Chapter 3

CYCLONES

A school building lies in shambles after the cyclone, wind and water ravaged the village

The extract on the right from a newspaper gives you an idea of the devastating power of a cyclone. The Indian subcontinent is the worst cyclone-affected part of the world, as a result of low-depth of the Ocean bed and the way our coast is shaped. The Indian Ocean is one of the six major cyclone-prone regions of the world.

12th May 1990

Andhra Pradesh coast was hit by a severe cyclonic storm on 8th May 1990 with wind speed about 240-250 km/h and 5-6 metre-high storm surges. The area all along the coast of Krishna and Guntur districts was affected severely by the storm, which was accompanied by gales and heavy rainfall. Other areas were affected by flooding due to heavy rainfall. The cyclone affected 9 of the total 23 districts, while the number of villages affected was 5,923. The cyclone killed 928 persons and around 24,000 cattle. A total of about of 7.8 million people were affected by the cyclone. About 827,100 houses were partially damaged while 569,000 were completely destroyed. More than 500,000 hectares of agricultural and horticultural land was affected. Total damage to property was worth Rs 125 million.

Source: Press Release, Government of Andhra Pradesh

Look at this picture. It shows children standing outside their school whose roof was partly blown off, during the Orissa Cyclone on 29th October 1999.

Every year cyclones take their toll on thousands of people, and property. *But the magnitude of destruction can be reduced to a large extent through knowledge and preparedness.*

What Is a cylcone?

A cyclone is a region of low atmospheric pressure, which occurs in the hot oceans of temperate and tropical latitudes. It is a swirling atmospheric disturbance, accompanied by powerful winds (exceeding the 300 km/h sometimes) blowing in a clockwise direction in the **Northern** hemispheres and anti clock wise direction in the **Southern** hemisphere, by pouring rain, and enormous waves in the ocean. Cyclones occur due to a combination of warm sea temperature, high relative humidity and atmospheric instability.

In a cyclone, clouds gather around a centre that is called the **"eye of the cyclone".** A zone of calm, accompanied by good weather characterises the eye. It is in edge of the eye called the "wall of the eye" (in a radius of 20 to 30 kilometres) that the worst conditions prevail, with devastating winds. So, as the eye of the cyclone crosses an area, the wind drops. As it passes, the wind speed rises again, and hence the calm should not be confused as the 'end' of the cyclone.

The diameter of the cyclone is often several hundreds of kilometres. That of the eye varies between 20 and 50 km and the cloudy mass of the cyclone raises to occupy all of the troposphere.

Important Terms:

Troposphere: The layer of the Earth's atmosphere that is closest to its surface, between 0-10 km. Most (90%) of the Earth's atmosphere lies within the Troposphere.

What happens during a cyclone?

The principal dangers from a cyclone are:

(i) Gales and strong winds; (that may uproot trees, destroy telephone lines and electricity poles which may disable power and communication)

(ii) Torrential rain that can cause flooding

(iii) High tidal waves (also known as 'storm surges'). Most casualties are caused by coastal inundation by tidal waves and storm surges.

The rise in water level caused by a storm surge can cause severe flooding in coastal areas, particularly when this surge coincides with the normal high-tide.

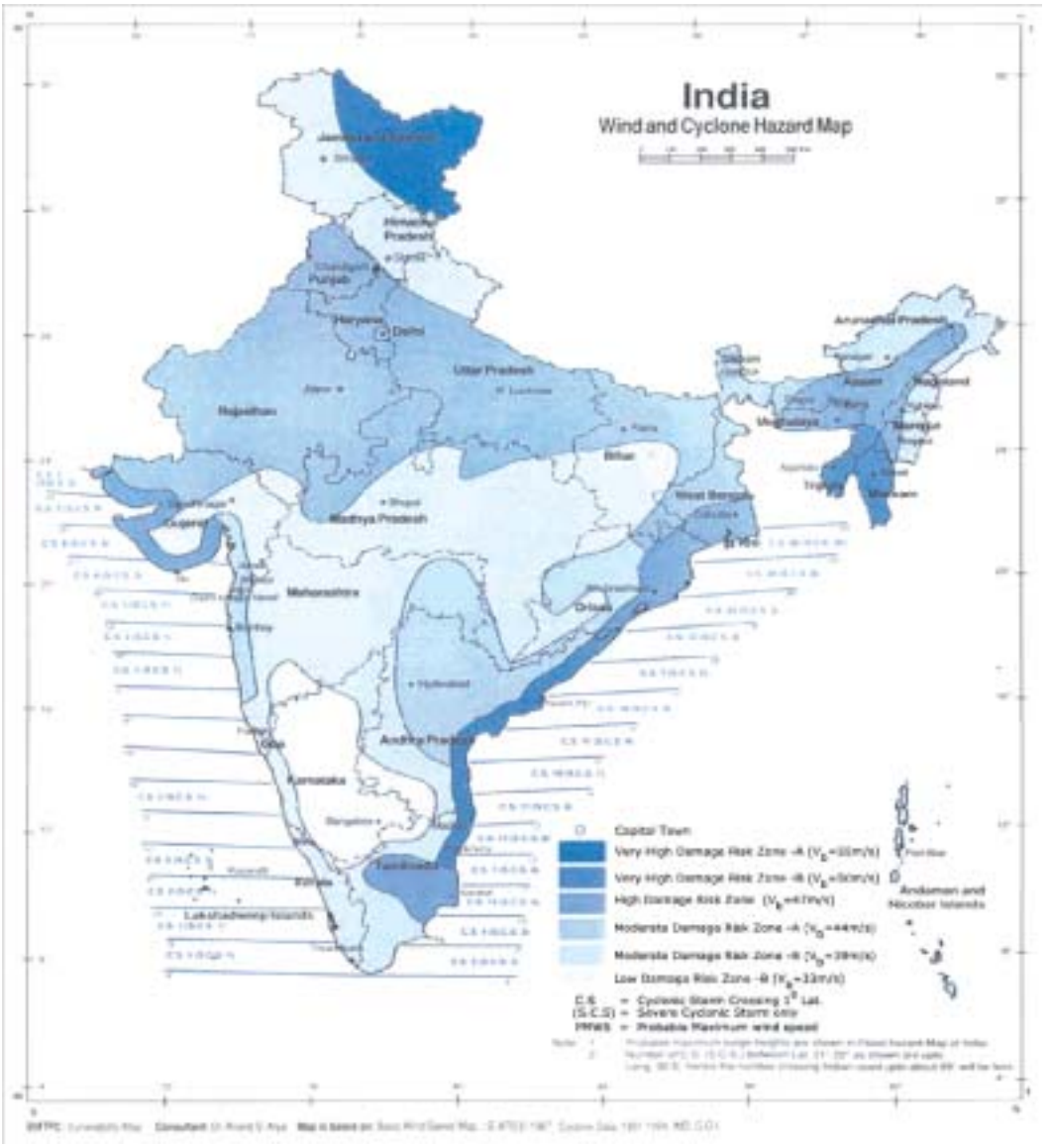
Preparing for cyclones

Knowing about the areas that are most likely to be hit by cyclones is the first step towards preparedness. Cyclones usually occur between 5-20 degrees latitude, North and South of the equator.

Important Terms:

Storm Surge: is simply water that is pushed toward the shore by the force of winds swirling around the cyclone. This advancing surge combines with the normal tides to create a cyclonic tidal wave, which can increase the mean water level by more than 15 feet. The slope of the continental shelf also determines the level of surge. A shallow slope of the coast causes deeper inundation and flooding.

Wind and Cyclone Hazard Map of India:



The eastern coastline is more prone to cyclones as around 80 per cent of the total cyclones generated in the region hit there.

The entire East Coast is vulnerable to cyclones arising mainly in the Bay of Bengal. The states most exposed to cyclone-related hazards, including strong winds, floods and storm surges, are West Bengal, Orissa, Andhra Pradesh and Tamil Nadu along the Bay of Bengal. Along the Arabian Sea

DO YOU KNOW ? Storms such as cyclones in India are known as hurricanes in the Atlantic Ocean, typhoons in the Pacific Ocean, and Willie-Willie in Australia

on the West Coast, the Gujarat and Maharashtra coasts are more vulnerable compared to the southern part. The **frequency of tropical cyclones is the greatest in the Bay of Bengal and Arabian Sea** as compared to other cyclone-prone areas in the world.

Cyclones and Environmental Degradation

Forests along the coast act as natural wind and water barriers, shielding the coastal communities from the destructive power of cyclones and storm surges. They form natural windbreakers to reduce the impact of cyclonic storms on the coastal areas. But deforestation and encroachment of the coastal shelterbelt area, as this forestland is known, by paddy cultivators, prawn farmers, etc. has been depleting these forests.

Are we increasing our own vulnerability?

True, natural calamities are hard to avert. But in Orissa the ordeal was also man-made. There has been a systematic destruction of mangrove and other tropical trees having branches that send down roots. This growth protected the coastal areas. Greedy people have deforested the coastal areas, leaving no impediment between the sea and habitations.

13 November 1999, Rediff on the Net (adapted from the internet news site)

Cyclone forecasting and warning

The Indian Meteorological Department (IMD) is responsible for cyclone tracking and warning. Cyclone tracking is done through the INSAT satellite and 10 cyclone detection radars. Warning is issued to cover ports, fisheries and aviation departments. The warning system provides for a cyclone alert of 48 hours and a cyclone warning of 24 hours. There is a special Disaster Warning System (DWS) for dissemination of cyclone warning through INSAT satellite to designated addresses at isolated places in local languages.

Cyclone warning and mock-drills work wonders:

This is evidenced from the difference in loss suffered during cyclones of comparable intensity that hit the Andhra Pradesh coast in 1977 and 1990. The cyclones were accompanied by high storm surges of huge intensity. The number of deaths in 1977 was over 10,000 whereas the loss of human lives in 1990 was less than 1,000. Timely warnings issued by the IMD enabled the administration in evacuating and transporting over half a million people from the affected areas, who had practised their disaster preparedness and response plans over and over.

Managing Cyclones....

Managing any disaster requires at the outset, a clear definition of the role to be played by every individual in a community. We have learnt that a Community Contingency Plan is a list of activities a village decides to follow, to prevent loss of life, livelihood and property in case of an emergency. It also identifies in advance, actions to be taken by individuals in the community so that each one is aware of specific responsibility when an emergency warning is received. The community makes the plan, with the help of civil society, government functionaries and elected representatives of the people.

As a student, you have an important role in creating awareness and disseminating information.

In The Cyclone Seasons:

1. Listen to radio or TV weather reports and in case of a cyclone warning, ensure that everyone is alerted. This is usually done through loudspeakers or by going from house to house.
2. Identify safe shelters (cyclone shelters, pucca buildings, etc) in your area, and the closest and safe route to reach them.
3. Keep an emergency kit ready at home
4. Check your house and surrounding areas to see if it is secure. Doors, windows, the roof and walls should be strengthened before the cyclone season through retrofitting, repair, etc.

5. Store adequate food grains and water in safe places.
6. Keep your important papers in the emergency kit.
7. Keep a list of emergency addresses and phone numbers such as the local police station, Block or taluka office (in rural areas) on display
8. Conduct mock drills for yourselves, imagining that a warning has been given.

Upon A Cyclone Warning

1. Listen to your local radio, TV or community warning system for further information
2. Close all windows and doors. Secure doors and stay indoors.
3. Keep food items in waterproof bags.
4. Prepare or update a list of assets and belongings of your house and give information to volunteers and other authorities about your near and dear ones.
5. Get the emergency kit ready and in case of warning of a severe cyclone, move with your family to a strong pucca building or cyclone shelter.
6. Do not venture into the sea
7. Wear warm clothing for protection

If You Have To Evacuate

1. Keep track of radio updates and advice.
2. If the wind suddenly drops, do not venture out, as this could be the eye of the cyclone. Wait till the official 'all clear' declaration.
3. If in a vehicle, stop, but away from the sea and trees, power lines and water courses.

After The Cyclone.

1. Do not go out till officially advised that it is safe. If evacuated, wait till advised to go back. Use the recommended route for returning and do not rush.
2. Check for gas leaks before using the stove.
3. Dry electric appliances thoroughly before use.

4. Be careful of snakebites

5. Beware of fallen power lines, damaged bridges, buildings and trees

6. Do not enter floodwaters.

ACTIVITY I

Read the newspaper article given below :

29 October 1999

Hundreds feared killed as cyclone devastates Orissa coast

Several hundred people were feared killed as the super cyclone with a velocity of more than 260 kph battered 10 coastal districts of Orissa for more than eight hours today. The state government called in the army and the air force to help carry out relief and rescue operations. "You cannot imagine the devastation. More than 200,000 houses have been destroyed and vast tracts in the coastal areas submerged," Chief Minister Giridhar Gamang told the United News of India on telephone. He also spoke to Defence Minister George Fernandes to send in troops, air force helicopters and transport aircraft.

All the 10 affected districts remained cut off from the rest of the country with power supply and telecommunication links cut off. According to initial reports, heavy damage has been reported in the affected areas. Road links in certain areas have been cut off.

The cyclone hit Paradip port this morning at a speed of 260kph. The diameter of the cyclone was very big and all nine coastal districts of Orissa were affected badly. The storm of rare intensity left petrified residents fearing for their lives in the capital and the thickly populated areas along the coast. Massive loss of life and property was feared, but a clear picture will emerge only after the storm abates.

The hardiest of trees fell to the ferocity of the gales, which swept away much of what came in their way. Torrential rains continued to lash the capital city, which is about 65 km from the Puri coast. The flat terrain along the coast allowed the strong tidal waves to reach far inland without obstruction. The cyclone stormed Bhubaneswar at around 0830 IST. The gale speed had touched a howling 260 kph by 1500 IST. Telephone and electricity poles snapped like matchsticks, leaving the telecommunication network in shambles. Power breakdowns plagued the affected areas with little prospects of early restoration of supply. The air traffic control tower in Bhubaneswar reportedly suffered damage, leaving little scope for early resumption of air traffic. Fallen trees blocked the roads and the highway between Cuttack and Bhubaneswar.

The army moved in to provide immediate relief. Two signal attachments were flown in with INMARSAT terminals to re-establish telecommunication links. Electrical and mechanical engineers of the army are already trying to restore power supply.

Huts and other fragile structures collapsed, forcing the inmates to seek shelter in temples and schools. Tidal waves rose two-storeys high, breaking embankments at Talachua in Paradip and Erasama. Large parts were inundated in the coastal areas. But details

were not immediately available. Ships had been taken off the harbour. Several buildings, including the state secretariat complex, were damaged. Eyewitnesses said no tall tree was standing in the entire city anymore. Old-timers said they had never seen such devastation.

The building housing the UNI offices in the heart of the city was among the structures damaged. It forced the agency to shut down its computerised news operations. The only means of communication available was the telephone line, which also threatened to go off anytime.

Full details of the havoc wrought by the cyclone are yet to come in, but it was feared to have left a ghastly trail, especially in the coastal areas. Meanwhile, the railways cancelled 14 passenger and mail trains scheduled to run in the cyclone-affected areas.

Source: United News of India

1. Imagine that you were in Bhubaneswar when the storm struck…. Write down what you experienced and saw around you in a page. Share your experiences with your classmates.

2. In your view, what preventive actions could Orissa have taken to reduce the damage caused when the Super Cyclone struck?

ACTIVITY II

Make a contingency plan with all the members in your class and conduct a mock cyclone drill following a cyclone warning.

ACTIVITY III

How would you increase awareness among your community members about preparedness for cyclones? Make charts and illustrations, which shows this.

EXERCISES

1. What causes a cyclonic storm?

2. What are the hazards associated with cyclones?

3. What is the eye of a cyclone and what are its characteristics?

4. List the steps in preparing for a cyclone.

5. Besides natural causes, what are the man made reasons, which have contributed to increase in the impact of cyclones?

6. Which are the cyclone prone areas of our country?