Available online @ www.iaraindia.com
RESEARCH EXPLORER-A Blind Review & Refereed Quarterly International Journal
ISSN: 2250-1940 (P) 2349-1647 (O)
Impact Factor: 3.655(CIF), 2.78(IRJIF), 2.77(NAAS)
Volume XII, Issue 39
January - June 2024
Formally UGC Approved Journal (63185), © Author

VULNERABILITY OF NATURAL DISASTER - A STUDY WITH REFERENCE TO CYCLONE

MONALISA MAITY
Faculty Member, Department of Geography
Hiralal Mazumdar Memorial College for Women, Dakshineswar, Kolkata

Abstract

A disaster is a serious problem occurring over a short or long period of time that causes widespread human, material, economic or environmental loss which exceeds the ability of the affected community or society to cope using its own resources. Disasters are routinely divided into natural or human-made. Cyclones and the associated floods have recently become a regular problem for many states of India, particularly on its west and east coasts. Some of the recent severe cyclonic storms that caused large-scale devastation in the last decade include cyclone Amphan in May 2020, cyclone Fani in May 2019, cyclone Titli in October 2018, cyclone Hudhud in October 2014 and cyclone Phailin in October 2013. This paper focuses on giving an overview of different types of cyclones, different categories of cyclone and their impact on the life of human beings and the process of mitigation and prevention from cyclones. The study is basically a descriptive study, based on different secondary data.

Keywords: Cyclone, Disaster, Descriptive Study, Coasts, Risks, Environment, Impact.

Introduction

A disaster is a mishap or hazard which causes huge loss of life and property and disrupts the balance of the economy. It is a tragic event with drastic consequences for living beings as well as social and individual development. A disaster can be caused by either natural or man-made factors. Both these factors need to be taken care of to prevent a disaster or lessen its impact. Disasters also arise due to inefficient management of risks. If a safety net is devised to address the potential risks, it would lead to reduction in damages triggered by disasters. Developing countries are more vulnerable to disasters.

An environmental disaster is a mishap or hazardous event which directly influences the environment, bringing serious alterations in the same. These alterations become the root cause of failures or damages that would occur following a disaster. Since the environmental disasters have direct impact on the environment, they could stunt economic growth, lead to socio-economic failures, deteriorate environmental conditions or threaten life.

Apart from heavy immediate effects or damages, the environment also suffers from the long-term consequences of a disaster, which can prove to be costly. As these long-term effects alter the ecosystem, they can lead to more deaths over the next few years by giving rise to certain diseases and ailments. They may also hinder tree growth or stop cultivation in a particular area, almost instantly. When a disaster strikes, the economy needs to divert all its resources towards the affected areas to try and save its elements from damage to the maximum extent possible. However, it takes high costs to recover the

elements which been lost in or damaged by the disaster.

Objectives

1. To have an overview of the concept of disaster and it's various types.
2. To discuss about the causes and consequences of Disaster.
3. To identify the types of disasters like Man-made and Nature-made disasters.
4. To discuss the effects of disaster.
5. To identify the causes and effects of Natural Disaster Cyclone.
6. To explain about different types and categories of cyclone.
7. To discuss about different impact of cyclone and their phenomenon.
8. To discuss the after-effects of cyclone.

Cyclone as Natural Disaster – An Overview

A cyclone is a large Air Mass that rotates around a strong center of low atmospheric pressures Anti Clock-wise in Northern Hemisphere and clock-wise in Southern Hemisphere "Cyclone" derived from Greek word 'Kyklos' which mean 'Coil of Snakes.' Henry Piddinto was first used the term 'cyclone' in the year 1848 of his weather research. Cyclones are characterised by inward spiralling winds that route about a zone of low pressure. Tropical Cyclone are one of the biggest threats to life and property. It includes a number of different hazards that can individually cause significant impact on life and property. A tropical cyclone is referred by names as hurricane, typhoon, tropical storm, tropical depression and cyclone.

In meteorological terms a cyclone is a wind system that rotates inwards (Counter-clockwise in the Northern Hemisphere and clockwise in the /southern) around a strong low-pressure centre. Simply, put, inward-spiralling winds that rotate about a low-pressure zone is known as a cyclone. Generally, when winds rise above 118 km/ph, it is known as a cyclone.

To understand the severity of this storm, one must learn in detail about cyclone formation and its categories. Generally, the two factors which play an important role in the creation of cyclone are – Depression and high Air Pressure and the temperature of the Sea Level which is 27 degree Celsius. This sea-level temperature is always maintained at the Bay of Bengal. So Bay of Bengal creates maximum cyclones.

The World Meteorological Organization has given the responsibility of naming the cyclone to The Mausam Bhawan in Delhi. If the speed of the storm is more than 34 nautical miles per hour, then that cyclone is named in different places and if the speed of the storm is 74 miles/hour or more, then the storm is identified as a cyclone. Some of the world's most tropical winding sites are India, Pakistan, Srilanka, Mayanmar, Bangladesh, Thailand, Maldives etc.

Causes of Cyclone

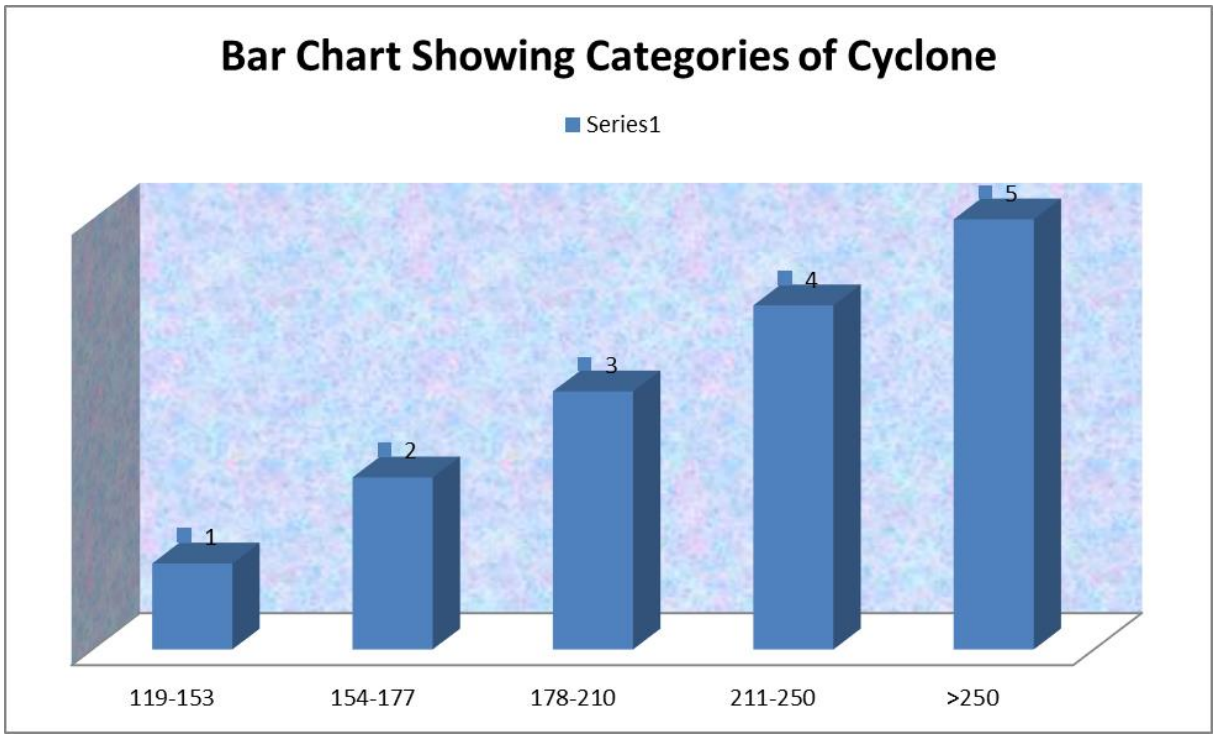
When warm air rises from the earth and condenses to form clouds, a great amount of heat is released. The combination of this heat and moisture often leads to thunderstorms, from which a tropical storm can develop. The trigger for most Atlantic hurricanes is an easterly wave, a band of low pressure moving

- Westwards, which may have begun as an African thunderstorm. Typhoons in the Far East and Cyclones in the Indian Ocean often develop from a thunderstorm
- In the equatorial trough. During the hurricane season, the Coriolis Effect of the Earth's rotation leads to the winds in the thunderstorm spinning in a circular motion.

Categories of Cyclone

The categories of a cyclone depend on wind strength. From the following table, you will be able to estimate the damage a cyclone may cause after landfall based on wind speed.

Category	Wind Speed (in km/per hour)	Damage at Landfall
1	119-153	Minimal
2	154-177	Moderate
3	178-210	Extensive
4	211-250	Extreme
5	More than 250	Catastrophic



Types of Cyclone

There are two types of Cyclone:

(i) A tropical cyclone is a storm system characterized by a large low-pressure centre and numerous thunderstorms that produce strong winds and heavy rain. Tropical cyclones feed on heat released when moist air rises, resulting in condensation of water vapour contained in the moist air. The term 'tropical' refers to both the geographic origin of these systems, which form almost exclusively in tropical regions of the globe, and their formation in maritime tropical air masses.

(ii) A tropical cyclone is the generic term for a warm-cored, non-frontal synoptic scale low pressure system over tropical or subtropical waters around the world. In the northwestern Pacific, the same powerful storms are called 'typhoons.' In the southeastern Indian Ocean and southwestern Pacific, they are called 'severe tropical cyclones'. In the northern Indian Ocean, they're called 'severe cyclonic storms.' In the southwestern Indian Ocean, they're just 'tropical cyclones.' Typhoon, Tornado, Hurricane etc. are the examples of tropical cyclone.

Some Important Tropical Cyclones

Name of Cyclone	Sources	Affected Areas	Speed (km/h)
TORNADO	Gulf of Mexico	The Great Plains of the Mississippi	300-500KM/H
TAIFUN	South China Sea and Sea of Japan	East China & South Japan	200km/h
HURRICANE	Karabian sea	West Indies	150-200km/h
CYCLONE	Bay of Bengal, Arabian sea &South West Indian Ocean	Srilanka, Pakistan, India, Bangladesh	60-100km/h

Other important Super-Cyclones

Apart from these cyclones, various cyclones occurring at different times which have deeply affected human life and social life are also notable.

Name of Cyclone	Time	Average High Speed	Affected Place	Fatalities	Damage
AYLA	2009 – 25TH May to 27th May	150km/h	Bangladesh, Sundarban, W.B.	339	$ 1 billion USD

Hudhud	2014- 7th Oct to 14th Oct	185 km/h	Andaman, Nikobar Island, Bisakha Pattanam, Andhra Pradesh	124	$ 3.58 billion USD
TITLI	2018 – 8th Oct to 12th Oct	150 km/h	Andhra Pradesh, Odisha, West Bengal, Bangladesh	85	$ 920 million USD
Fani	2019 – 26th April to 5th May	250 km/h	Odisha, West Bengal, Andhra Pradesh, Bangladesh	89	$ 8.10 billion USD
Bulbul	2019 – 28th Oct. to 09 Nov.	140 km/h	Bangladesh, Andaman& Nicobar Island, Vietnam	43	$ 3.54 billion USD
Amphan	2020 – 16 May to 21 May	240 km/h	West Bengal, Odisha, Andaman, Bangladesh	128	$ 13.7 Billion USD
Nisarga	2020 – 1ST June to 4th June	140 km/h	Maharashtra, Gujarat	6	$ 803 Million USD
Yaas	2021- 23rd May to 28th May	140 km/h	Bangladesh, Andaman, Odisha, Bihar, Madhya Pradesh, W.B.	20	$ 2,99 billion USD

Impact of Cyclone

While tropical cyclones can produce extremely powerful winds and torrential rain, they are also able to produce high waves and damaging storm surge as well as spawning tornadoes. They develop over large bodies of warm water, and lose their strength if they move over land. This is why coastal regions can receive significant damage from a tropical cyclone, while inland regions are relatively safe. Heavy rains, however, can produce significant flooding inland, and storm surges can produce extensive coastal flooding up to 40 kilometres from the coastline. Although their effects on human population can be devastating, tropical cyclones can also relieve drought conditions. They also carry heat and energy away from the tropics and transport it toward temperate latitudes, which make them an important part of the global atmospheric circulation mechanism. As a result, tropical cyclones help to maintain equilibrium in the Earth's troposphere, and a relatively stable and warm temperature worldwide.

Tropical cyclones out at sea cause large waves, heavy rain, and high winds, disrupting international shipping and, at times, causing shipwrecks. Tropical cyclones stir up water, leaving the air cooler behind them, which causes the region to be less favourable for subsequent tropical cyclones. On land, strong winds can damage or destroy vehicles, buildings, bridges, and other outside objects, turning loose debris into deadly flying objects. The storm surge, or the increase in sea level due to the cyclone, is deaths. The broad rotation of a tropical cyclone, and vertical wind shear at its periphery, spawns tornadoes.

Over the past two centuries, tropical cyclones have been responsible for the deaths of about 1.9 million people worldwide. Large areas of standing water caused by flooding lead to infection, as well as contributing to mosquito-borne illnesses. Crowded evacuees in shelters increase the risk of disease. Tropical cyclones significantly interrupt infrastructure, leading to power outages, bridge destruction, and the hampering of reconstruction efforts.

Conclusion

Disaster is such a phenomenon which can be caused by different factors. Natural disaster is not at all controlled by Human Beings. Cyclone is one of the most important Natural Disasters and therefore effective measures for prevention and mitigation should be managed in advance by the local government. History shows that different types of cyclones occurred in different times and government has taken a very positive role to save people from the hazardous effects of these cyclones. Nowadays, different important machineries, techniques and gazettes are also available for the purpose which are being effectively used to prevent from the adverse impact of cyclone.

References

1. *Simpson, R. H., 1974: The hurricane disaster potential scale. Weatherwise, 27, 169-186.*
2. *NOAA NWS National Hurricane Center, 2010: The Saffir-Simpson Hurricane Wind Scale Summary Table. [Available online at http://www.nhc.noaa.gov/sshws_table.shtml?large]].*
3. *Neumann, C. J., 1999: Tropical cyclones of the north Atlantic ocean, 1871-1998. National Oceanic and Atmospheric Administration, 193.*
4. *Holland, G. J., Ed., 1993: The global guide to tropical cyclone forecasting Vol. WMO/TD-560, World Meteorological Organization, 342 pp.*
5. *Frank, W. M., 1977: The structure and energetic. of the tropical cyclone I. Storm structure. Mon. Wea. Rev., 105, 1119-1135.*
6. *Kepert, J., 2001: The dynamics of boundary layer jets within the tropical cyclone core. Part I: Linear theory. J. Atmos. Sci., 58, 2469-2484.*