split of increasing and decreasing inequality (World Bank 2016). The state of poverty and inequality no doubt made one-third of the world's urban population to live in slums of overcrowding without access to adequate shelter, clean water, and basic sanitation and environmental degradation. In fact, nowhere is the threat of urbanizing poverty graver than in Africa, which has the fastest rate of urban growth and the highest incidence of slums in the world (Halfani 2007)

It is equally important to note that the formation of slum as a result of poverty and inequality contributes a lot to vulnerability of natural disasters. This is simply because the more the urban poor, the more vulnerable to the spread of disease and other natural disasters as result of slum environment. Apart from the increasing concentration of people, expansion of slums, deforestation, blocking of natural derange, soil erosion, and rising sea levels that increase the risk of

disasters others factors are poor preparedness, inadequate governance, and the inappropriate use of resources (Gencer 2013), At the same time, increasing environmental degradation, risk of extreme weather and geological events due to increased population promote vulnerability and reduced resilience to risk disasters (Lankao Quin 2011) The lives and livelihood activities of the urban poor are always hard hit by disasters even if the sad event were on a small scale compared to those that usually occur in developed countries of the world (Birkmann, 2011) while the level of risk and vulnerability in urban areas of developing countries is attributable to socio-economic stress, aging and inadequate physical infrastructure (Henderson 2004)

The occurrence of natural disasters particularly rainstorms which are usually triggered by man's varying influences or developmental activities are extremely devastating event causing huge economic, social and environmental losses and even leading to loss of life in many cities all over the world. (Tkacik 2013). At the same time the phenomenon keeps many homes and urban environments of many parts of the world in miserable conditions (Raetzo 2006). In fact rainstorms are regular feature of weather system in Nigeria cities as there is hardly any year that disaster caused by rainstorm is not reported across the country. For instance. in Calabar, Cross River State, 1132 persons were displaced with 383 houses destroyed by flood, landslide, windstorm and fire. In Delta State, flood and windstorm destroyed 500 houses and displaced 1225 persons. Likewise, in Kwara State, rainstorm displaced 9,000 people and destroyed many properties while in Yobe State, 800 households were displaced with many properties destroyed by wind rainstorm (Ologunorisa 2012).

The vulnerability of an individual or society to Natural disaster cannot be completely stopped. However the devastating consequences of most hazards can be alleviated through short term coping strategies and longer term adaptations practices through building resistance and community based response to cope with the event whenever and wherever it happens (Tall, Patt, and Fritz 2013) Effective DRR can also be achieved through the participation of the affected and potential victims of environmental hazards in the planning and operations of disaster relief operations (Gilbert 2013). In operational terms, there is the need for an inventory of the inherent physical and material resources, organizational strength; knowledge and skills, of the vulnerable groups to be developed and applied to reduce the occurrence of disasters or minimize their impacts anywhere it occur (Olayiwola, 2005; Ologe, 2005;).

3 STUDY AREA AND METHOD

3.1 Study Area

Ado Ekiti ,is the study area and the city is located on latitude 7^0 40' North of the Equator and longitude 5^0 16' East of the Greenwich Meridian. The city is as well centrally and strategically located in Ekiti land to give way for maximum spatial interaction with all towns in the state. It covers an approximately area of 265 square kilometer. It has a number of satellite towns around it. To the North is Iworoko, about 16 kilometers away from the town; to the East are Are and Afao, about 16 kilometers; to the West are Iyin and Igede, about 20 kilometers and to the South is Ikere, about 18 kilometers..See figure 3

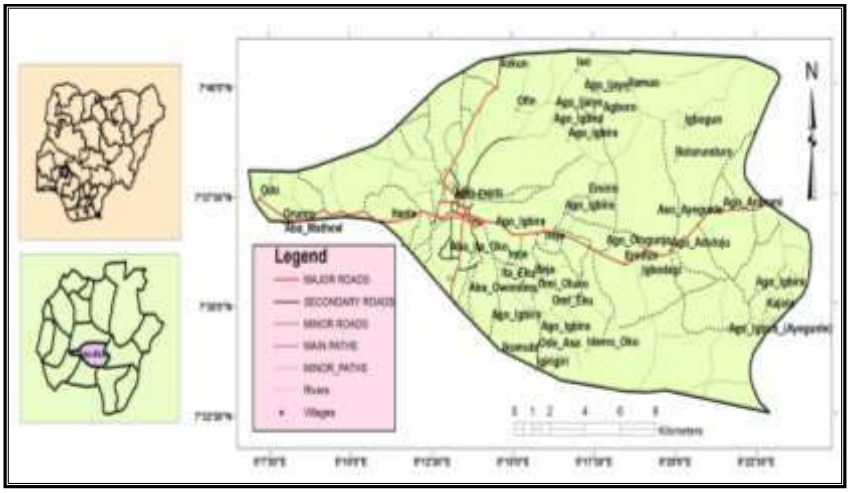

Fig3Maps of the study area: Source: Ministry of Lands and Housing

3.2 Method

This paper made used of primary and secondary sources of data. The primary data made use of 150 structured questionnaires administered with professionals and specialists of built environment at Ado Ekiti on rainstorm indicators. This was supported with relevant photography. The secondary data collected from Ekiti State Emergency Agency is on impact and relief package overtime at Ado Ekiti. The data analysis is presented in tabular format.

4 RESULT OF FINDINGS AND DISCUSSION

4.1 Result of Findings

The result of finding was purely descriptive analysis. The analysis presented the records of rainstorm overtime together with the records of professional evaluation of the various rainstorm indicators in Ado Ekiti .

The result of finding on the trend of rainstorm overtime is as in table 1. This clearly showed that about 686 buildings were affected by rainstorms between 2010 and 2018 at Ado Ekiti which amounted to an average of 86 buildings per annum. At the same time, the period recorded 1655 displaced families with an average of 207 families displaced per annum. It is also on records that amount spent on rainstorm disaster over the years in the state was over 100 million naira with yearly average of 12.75 million naira. The State Government released relief package of an average of 44 bundles of iron sheets, 21 bags of nails and 8 tons of cement to affected rainstorm victims yearly

Table 1: The General Overview of Rainstorm

	2010-2012	2013-2015	2016-2018	Total	Average
Affected buildings	237	198	251	686	86
Damaged Electric pole	9	15	21	45	6
Family Displaced	583	467	605	1655	207
Cost implication	25million Naira	30 million Naira	47 million Naira	102million	12.75millio n
Relief package	100 bundles of roofing sheet, 50 bags of roofing nails and 20 tones of cements	120 bundles od roofing sheet, 54 bag of nails and 25 tons of cement	135 bundles of roofing sheet, 65 bags of Nails and 35 tons of cement	Iron sheet 355 bundles nails 169 bags and 80 tons of cement	Iron sheet 44 bundle. nails 21 bags and 8 tons of cement

Source Ekiti State Emergency Agency 2018

The findings on the evaluation of rainstorm disaster at Ado Ekiti is divided into three major sectors namely the effects, factors and management of rainstorm. The rainstorm effects indicated that lost of properties and displacement of people are strongly affected with 87.3 percent and 56.7 percent respectively. It is also noted that there is moderate lost of life with 65.3 percent. At the same time, weak infrastructure damage dominated the town with 42 percent.

However the rainstorm factors as indicated in the table made urbanization and building condition to have moderate influence with 54.7 percent and 51.7 percent respectively. The table also indicated a strong influence of poverty, climate and environmental conditions as factors with 57.3 percent, 58 percent and 61.3 percent respectively.

Available records from the table clearly indicated that rainstorm management experienced a weak mitigation and awareness measures with 52.7 percent and 56 percent. It is also on the record that the management maintained a moderate recovery measure of43.3 percent. In fact, there is a strong intervention measure of 72 percent as management strategy in the town

Table 2: Ado Ekiti Rainstorm Indicator

		Strong		Moderate		Weak	
Rainstorm Effect	Damage to Infrastructure	32	21.3	55	36.7	63	42
	Loss of property	131	87.3	19	12.7	-	-
	Loss of life	10	6.7	98	65.3	42	28
	Displacement of people	85	56.7	56	37.3	9	6.0
Rainstorm Factors	Urbanization	33	22	82	54.7	35	23.3
	Level of Poverty	86	57.3	48	32	16	10.7
	Climate condition	87	58	63	42	-	-
	Environmental condition	92	61.3	43	28.7	15	10
	Building condition	61	40.7	77	51.3	12	8
Rainstorm management	Mitigation measures	29	19.3	42	28	79	52.7
	Awareness measures	26	17.3	40	26.7	84	56
	Intervention measures	108	72	42	28	-	-
	Recovery measures	38	25.3	65	43.3	47	31.3

Source: Author fieldwork 2018

4.2 Discussion

Generally, rainstorms disasters affect not less than 86 buildings annually at Ado Ekiti. This could be attributed to the fact that rainstorm is always associated with loss of property.. Although loss of life is not much associated with rainstorms but the disaster always involved displacement of many people of which the annual average in Ado Ekiti is 207 families and they are mostly the urban poor. The high level of poverty of the people equally tells much on the building conditions that are very vulnerable to the rainstorm disasters. This is because only those who are financially poor built with poor building material while lack of proper education on land use matters, make many to misused land by carrying out haphazard development and other activities that can aggravate degradation of land (Wahab 2013). As a matter of fact, these unbearable effects are better explained as shown in plate 1.

Source Author Fieldwork 2018 **Plate1 Building affected by Rainstorm**

Lack of proper disaster management of weak awareness campaign and mitigation measures actually contribute immensely to the intensity of the rainstorms. At the same time, the government failure to plan ahead amount to cost implication for intervention with an average of 12.5 million per annum. This disastrous economic loss is corroborated with the total cost of damage to properties (buildings, vehicles and social infrastructures) that was valued at an average of N 5.31 billon ($45 million) per year in Nigeria (Odjugo, 2009)

5 CONCLUSIVE REMARKS

Though rainstorm disaster is a natural phenomenon but this research reveals that the major effect of rainstorm disaster is loss of property, displacement of affected people and unplanned expenses which has been on increase over the years. However the result indicates that urbanization,

poverty weak building structure as well as poor landscape design of environment are responsible for the phenomenon. It is also noted that there is no any serious policy measure provided by the government to curb the rainstorm disaster apart from the government relief packages to the rainstorm victims every year. It is against this background that the following recommendations are suggested to ameliorate the disastrous event.

It is high time government strengthen the existing mitigation measures in term of rules and regulation to guild proper building development particularly the building roof design and materials for related structures like electric poles, drainage system and other components of the built environment that can withstand the combine forces of wind and rainstorms.

There is also need for total compliance to the rule and regulation through enforcement of development control in the study area in order to guide building and the rebuilding of structures.

Government should as a matter of policy consider pre disaster measure as a priority through adequate awareness campaign towards the eminent likely disasters.

Government must also make a preparedness plan to strengthen the existing weak and old structure particularly the roof elements drainage and electric poles that require replacement.

REFERENCES

1. *Birkmann, J.F (2011).Contribution of insurance data to cost assessment of coastal flood damage to residential buildings: insights gained from Johanna (2008) and Xynthia (2011) storm events. Natural Hazards and Earth System Science, 13(8):2003–2012, doi:10.5194/nhess-13-2003-2011.(cited on pp. 2, 3, 5, 36, 64, 85)*
2. *Ekiti state Emergency Agency, 2017 Data on relief materials for rainstorm affected individuals*
3. *Ekiti State Ministry of lands, Housing and Urban Development*
4. *Gencer E (2013).The Interplay between Urban Development, Vulnerability, and Risk Management. Springer Briefs in Environment, Security, Development and Peace*
5. *Gilbert, F.B. (2013). Quantifying the risk of heavy rain: its contribution to damage in urban areas. In Proceedings of the 11th International Conference on Urban Drainage, Edinburgh, Scotland, UK*
6. *Habiba, F.K. 2011). Climate change and increased risk for the insurance sector: a global perspective and an assessment for the Netherlands. Natural Hazards*
7. *Henderson, L.J (2004) "Emergency and Disaster: Pervasive Risk and Public Bureaucracy in Developing Nations". Public Organization Review: A Global Journal Vol. 4 pp 103-119*
8. *Lankao P R, Qin H (2011) Conceptualizing urban vulnerability to global climate and environmental change. Current opinion in environmental sustainability, 3(3), 142-149. Lelieveld J, Barlas C*
9. *Munich Re (2015) Review of natural catastrophes in 2014. fromhttp://www.munichre.com/en/media-relations/publications/press-releases/2015/2015-01-07-press-release/index.html (Accessed 30 December 2015)*
10. *Odjugo, P.A(2009) Quantifying the cost of climate change impact in Nigeria: Emphasis on wind and rainstorms Journal of Human Ecology 28(2): 93-101*
11. *Olayiwola, F. (2005) The Continuing Debate about Urban Bias: The Thesis, its Critics, its Influence, and Implications for Poverty Reduction, Department of Geography and Environment, London School of Economics and Political Science,*
12. *Ologee S.O. (2005) The Structure and Functions of Urban Government: The Institutional Framework of Urban Management, Working Paper No. 1, Development Administration Group, University of Birmingham, Birmingham, 129 pages.*
13. *Ologunorisa, E. (2012) climate and Public Health. Annual Review of Public Health 2004, 25: 397-418*
14. *Otero, R. C and R. Z. Marti (1995). "The Impacts of Natural Disasters on Developing Economies: Implications for the International Development and Disaster Community".*
15. *Raetzo,H.(2006).Adaptation to climate change in Switzerland ' s natural hazards management policies*
16. *Ravallion, Martin, Shaohua Chen, and Prem Sangraula. 2007. "New Evidence on the Urbanization of Absolute Poverty." World Bank Policy Working Paper 4199, Washington, DC*
17. *Taall, Patt and Fritz, (2013) "Climate, climate change and human health in Asian cities," Environment and Urbanization, Vol. 20, No. 1.*
18. *Tkacik, (2013). Strategies for Affordable environment with climate change in Nigeria. 18th Inaugural Lecture of Ambrose Alli University, Floreat System Benin-City pp*
19. *U N (2009). Disaster Risk Reduction in the United Nations*
20. *UN DESA (2018) Revision of World Urbanization Prospects produced by the Population Division of the UN Department of Economic and Social Affairs*
21. *UNDP (2014) Human Development Report 2014, UNDP, new York*
22. *UN-HABITAT (2007) Global Report on Human Settlements, 2007: Enhancing Urban Safety and Security, Earthscan, London*
23. *Wahab, B (2013) Disaster risk management in Nigerian human settlements. InWahab,B etal ed Disaster risk management in Nigerian rural and urban settlements, NITP/TOPREC*
24. *World Bank (2005) Natural Disaster Hotspots: A Global Risk Analysis, World Bank, Washington DC/.*
25. *World Bank. (2013b).Harnessing Urbanization to end Poverty and boast Prosperity in Africaan Action Agenda for transformation World Bank.org external default Wd Content*
26. *World Bank. (2016). Poverty and Shared Prosperity 2016: Taking on Inequality. Washington, DC: World Bank. doi:10.1596/978-1-4648-0958-3. License: Creative Commons Attribution CC BY 3.0 IGO*