

## GLOBAL NATURAL DISASTERS AND THEIR IMPLICATIONS ON HUMAN SUSTAINABILITY

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### Abstract

There are lots of natural disasters that plague mankind in different parts of the world. These range from natural wild fire, drought, desertification, climate change, flood, earthquake, volcano, erosion, landslide, tsunami, hailstorm and heat wave among others. These natural disasters are caused by nature and despite man's technological advancement and prodigious efforts to put a stop to them, they still ravage his habitants killing him and destroying his property. It is on this basis that this study investigates global natural disasters and their implications for man. Secondary data on the distribution of global natural disasters, their magnitude of damage, cost of such damage and lives lost were collected and analysed using percentages and times series among others. The results show that between 1950 and 2010, there were 19,370 great natural disasters causing the world \$2.1trillion with over 2,300,000 fatalities. The magnitude of destruction of these natural disasters was more in the continent of Asia, followed by North America and least in Africa. Within this period, the costliest and most fatal events are earthquake, hurricane, floods and heat wave. The 1980s and the 1990s saw the highest number of events of great natural disasters. Of all the disasters, Nigeria is currently being afflicted more by flood, wind storm, and erosion while the threat of desertification and coastal inundation are being strengthened due to climate change. It is recommended among others that for sustainable development, disaster prevention and risk management, environmental monitoring, early warning and preparedness are key factors never to be ignored by the Nigerian government in particular and global environmental management agencies in general.

**Keywords:** Natural disaster, damage, property, risk management, deaths, subperils activities

### INTRODUCTION

Disasters are multifaceted phenomena and they are open to a range of different interpretations. Disaster synonyms used by practitioners and experts have included "calamity" and "catastrophe". The definition that is provided by the UNISDR (United Nations International Strategy for Disaster Reduction) is one of the most appropriate definition: "A disaster is a sudden, calamitous event that causes serious disruption of the functioning of a community or a society causing widespread human, material, economic

and/or environmental losses which exceed the ability of the affected community or society to cope using its own level of resources" (UN/ISDR 2004). Disaster therefore is a situation or event, which overwhelms local capacity, necessitating a request to national or international level for external assistance. It could also be seen as an unforeseen and often sudden event that causes great damage, destruction and human suffering which are often caused by nature or and anthropogenic forces. Even though there is not a commonly acceptable worldwide

definition of “disaster”, there are some characteristics common to most definitions, which include; (1) Sudden, abrupt or unpredictable (2) Causing human, material, economic or environmental losses (3) Exceeding the ability of the affected community to cope with them.

The combination of hazards, vulnerability and inability to reduce the potential negative consequences of risk results in disaster. Not all disasters that occur are recorded in the United Nation’s International Strategy for Disaster Reduction (ISDR). For a disaster to be entered into the database of the UN’s International Strategy for Disaster Reduction (ISDR), at least one of the following criteria must be met:

- (1) a report of 10 or more people killed,
- (2) a report of 100 people affected
- (3) a declaration of a state of emergency by the relevant government
- (4) a request by the national government for international assistance.

Natural disasters can be divided into three specific groups, which include; hydrometeorological disasters, geophysical disasters and biological disasters. Hydrometeorological disasters are natural processes or phenomena of atmospheric, hydrological or oceanographic nature that may cause loss of lives or injuries, property damage, social and economic disruption or environmental degradation. These include floods and wave surges, storms, landslides, avalanches, and droughts and related disasters (extreme temperatures and forest/scrub fires). Geophysical disasters are natural earth processes or phenomena that may cause loss of lives or injuries, property damage, social and economic disruption or environmental

## **MATERIALS AND METHODS**

Data on different components of natural disasters worldwide were collected from various sources like EM-DAT, Munich Re Insurance and Joint Typhoon Warning

degradation. These include earthquakes, tsunamis and volcanic eruptions. Biological disasters are processes of organic origin or those conveyed by biological vectors, including exposure to pathogenic microorganisms, toxins and bioactive substances, which may cause loss of lives or injuries, property damage, social and economic disruption or environmental degradation. These include epidemics and insect infestations.

The magnitude of natural disasters can be divided into 6 categories based on the degree of damage to property and loss of lives. Category 1 natural disaster is a Small-scale event that involves loss of lives between 1 and 9 and/or minor and small-scale damage. Category 2 is a disaster of moderate magnitude that involves loss of lives ranging between 10 and 19 and/or damage to buildings and other property. Category 3 is a severe catastrophe which claims more than 20 lives and/or overall loss of more than US\$ 50m. Category 4 is a major catastrophe that involves the deaths of more than 100 people, major property, infrastructure and structural damage and/or overall loss of more than US\$ 200m. Category 5 is a devastating catastrophe within the affected region that is capable of killing more than 500 people and/or overall loss of more than US\$ 500m. Category 6 is a great natural catastrophe. In line with United Nations definitions, natural catastrophes are classified as great if the affected region’s ability to help itself is clearly overstretched and supra-regional or international assistance is required. As a rule, this is the case when there are thousands of fatalities, when hundreds of thousands of people are left homeless, and/or substantial overall economic losses. In this study emphasis is laid more on great natural disasters based on availability of data.

Centre (JWTC) among others. The different components of natural disasters where data were needed include climatological, hydrological,

meteorological, biological and geophysical. Data collected on these components of natural disasters include the number of events, number of deaths and economic losses between 1980 and 2010. The rationale for selecting these

events and period is based on available global data from renowned sources some of which are listed above. The data were analysed using tables, time series, pie charts and percentages

## RESULTS AND DISCUSSION

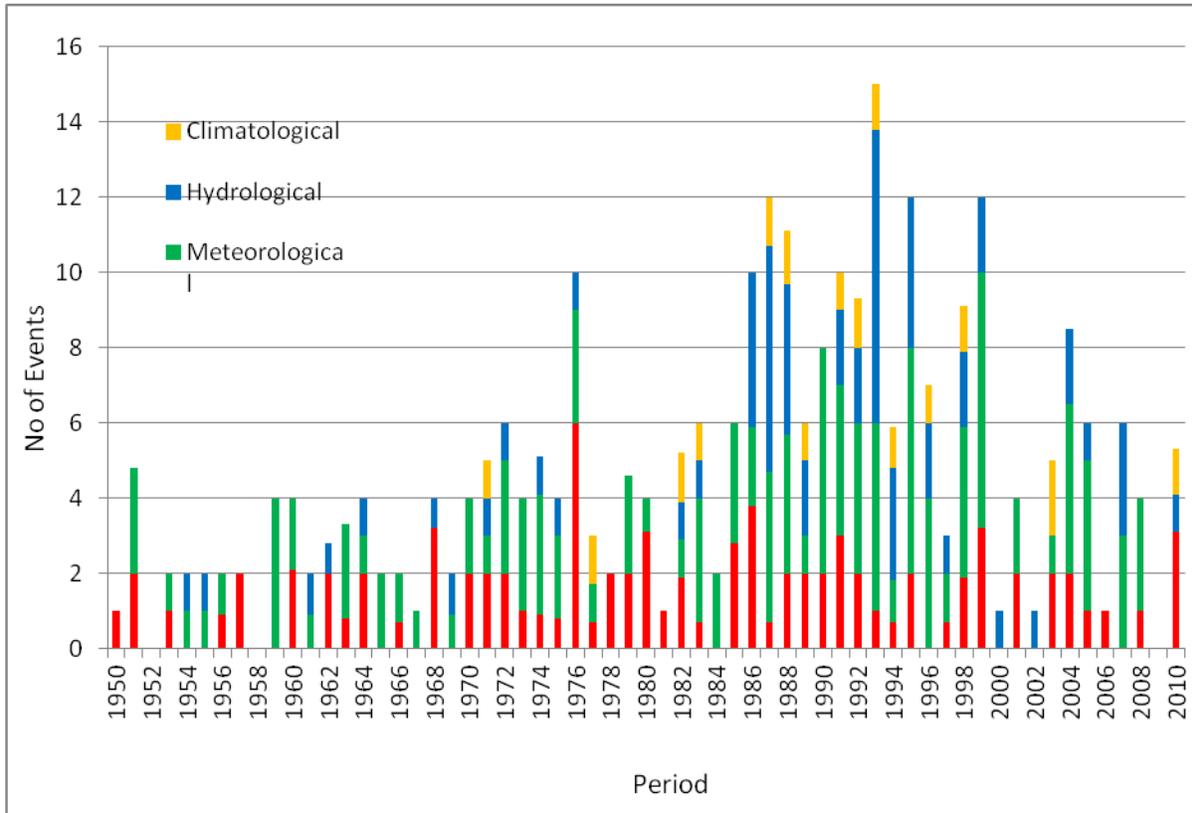


Fig 1: Great natural catastrophes worldwide 1950-2010: Number of events

With the exception of three years (1952, 1958 and 2009) where there were no forms of great natural catastrophe within the study period (1950 – 2010), all other years have one form of great natural disaster or the other (Fig 1). This is not to say that there were no disasters in the three years named above, but their magnitudes were not up to great natural disasters analysed in this study. Of the four catastrophes, meteorological (34%) topped the list followed by geophysical (32%), hydrological (23%) and climatological (11%). While geophysical, meteorological and hydrological have been major occurrence since the 1950s that of climatological became a major feature in

1971 and since then it has been re-occurring. This confirms the fact that climate change signals became stronger in the 1970s (IPCC, 2007, Odjugo, 2010).

Table 1 shows increasing occurrence of natural disasters between the 1950-1959 decade and 1990-1999 which recorded the highest number of disasters before a sharp decrease was experienced in the 2000-2010 decade. It has been asserted that the increasing global population and human activities which resulted in both geophysical and ecological destabilization led to the increasing number of great natural disasters ( Hung, 2007). This claim no longer holds because population is still increasing whereas there is a decline in

the occurrence of natural disasters in the 2000-2010 decade. This indicates that other anthropogenic and natural factors

rather than increasing human activities may be responsible for the occurrence of great natural disasters.

Table 1: Decadal analysis of number of events of great natural catastrophes worldwide between 1950 and 2010

Decade	Geophysical	Meteorological	Hydrological	Climatological	Total
1950-1959	6.9	10.9	2.0	0.0	20.8
1960-1969	10.8	11.5	4.8	0.0	27.6
1970-1979	19.4	21	5.0	2.3	46.3
1980-1989	18	21.2	18.1	6.0	63.4
1990-1999	16.5	42.2	25.8	6.8	91.0
2000-2010	12.1	17.5	9.0	3.2	44.2

Climatological and meteorological events are both weather related events which determine hydrological activities. This implies that the three phenomena (meteorological, climatological and hydrological) are all climate related events. Based on this assertion, the four events were grouped into two, namely geophysical and climate related disasters as shown in Fig 2. Figure 2 shows increasing trend in both geophysical and climate related disasters. The main difference is that while the increase in the number of disasters is gradual in the geophysical events, the rise is sharp in the climate related disasters. The geophysical

disasters peaked in the 1970-1979 decade and since then it has been on the decline (Table 1 and Fig 2) whereas the climate related events started its sharp increase in the 1970s through the 1990s and the 2000s decade. Among the climate related events, flood (36%) is more devastating followed by tropical cyclone (25%), tropical storm wet (19%), extreme temperatures (8%), extratropical storm (7%) and severe storm like tornado and hail (5%) (Fig 3). Since the 1970s when climate change became a thing of serious concern, the subperils activities also intensified.

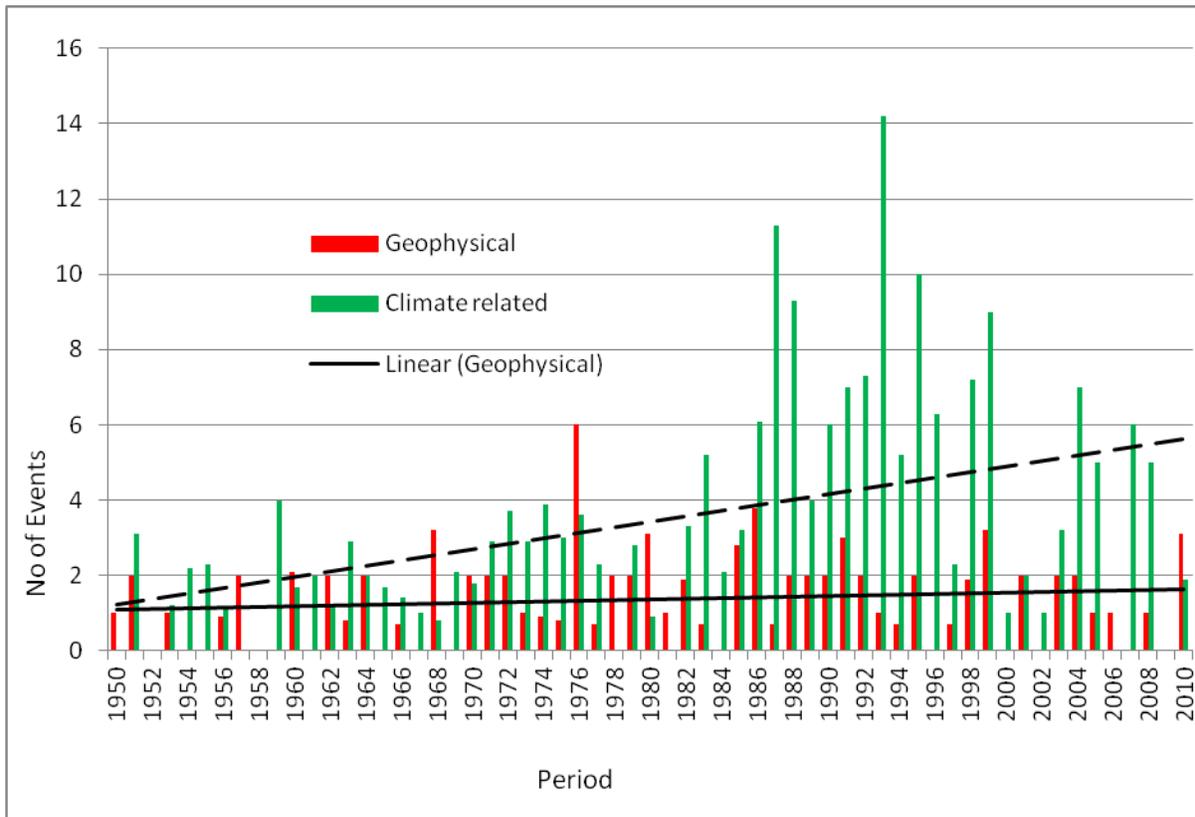


Fig 2: Great natural catastrophes worldwide 1950-2010: Climatological and Geophysical events

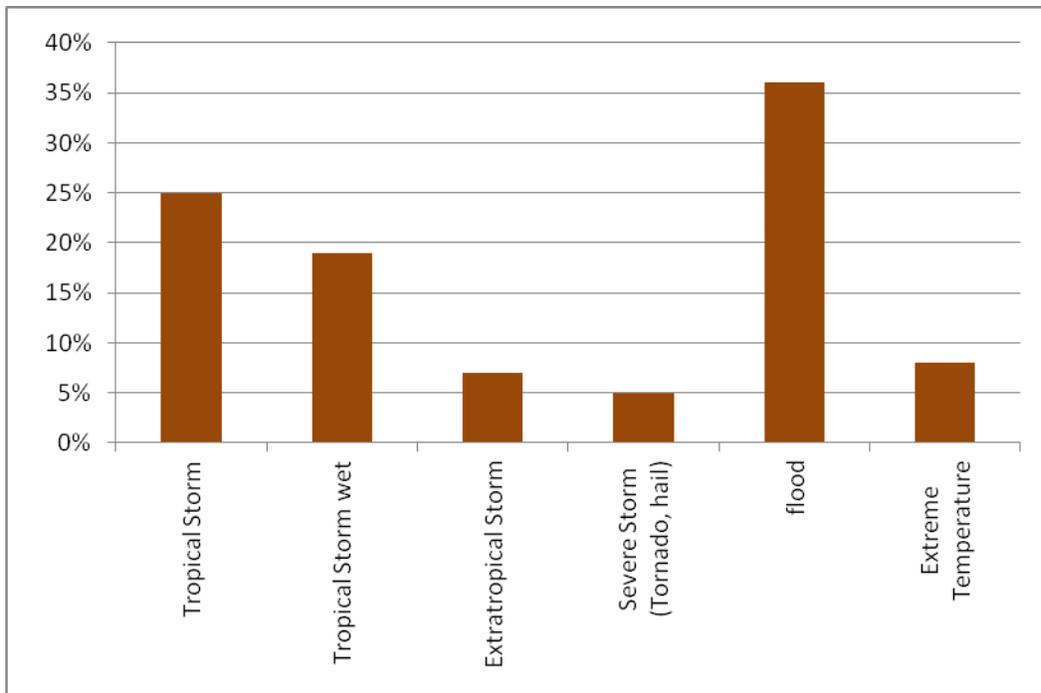


Fig 3: Great natural catastrophes worldwide 1950-2010: Percentage distribution of sub-perils event groups (206 events)

The intensity and frequency of tropical storms and flood have been observed to be on the increase globally in recent years (Odjugo, 2005, 2010). Extreme

temperatures and associated heat wave deaths have become almost annual events in different parts of the world since the 1970s (McDolnard, 2010).

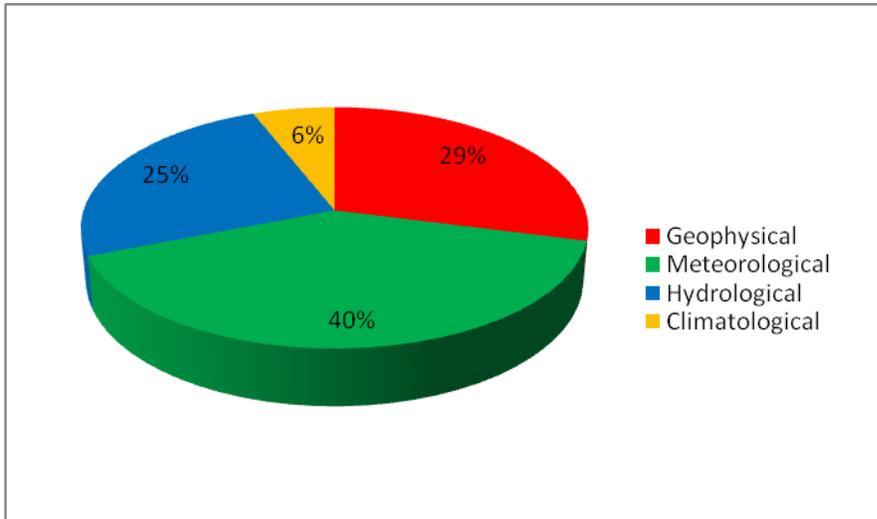


Fig 4: Great natural catastrophes worldwide 1950-2010: Percentage distribution of financial loss per event group

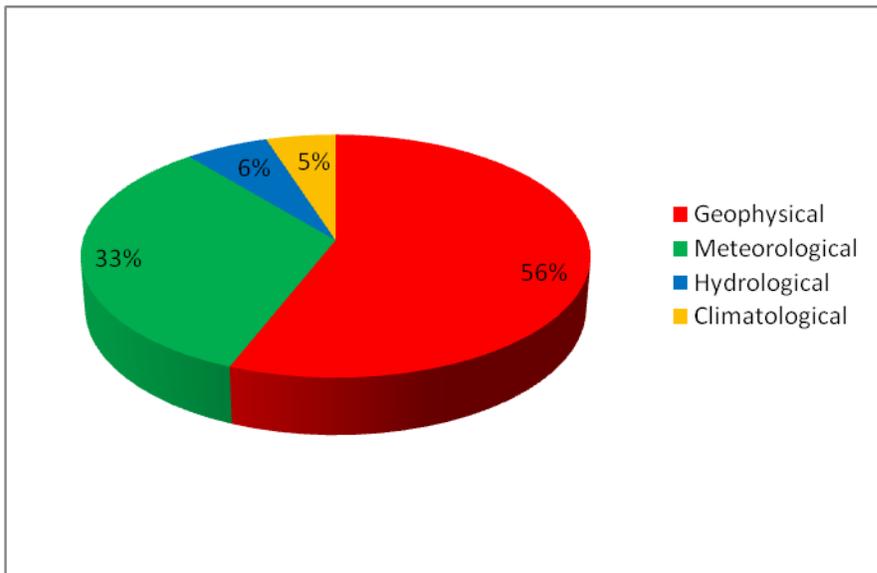


Fig 5: Great natural catastrophes worldwide 1950-2010: Percentage distribution per deaths event group

Within the study period (1950-2010), the destruction of property caused by the great natural disasters amounted to US\$2.100bn (N315tri) globally (Munich Re 2011). This is an average destruction cost of US\$35m (N5.2bn) annually. Of this amount, 40% was lost to meteorological disasters while 29%, 25% and 6% went for

hydrological, geophysical and climatological respectively (Fig 4). Looking at it from the two groups, climate related disasters accounted for 75% of the total destruction cost while geophysical events were 25%. The total number of deaths recorded within the study period was 2,360,000 (Munich Re 2011). Out of these

deaths, geophysical disasters accounted for 56%, while meteorological, hydrological and climatological disasters caused 33%, 6% and 5% of the deaths respectively (Fig 5). The climate related disasters put together caused 44% of the deaths while geophysical led to 56% of the total deaths. What is noteworthy in Fig 4 and 5 is that, while the meteorological disasters destroyed more property (Fig 4), geophysical disasters claimed more lives (Fig 5). The basic reason why the meteorological disasters did not claim more lives like the geophysical is that they are easily monitored. It is easier to monitor and predict the occurrence of meteorological disasters like storms; floods etc in a place and send early warning signals than geophysical phenomena like volcanoes and earthquakes. Such early warning signals lead to evacuation of most people from the disaster zone before it strikes. Most earthquakes and volcanoes occur without giving signals. This makes it difficult to give early warning signals and evacuate people thereby causing more deaths.

The economic impact of a disaster usually consists of direct (damage to infrastructure, crops, housing, etc) and indirect (loss of revenues, unemployment, market destabilization, etc) consequences on the local economy, while the coping capability is a function of the level of economic and technological development of the country. Countries with well developed economies (like USA, Japan etc) experienced more disasters and overall losses while countries with low and/or lower middle economies (like India, China, Bangladesh) suffered more of the deaths (Fig 6). This is a clear indication that countries with well developed economies have the money and technologies to monitor and predict the occurrence of these disasters and if necessary evacuate those living within the disaster zone before it occurs. Moreover the developed economies of the world also have better management strategies to cope when disasters occur. Such disaster

preparedness, management techniques and coping capabilities of the developed nations actually reduce casualty levels when natural catastrophes occur. The poor nations (like Nigeria, Haiti, India, Ethiopia), have no effective technologies to monitor disasters and when they eventually occur, they have no financial capability to cope with the impacts.

The role of economic development in reducing the death toll from natural disasters is confirmed by analyses undertaken by Kahn (2005) and van der Vink et al. (2007). Kahn's analysis of natural disasters for 73 nations from 1980-2002 found that an average nation with a population of 100 million and GDP per capita of \$2,000 would in 1990 have experienced 944 deaths from natural disasters, however, had GDP per capita been raised to \$14,000, its death toll would have fallen to 180 per year, an 81% decline. Although both studies covered weather and non-weather related disasters, their findings should be generally applicable to all types of natural disasters, either weather related or not. Both also found that nations that were less democratic and scored lower on measures of good governance suffered a higher death toll. Kahn also concluded that greater income inequality led to higher death tolls.

These findings are generally consistent with recent experience on natural disasters. For instance, while no two disasters are alike in terms of risk and population exposure, it is notable that an estimated 222,600 people died in the 7.0 magnitude Haiti earthquake in January 2010, while the death toll from the much-stronger 8.8 magnitude Chilean earthquake that occurred the following month killed fewer than 600 people (EM-DAT 2010). Similarly, in 2008, Cyclone Nargis, with a maximum intensity of 115 knots, killed 138,400 in Myanmar while Cyclone Sidr with maximum intensity of 140 knots — killed 4,240 in Bangladesh (JWTC 2007, 2008; EM-DAT 2010).

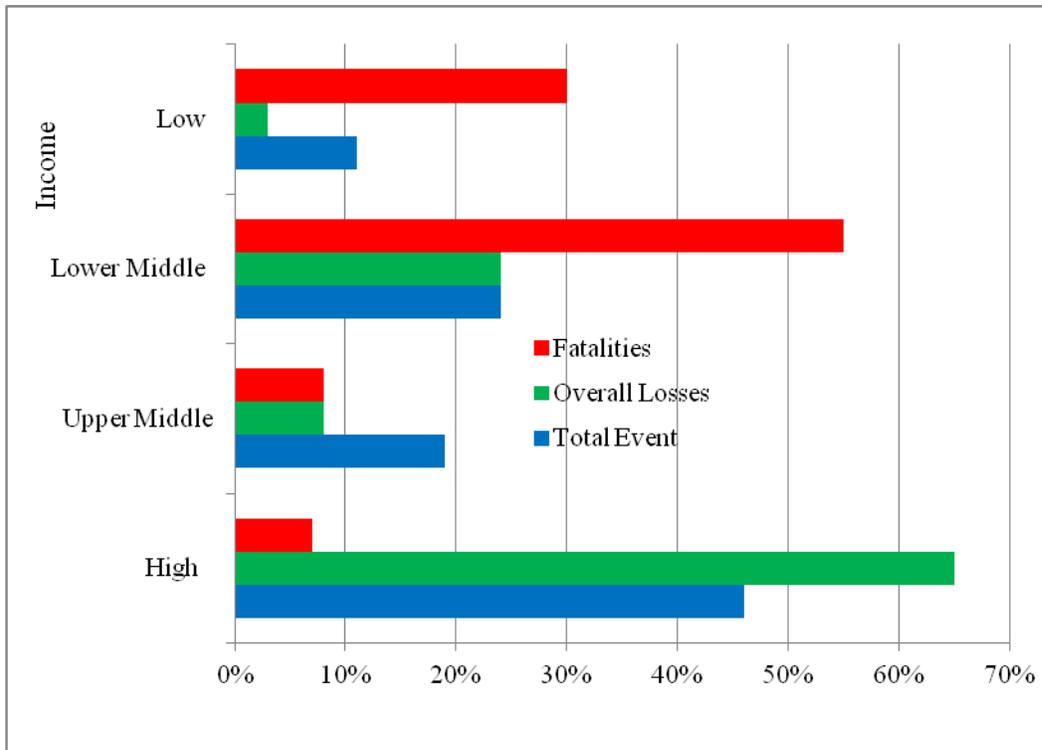


Fig 6: Great natural catastrophes in differently developed economies

**Significant natural catastrophes 1980 - 2010**

As shown in Fig 1, the last 4 decades (1980-2010) recorded the most significant catastrophes since the 1950s in terms of highest number of occurrence and the

deadliest. That is why this section is devoted to analyze the most significant of the events.

Table 2: Distribution of natural catastrophes per continents between 1980-2010

Continent	No of events	Deaths	Overall losses (US\$ m)
Africa	1,700 (9%)	607,000 (27%)	43,000 (1%)
North America	4,720 (24%)	289,600 (12%)	1,144,523 (37%)
South America	1,180 (6%)	72,400 (3%)	120,476 (4%)
Asia	6,200 (32%)	1,150,000 (38%)	1,265,000 (38%)
Australia/Oceania	1,470 (8%)	5,620 (1%)	77,000 (3%)
Europe	4,100 (21%)	150,000 (7%)	485,000 (16%)
Total	19,370	2,274,620	3,134,999

The number of great natural disasters is more in Asia (32%), followed by North America (24%) and Europe (21%) while the lowest occurred in Australia/Oceania (8%) (Table 2). The highest number of deaths occurred in Asia (38%), followed by Africa (27%) while the highest financial loss was

recorded in Asia (38%) followed by North America (37%). Of the 10 deadliest natural disasters, five were earthquakes, two cyclones, two heat wave and one flood (Table 3). Deaths caused by earthquakes were 654,570, cyclones were 279,000, while heat waves and floods were 126,000

and 30,000 respectively (Table 3). The total number of deaths from these ten deadliest disasters between 1980 and 2010 was 1,089,570 while all great natural disasters between 1980 and 2010 killed 2,697,654. This implies that only 10 of the deadliest natural disasters killed 40.4% of

all great natural disasters that occurred worldwide between 1980 and 2010. The deadliest of all great natural disasters between 1980 and 2010 is the earthquake of 12<sup>th</sup> December, 2010 (Plate 1) that hit Haiti and claimed 222,570 lives.



Plate 1: Property damage during the Haiti 12/12/2010 earthquake

The costliest natural disaster between 1980 and 2010 was the hurricane Katrina that struck the USA between 25<sup>th</sup> - 30<sup>th</sup> August, 2005 and destroyed property that worth US\$125 billion (Table 4). Hurricane Katrina was so costly and devastating because of its path. According to Amadeo (2011), hurricane Katrina affected 19% of U.S. oil production. Hurricanes Katrina (and a smaller previous Hurricane Rita) destroyed 113 offshore oil and gas platforms, damaged 457 oil and gas pipelines, and spilled nearly as much oil as the Exxon Valdez oil disaster. This caused oil prices to increase by \$3 a barrel, and gas prices to nearly reach \$5 a gallon. It struck the heart of Louisiana's sugar industry, with an estimated \$500 million annual crop value, according to the American Sugar Cane League. This area of Louisiana had 50 chemical plants, which produced 25% of the nation's chemicals. The nearby Mississippi coast was home to 12 casinos, which took in \$1.3 billion annually.

As important as these industries are, the main damage was done to the City of New Orleans. Hurricane Katrina caused \$260 million damage to the port, although it was open to ships just a week later. The city's tourism industry created \$9.6 billion annually before Katrina, and has only recently returned to attracting 7.1 million visitors each year, up from 2.6 million in 2006. Of more importance, but impossible to quantify, was the impact on people and animals. More people were displaced (770,000) than during the Dust Bowl migration of the Great Depression. About 1/10 of these (75,000 people) found out on their return that their homes had been destroyed. The Louisiana death toll was 1,836 people. Old age was a contributing factor, since 71% of those who died were 60 years or older, while nearly half of those were more than seventy-five.

The level of destruction of the hurricane Katrina was followed by the Japan earthquake of 17<sup>th</sup> January 1995 that destroyed property worth US\$100billion. The 10 costliest natural disasters

destroyed property worth US\$532 billion worldwide. While the three costliest hurricanes destroyed property evaluated to be US\$ 189.8 billion, earthquakes were US\$287 billion and the two costliest floods accounted for US\$54.7 billion (Table 4). Hurricanes and floods are extreme weather events while earthquakes are not. Out of the ten costliest natural disasters,

five are extreme weather events and five earthquakes. While the five earthquakes destroyed property worth US\$ 287 billion, the five extreme weather events cost US\$244 billion. This shows that earthquakes are the costliest natural disasters. As shown in Tables 3 and 4, earthquakes are observed to be the deadliest and costliest.



Plate 2a: Christ Episcopal Church, 912 South Beach Blvd, Bay St. Louis MS, before the Hurricane Katrina of 15<sup>th</sup> July, 2005.



Plate 2b: Same area at Plate 2a after the Hurricane. (<http://4chrste.tripod.com/4chrste>)

Table 3: The 10 deadliest natural disasters worldwide between 1980-2010

Period	Event	Affected Area	Overall losses	Insured losses	Deaths
			US\$ m		
12/1/2010	Earthquake	Haiti: Port-au-Prince, Petionville, Jacmel, Carrefour, Leogane, Petit Goave, Gressier	8,000	200	222,570
26/12/2004	Earthquake/ Tsunami	Sri Lanka, Indonesia, Thailand, India, Bangladesh, Myanmar, Maldives Malaysia	10,000	1,000	220,000
2-5/5/2008	Cyclone Nargis, storm surge	Myanmar: Ayeyawaddy, Yangon, Bugalay, Rangun, Irrawaddy, Bago, Karen, Mon, Laputta, Haing Kyi	4,000		140,000
29-30/4/1991	Tropical cyclone, storm surge	Bangladesh: Gulf of Bengal, Cox's Bazar, Chittagong, Bola, Noakhali districts, kutubodia	3000	100	139,000
8/18/2005	Earthquake	Pakistan, India, Afghanistan	5,200	5	88,000
12/5/2008	Earthquake	China: Sichuan, Mianyang, Beichuan, Wenchuan, Shifang, Chengdu, Guangyuan, Ngawa, Ya'an	85,000	300	84,000
July-Aug 2003	Heat wave, drought	France, Germany, Italy, Portugal, Romania, Spain, United Kingdom	13,800	20	70,000
July Sept 2010	Heat wave	Russian Federation: Moscow region, Kolomna, Mokhovoye	400		56,000

20/6/1990	Earthquake	Iran: Caspian Sea, Gilan provinve, Manjil, Rudbar, Zanjan, Safid, Qazvin	7,100	100	40,000
8-19/12/1999	Landslides, flash floods	Venezuala: Vargas, La Guaira Punta de Mulatos, Miranda, Nueva Esparta, Yaracuy. Colombia	3200	220	30,000

Table 4: The 10 costliest natural disasters worldwide ordered by overall losses between 1980-2010

Period	Event	Affected Area	Overall losses	Insured losses	Deaths
			US\$ m		
25-30/8/2005	Hurricane Katrina, storm surge	USA: New Orleans, Slidell, Biloxi, Pascagoula, Waveland, Gulfport	125,000	62,200	1,322
17/1/1995	Earthquake	Japan: Hyogo, Kobe, Osaka, Kyoto	100,000	3,000	6,430
12/5/2008	Earthquake	China: Sichuan, Mianyang, Beichuan, Wenchuan, Shifang, Chengdu, Guangyuan, Ngawa, Ya'an	85,000	300	84,000
17/1/1994	Earthquake	USA: Northridge, Los Angeles, San Fernando Valley, Ventura, Orange	44,000	15,300	61
6-14/9/2008	Hurricane Ike	USA, Cuba, Haiti, Dominican Republic, Turks and Caicos Islands, Bahamas	38,300	18,500	170
May-Sept 1998	Floods	China: Jangtsekiang, Songhua Jiang	30,700	1,000	4,159
27/2/2010	Earthquake, tsunami	Chile: Bio Bio, Concepcion, Talcahuano, Coronel, Dichato, Chilan, Del Maule, Talca, Curico	30,000	8,000	520
23/10/2004	Earthquake	Japan: Honshu, Niigata, Ojiya, Tokyo, Nagaoka, Yamakoshi	28,000	760	46
23-27/8/1992	Hurricane Andrew	USA: Florida, Homestead, Bahamas	26,500	17,000	62
27/6-13/8/1996	Floods	China: Guizhou, Guiyang, Zhejiang, Sichuan, Hunan, Anhui, Jiangxi, Hubei, Guangxi, Jiangsu	24,000	445	3,048

### Natural Disasters: The Nigerian Example

Table 5: Top 10 Natural Disasters in Nigeria for the period of 1900 -2012 sorted by numbers of people affected

Disasters	Date	Total No Affected
Drought	Jun-83	3,000,000
Flood	13-Sep-10	1,500,200
Flood	11-Sep-94	580,000
Flood	Aug-88	300,000
Flood	5-Sep-03	210,000

Flood	10-Sep-09	150,000
Flood	10-Oct-98	100,000
Flood	15-Sep-99	90,000
Flood	27-Aug-01	84,065
Epidemic	Oct-69	80,000
Total		6,094,265

Source: <http://www.emdat.be/result-country-profile>.

Table 6: Top 10 deadliest Natural Disasters in Nigeria between 1900 -2012 sorted by numbers killed

Disasters	Date	No Killed
Epidemic	6-May-91	7,289
Epidemic	Feb-96	4,346
Epidemic	Oct-69	2,000
Epidemic	1-Jan-09	1,701
Epidemic	19-Feb-96	1,193
Epidemic	Nov-86	1,000
Epidemic	27-Jun-11	694
Epidemic	28-Feb-05	561
Epidemic	Apr-91	400
Epidemic	23-Jul-10	353
Total		19,537

Source: <http://www.emdat.be/result-country-profile>.

Table 7: Top 10 Costliest Natural Disasters in Nigeria between 1900 – 2012 sorted by economic damage costs

Disasters	Date	Damage (000 US\$)
Drought	Jun-83	71,103
Flood	11-Sep-94	66,500
Flood	13-Sep-10	30,000
Flood	23-Sep-85	8,000
Flood	20-Sep-00	4,805
Flood	27-Aug-01	3,000
Flood	5-Sep-03	2,570
Flood	15-Aug-00	1,900
Flood	28-Aug-11	1,500
Flood	7-Aug-05	147

The top 10 natural disasters in Nigeria between 1900-2010 show that they are mainly made up of drought, flood and epidemic. While drought affected 3,000,000 people, flood inundated areas that led to the evacuation of 3,014,265 people and epidemic affected 80,000 people (Table 5). In all, the ten top natural disasters affected 6,094,265. Among the ten top natural disasters that affected Nigeria, flood has highest frequency and affected more people. All the major floods that led to the displacement of people in Nigeria occurred between 1980 and 2000 decades. This period coincided with the

period when rainfall becomes more erratic with higher intensity due to intensifying impacts of climate change (Odjugo, 2005, 2012). The 10 deadliest natural disasters in Nigeria between 1900 and 2011 claimed 19,537 lives and they are epidemic in nature (Table 6). The deadliest of the epidemic is the bacterial infectious disease (Cholera) which started 6<sup>th</sup> of May, 1991. It affected 10,000 people and killed 7,289 people in Bauchi and Kaduna States of Nigeria. The least among the 10 is also cholera that claimed 353 lives in July 2010. The 10 costliest disasters in Nigeria destroyed property worth \$189.5bn

(N30.3trillion) (Table 7). Apart from the 1983 drought that destroyed property worth \$71.7bn, all other destructions resulted from flood. It is therefore obvious that among the 10 natural disasters in Nigeria, flood is the costliest and it affected more people while epidemic is the deadliest.

The pattern of global great natural disasters and those of Nigeria have some

similarities. Globally, meteorological events like storms and floods destroyed more property and affected more people in terms of relocation; the same pattern is also experienced in Nigeria. On the other hand, while geophysical events like earthquakes claimed more lives globally, it is biological (epidemic) in Nigeria.

### **Disaster management and sustainable development**

Disaster management is a complex series of activities that include risk assessment, prevention measures, preparedness to cope with future disasters, emergency response to a disaster, recovery and reconstruction. Good development and community preparedness can reduce the impact of a disaster especially for the most vulnerable people, such as those living in hazard-prone areas with few financial resources to help them recover if they lose their means of livelihood.

#### **Disaster Response**

When disaster strikes the first response is to save lives (humanitarian action). While each disaster creates unique circumstances and the response needs to be tailored to meet the specifics of the situation the following general areas will usually form part of the response:

- Search and rescue - finding those who may be trapped under debris;
- Assessment of needs - working out what is required, in what quantities, and for whom;
- Health – providing medical care and preventing the spread of disease through immunization, the provision of safe water and food, waste disposal and burial of the dead;
- Basic needs - procuring and distributing food, shelter and clothing;

- Gender - understanding the roles of men and women in families and communities to identify needs and ensure the fair distribution of resources;
- Livelihood and economy - assisting people earn a living to speed their recovery;
- Emotional support - counseling and reuniting separated families;
- Logistics - transporting people and equipment;
- Finance - obtaining, allocating and accounting for money;
- Communication - providing affected people with information, informing the fund raising bodies the needed materials;
- Infrastructure - rebuilding roads, electricity and telephone networks, water pipelines, and waste disposal systems.

Few countries have all the resources necessary to meet the demands of a large-scale disaster. International assistance can provide expert knowledge and resources, but survivors and people living in the area can also do much to help if they are prepared. Any emergency response needs to be coordinated to ensure the survival of the maximum possible number of victims. Some of the issues to be considered in the disaster response include:

- respecting local knowledge while using international best practice;
- meeting survival needs in a culturally appropriate manner (eg. types of food, clothing, shelter);
- limiting the effects of aid on the local economy;
- training people, organizations and communities to manage development fairly;
- prioritizing the distribution of limited supplies;
- gaining funding for long-term redevelopment and disaster preparedness, rather than simply responding to the current emergency situation.

In the chaos of a disaster, the pressure to make quick decisions and balance the specific interests of victims, governments, Non Governmental Organizations (NGOs) and donors may mean that best practice standards are not always achieved.

#### **Disaster recovery**

Once the immediate danger is over, people may need assistance to rebuild their lives and their livelihoods. Communities may need to rebuild their social and physical infrastructure and revitalize the economy. It takes time and money to plan and ensure that long-term redevelopment and future disaster preparedness are appropriate for

#### **Development and Community preparedness**

Reconstruction after a disaster provides significant opportunities for improved development in the following areas:

- planning the response and recovery to prepare for future hazards;
- upgrading infrastructure, including roads, communication networks and water and sanitation systems to withstand disasters and assist in emergency response;

everyone. Damaged structures and services may not necessarily be restored in their previous locations or forms as the disruptions can be an opportunity to make improvements. Seasonal factors must be considered; for example, seeds need to be distributed during the planting season and the type of temporary shelter used will depend on the climate and season.

#### **Disaster preparedness**

Much can be done to prepare for future disasters by:

- modifying or removing the causes of any likely hazard - for example by building houses away from hazard prone areas, building levy banks in flood prone areas and upgrading stoves to reduce the risk of fire;
- taking measures to reduce the effects of a hazard - for example by building houses to standards that will protect people during a hazard, developing early warning systems that can function without power systems, developing response plans, defining the roles and training of emergency services personnel, collecting and storing resources and equipment to ensure a quick response, educating the public and rehearsing for a hazard (e.g. evacuation drill).

- building hazard resistant public buildings and housing to reduce the impact of hazards;
- developing the skills of local personnel to increase their capacity to respond to an emergency;
- poverty alleviation to reduce the vulnerability of those with limited resources;
- expansion and modernization of the economic base.

For proper risk management and sustainable development, care must be taken to ensure that changes do not increase an area's susceptibility to disasters. For example environmental factors need to be considered when creating job opportunities so that the people do not move to hazard-prone areas such as floodplains or unstable hillsides; introduction of new agricultural practices needs to avoid leading to land degradation.

### **Our individual responses**

When disaster strikes money is the best way to help. The most useful form of assistance during a humanitarian crisis is the donation of money to governmental and non-government organizations responsible for providing aids to affected victims. This is because such organizations:

- may have qualified people already working in the affected country who understand what is needed in

the emergency situation, understand the peoples' cultures, and know the local languages.

- have strong local networks so they know where to buy emergency relief goods at the best prices with the least long-term negative impact on the affected country and can manage timely and cost-effective transportation and have controls in place to check that as much money as possible is spent on goods or services for the people in need.
- What not to give: Items such as food, clothing, blankets, medicines and toys can cause problems for relief authorities. The costs of sorting, storing, packing, labelling (in English and in the recipient country's language) and then transporting these items may be higher than the cost of buying them in the country of need or from a country nearby. Sometimes such donations may also be culturally inappropriate.

### **Conclusion and Recommendations**

The study shows that between 1950 and 2010, there were 19,370 great natural disasters globally costing the world \$2.1trillion with over 2,300,000 fatalities. The magnitude of destruction of these natural disasters was more in the continent of Asia, followed by North America and least in Africa. The 1980 and the 1990 decades saw the highest number of events of great natural disasters. While geophysical, meteorological and hydrological events have been major occurrences since the 1950s that of climatological became a major feature in 1971 and since then it has been re-occurring. This confirms the fact that climate change signals became stronger in the 1970s. Within this period (1950-2010), the costliest and most fatal events are earthquakes, hurricanes, floods and heat

waves. While the meteorological disasters destroyed more property, the geophysical disasters claimed more lives. Countries with well developed economies (like USA, Japan etc) experienced more disasters and overall financial losses while countries with low and lower middle economies (like India, China, Bangladesh) suffered more of deaths. Of all the disasters, Nigeria is currently being afflicted more by flood, wind storm, and erosion while the threat of desertification and coastal inundation are being strengthened due to climate change. It is recommended that for sustainable development, disaster prevention and risk management should be features that every country must take seriously. While it is difficult to prevent the occurrence of some of the natural disasters like earthquakes, volcanoes and windstorms, adequate risk

management policies and measures should always be put in place especially countries within the pacific ring of fire of the world that is mostly affected by these disasters. Global disasters management agencies and organizations should have prompt rescue measures while the rich nations should assist the affected poor nations irrespective of bilateral relationships prior to the disaster. Environmental monitoring, early warning and preparedness are other key factors never to be ignored by government of any nation. While the developed nations like USA, Canada, Russia Federation and Japan among others are trying because they have the financial and technological strength to do so, the poor nations like Nigeria, Bangladesh, Pakistan and India have little or no means of effective environmental monitoring and early warning.

Although Nigeria has not in recent times been prone to severe natural disasters like earthquake, volcanoes and hurricanes, there is clear evidence that the country is not even prepared to monitor and send early warning for the minor disasters affecting the nation. Since most disasters hardly send any warning before they strike, calls for all-year-round preparedness both financially and technologically so that warnings are give before they strikes or proper rescue and

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relief measures put in place if they eventually occur. The major disasters affecting Nigeria currently are floods, epidemic, wind storms, droughts and erosion. Apart from the epidemic, others can easily be monitored and warning signals given before they occur if the governments equip the agencies or institutions responsible for these environmental issues. The erosion and flood prone areas should be identified and the Town Planning Department ensures that such areas be made free of residential and industrial activities so as to limit the loss of lives and property in case of flood or landslide. The medical sector of Nigeria needs to be strengthened so as to tackle any outbreak of epidemic since it is the deadliest natural disaster in Nigeria. Finally, natural disasters cannot be avoided but their dramatic consequences can be greatly reduced through appropriate preparedness and risk reduction measures including education, technology development, land-use planning and environmental protection

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