

Cyclonic Hazards in Odisha And its Mitigation

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As India is a subcontinent being surrounded by oceans from three sides, it is more prone to cyclones. Although cyclones affect the entire India, east coast is more prone to cyclone than west coast. Among all the east coastal states Odisha is worst affected by tropical cyclones experiencing landfall of 260 cyclones within a time span of 100 years. The fertile alluvial soil of coastal deltaic region, well developed irrigation and communication facility has made this region most developed from socio-economic and cultural point of view and most populous region of the state thus making this region highly vulnerable to hazards.

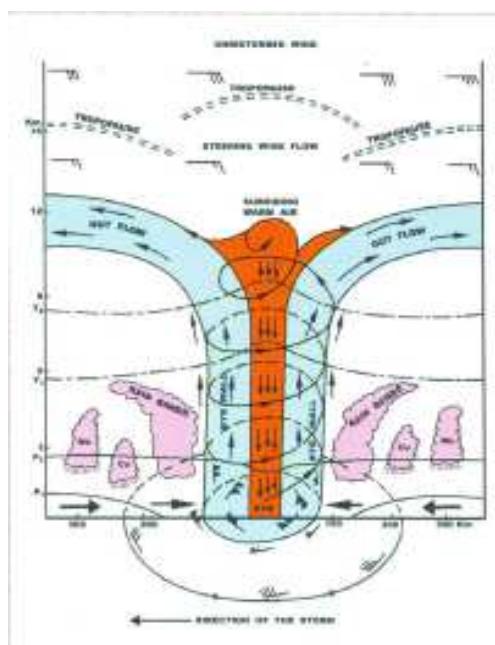
like cyclone. Damage to the coastal Odisha due to cyclonic disaster hits state economy very hard. So proper planning, mitigation strategy and preparedness is badly needed to reduce the disastrous consequences of cyclone.

Mechanism of Tropical Cyclone

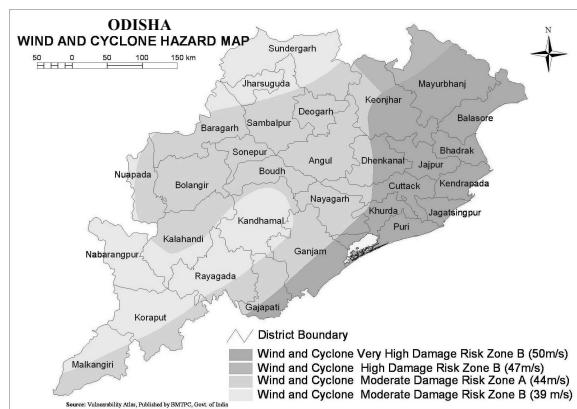
Tropical cyclones are violent storms that originate over warm oceans of tropical area. These are rotational low pressure systems characterized by spirally circulating wind around the centre called eye. The eye is a region of calm with subsiding air and around the eye wall there is strong spiraling ascent of air to greater height reaching the tropopause.

The energy that intensifies the storm comes from the condensation process in the towering cumulonimbus clouds surrounding the centre of the storm. On reaching the land the moisture supply is cut off and the storm dissipates. The place where cyclone crosses the coast is called landfall of the cyclone.

The entire peninsular India lies in the tropical region with the north eastern trade winds flowing over them. Also the cyclones travel in an east to west direction thus, facing the eastern coastal plain more frequently. The tropical cyclones develop over warm tropical waters. Sea



surface temperature of the Bay of Bengal is 2 to 3 degree Celsius more than the sea surface temperature of the Arabian Sea. Hence it experiences more cyclones. The tropical cyclones are more attracted towards the wet points. The wet points in the east coast outnumber the wet points over the western plain, thus making the eastern plain more susceptible to cyclones. The tropical cyclones, which move from high pressure areas above the sea to the low pressure areas over the land, are hindered by the formidable Western Ghats on the west coast. While the Eastern Ghats are present but are not that formidable to be able to hinder the movement of cyclones. So subtle geographical variation over the eastern and western coasts make our eastern coasts more susceptible and vulnerable to tropical cyclones.



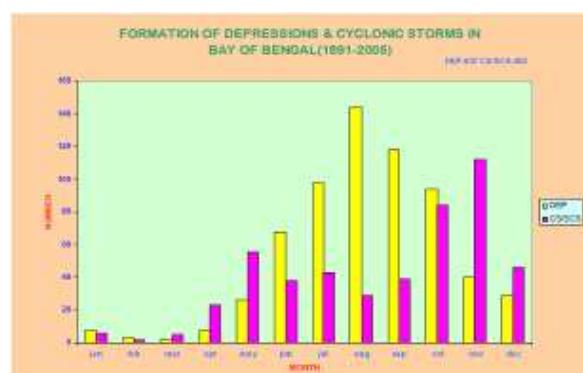
Odisha and Cyclone

Among all the coastal states of India Odisha is more prone to cyclone where nearly one third of cyclones of east coast visits the state Odisha. Out of the total severe cyclonic storms of the Bay of Bengal 15% affect Odisha and districts like Balasore, Bhadrak, Jagpur, Cuttack, Puri, Ganjam, Kendrapara, Jagatsinghpur, Khordha, Gajapati are more prone to cyclone. In the last 100 years total 260 have confronted

Odisha coast out of which 180 were depression, 57 were storms and 23 were severe storm which accounted for 69%, 22% and 9% respectively of the total disturbances.

Most of the major cyclones have occurred in the month of October and November i.e in post monsoonal season and the graph below shows that :

- More numbers of depressions have affected the Odisha coast in the month of July and August
- More numbers of storms have affected Odisha coast in the month of June and July
- More numbers of severe storms have affected Odisha coast in the month of September and October.



Source- www.ndma.gov.in

In Odisha cyclonic storm exposes people and landscape to the impact of three types of hazards i- e high speed wind, storm and tidal surge, heavy torrential rainfall which leads to physical destruction, saline inundation of low-lying area and flooding respectively. The severe storms of 1942, 1967, 1971, 1977, 1990-Super Cyclone and the recently occurred Phailin of 2013

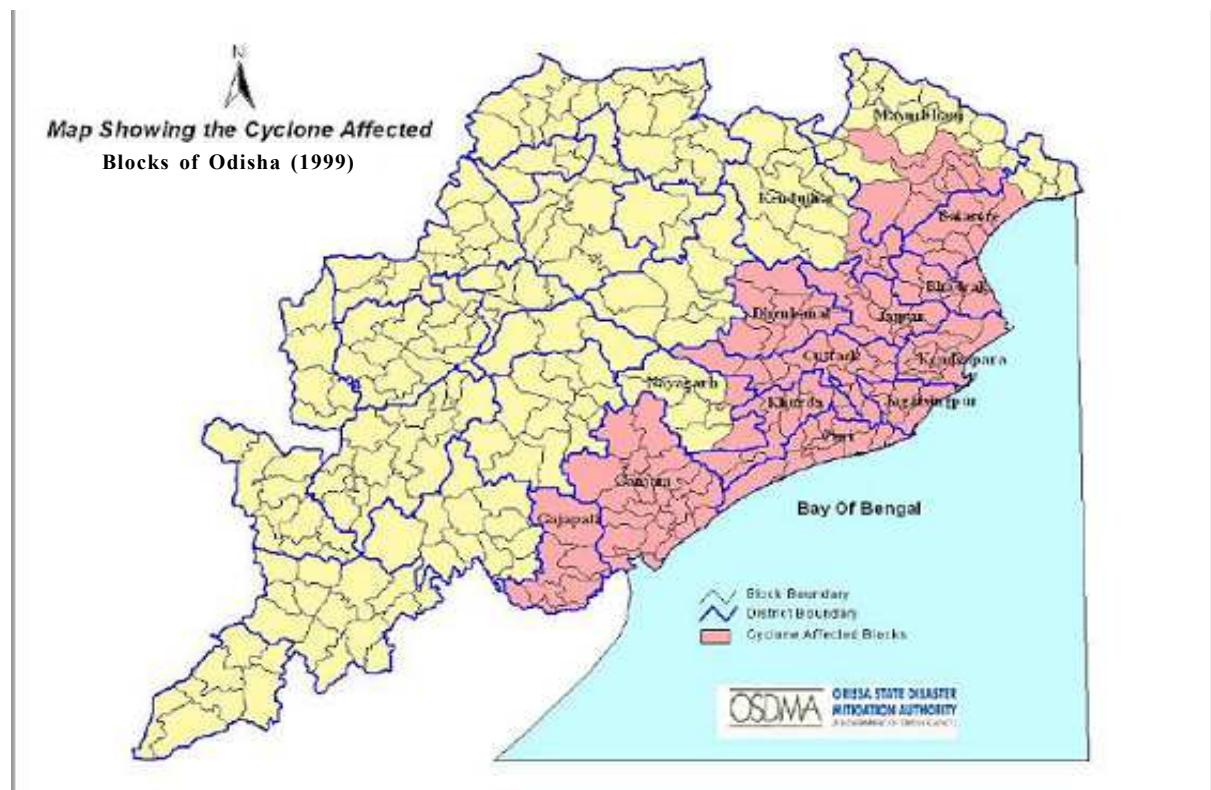
have led to devastation of public life, public property and great death toll. But the Super Cyclone of 1999 broke all the records of 100 years regarding intensity of the hazard and loss of life and property.

1999- Super Cyclone: An Overview

The super cyclone which Odisha faced on 29th Oct 1999 with a wind speed of more than 300 k.m per hour, made landfall near Ersama (Jagatsinghpur)and caused rainfall of 45 to 90 c.m.

land, 75% of the standing trees of coastal area.

- Cyclone disrupted the entire network of telecommunication, transmission towers, poles, lines, exchange and supply of electricity, supply of water along with damaging bridges, roads and government as well as private buildings.
- Vast area, nearly 10 blocks in the coastal districts ranging from Puri to Kendrapara suffered from saline inundation due to



It was probably the greatest cyclonic disaster ever recorded in the last century.

Damage caused due to super cyclone-1999

- The cyclone affected 1.89 crores people in 14 districts of Odisha along with death toll of approximately 10,000 with loss of 4.45 lakh livestock, crops of 18.43 lakh hectare

flooding and cyclone induced tidal surge of 6 to 8 meters.

- Cyclone destroyed 90% of the coastal vegetation, mangroves of Kendrapara and Jagatsinghpur along with vanishing the coastal shelter belt plantation and casuarina forest from Paradip to Konark.

Devastation of super cyclone left everybody traumatized but the disastrous consequences of recently occurred severe cyclonic storm Phailin had been reduced to a greater extent i.e., only 23 death toll due to proper planning, vast evaluation and implementation of mitigation strategy.

Mitigation And Management Of Cyclonic Hazard

Existing disaster management arrangements

- The state government has formulated a disaster management policy with a focus on total risk management and vulnerability reduction, strengthening physical infrastructure, psychological as well as socio-economic status of people to reduce vulnerability.
- A state level natural calamity committee has been formed under the chairmanship of Chief Minister for overall supervision and monitoring at the state level with subordinate committees and village level task force committee at district level, block level and Gram Panchayat level.
- A four stage warning system for tropical cyclone is followed by IMD since 1999
- Pre cyclone watch- a special bulletin is issued containing early information about the development of cyclonic disturbances.
- Cyclone alert –It is issued at least 48 hours in advance of the expected commencement of adverse weather over the coastal area.
- Cyclone warning – it is issued at least 24 hours in advance.
- Post landfall scenario-It is issued to cover the devastating impact of the cyclone in coastal areas.
- After the weakening of the cyclone into a depression stage, a final message on dewarning is issued.
- The warning received by IMD at state level is communicated to the district collectors which is communicated further to the Tahsildars and B.D.Os.
- Prior to 1999, there were only 23 cyclone centers while in the post super cyclone period 97 multipurpose cyclone shelters, 10042 school cum cyclone shelters were constructed by state government.
- Government of Odisha is implementing GOI-UNDP Disaster Risk Management programme in the cyclone prone blocks and stressing on formation of disaster management team at village level.
- Extensive trainings have been conducted for officers at different level on specialized training in search and rescue operation and psychological first aid.

Major disaster risk reduction initiatives being taken

- After super cyclone Government of Odisha constituted Odisha State Disaster Management Authority(OSDMA) to have a systematic and planned approach to disaster mitigation and management in the state.
- State Government have constituted 5 units of Odisha Disaster Rapid Action Force(ODRAF) being procured with equipment for use during disaster management.
- Government has implemented UNDP sponsored Disaster Risk Management Programme at multi-level and construction of Emergency Operation Centers or Control Room.
- 22 satellite phones have been provided to 17 districts and toll free numbers 1077 and 1070 installed in district Control Rooms and State Control Room respectively.

- OSDMA has started reconstruction and construction of new saline embankments, road and water supply construction of health centers, educational centers and agro – service centers in the aftermath of cyclone.

Projects taken to hand on cyclone risk mitigation

Many projects are taken into hand by Government through National Cyclone Risk Mitigation Project(NCRMP) of which following are the important projects-

- Construction of multipurpose cyclone shelters.
- Construction and renovation of embankments and coastal canals for improved drainage.
- Construction of approaching roads for connectivity to cyclone shelters and served villages.
- Shelter belt plantation and casuarina forests.
- Regeneration of mangroves.

Reduction Of Loss Due To Proper Management And Mitigation

Phailin –An Overview

It is the second strongest tropical cyclone ever to make landfall in India behind only 1999 super cyclone. It hit Odisha on 12 October 2013 having average wind speed of 250 k.m/ hour and made landfall near Gopalpur in Odisha. Total death toll was 44 with loss of 42.4 billion rupees while it was 6243.96 million rupees.

Mitigation

- 600 buildings were identified as cyclone shelter and people were evacuated from areas near the coast.
- The cyclone prompted in India's biggest evacuation with more than 11 lakh people

moved up from the coast land of Odisha to safer places.

- The Odisha Government issued high alert to cyclone prone districts and canceled the Dussehra holiday of employees in all 30 districts of Odisha.
- Food and relief material were stocked-up at storm shelters across the State and made arrangement for over 1000560 food packets for relief.

Cyclone being a natural phenomenon cannot be stifled or we cannot change its path but with preparedness, proper mitigation strategy and proper disaster management we can considerably reduce the devastation of public life and public property and other disastrous consequences of cyclone to a great extent. The recent cyclone Phailin is a burning example of this.

References :

- As it happened: cyclone reaches Odisha by Tripti Lahari, India Real Time, 12/oct/2013
- A report on Phailin by Prasad Nichenametla, The Hindustan Times, 13/oct/2013
- Mitigation of flooding and cyclone hazards in Orissa, India- P. Chittibabu, A.D. Rao, U.C. Mohanty, S.K. Dube, J.B. Macnabb, T.S. Murty, P.C. Sinha
- Orissa(India) super-cyclone : impact and emergency management- V.K. Sharma and A.A. Khan
- www.wikipedia.com
- www.slideshare.net
- www.osdma.org
- www.ncrmp.gov.in
- www.imd.gov.in