

Natural Disaster Management “Cyclone”

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Abstract: A low-pressure area was formed over east equatorial Indian Ocean (EIO) and adjoining southeast of Bay of Bengal (BoB) on 25.04.2019 intensifying into a Severe Cyclonic Storm over southeast & adjoining southwest BoB. It further intensified into Extremely Severe Cyclonic Storm ‘FANI’ over west central & adjoining southwest of Bay of Bengal on 1 May 2019 hitting one of the poorest coastal states of India “Odisha”. The Extremely Severe Cyclonic Storm ‘FANI’ made landfall on the Odisha Coast south of Puri on 3 May, 2019. Cyclone 'FANI' barrelled through Odisha on Friday 3 May 2019, unleashing copious rain and windstorm that gusted up to 175 kmph.

The cyclone affected 1.6 crore people, blowing away thatched houses, and swamping towns and villages. The Odisha government presented a preliminary report putting the losses at ₹11,942 crore. The districts affected by Fani are: Puri, Khurda, Cuttack, Mayurbhanj, Keonjhar, Balasore, Bhadrak, Jajpur, Angul, Dhenkanal, Nayagarh, Ganjam, Kendrapara and Jagatsinghpur. More than five lakh houses were damaged in the region, including 1,89,095 houses and apartments in Puri district alone. Puri district was in the eye of the storm which caused 64 human casualties. Lakhs of livestock also perished in the cyclone, which damaged summer crops, plantations and sanctuaries. While the cyclone caused losses to government properties and the Jagannath temple to the tune of ₹5,175 crore, an amount of ₹6,767 crore was required for relief and response. The highest estimated loss of ₹1,159 crore was suffered by the power sector managed by the Energy Department.

The cyclone has damaged almost all the kuccha houses, polythene roofed houses, tin and asbestos roofed houses in the area and made more than 60% families homeless. The major source of income from coconut orchards has been devastated making more than 35% people out of their livelihoods. The most vulnerable section of the affected community includes the women, the children, the elderly people and the persons with disability. The “FANI” also effected the transportation system of Odisha and other neighbouring states like West-Bengal, Assam, etc around 220 trains along the Howrah-Chennai route have been cancelled keeping in view passengers safety, Airports are also remain closed for several hours and Roadways also get effected due to the blockage of National Highways.

I. INTRODUCTION

A low-pressure area was formed over east equatorial Indian Ocean (EIO) and adjoining southeast of Bay of Bengal (BoB) on 25.04.2019 intensifying into a Severe Cyclonic Storm over southeast & adjoining southwest BoB. It further intensified into Extremely Severe Cyclonic Storm ‘FANI’ over west central & adjoining southwest of Bay of Bengal on 1 May 2019 hitting one of the poorest coastal states of India “Odisha”. The Extremely Severe Cyclonic Storm ‘FANI’ made landfall on the Odisha Coast south of Puri on 3 May, 2019. Cyclone 'FANI' barrelled through Odisha on Friday 3

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MAN-MADE & NATURAL DISASTER

DISASTER

A disaster is a sudden, calamitous event that seriously disrupts the functioning of a community or society and causes human, material, and economic or environmental losses that exceed the community's or society's ability to cope using its own resources. Though often caused by nature, disasters can have human origins.

Disasters are of two types:

- Natural disasters.
- Man-made disasters.

NATURAL DISASTER

A natural disaster is a major adverse event resulting from natural processes of the Earth. A natural disaster can cause loss of life or property damage, and typically leaves some economic damage in its wake, the severity of which depends on the affected population's resilience, or ability to recover.

Example-

- Earthquakes
- Volcanic eruptions
- Cyclones
- Floods
- Droughts
- Tornadoes
- Tsunami

CAUSE OF NATURAL DISASTER

The causes of natural disasters are many-

Human activities play a role in the frequency and severity of disasters. A natural disaster is a disruption in the balance of the environment. The human factor raises the cost, in both property damage and loss of life. Understanding the causes of natural disaster can provide clues to their prevention. Not all natural disasters can be prevented. Each natural disaster has its

own factors and complications. Understanding the basic principles of ecology can provide keys to lessening their effects. Nature evolved with natural disasters and disturbance. The best prevention is looking at the strategies found in nature.

a. EARTHQUAKES

An earthquake is a shaking of the ground caused by the sudden breaking and movement of tectonic plates of the earth's rocky outermost crust. The edges of the tectonic plates are marked by faults. Most earthquakes occur along the fault lines when the plates slide past each other or collide against each other. The shifting masses send out shock waves that may be powerful enough to alter the surface of the Earth, thrusting up cliffs and opening great cracks in the ground and cause great damage collapse of buildings and other man-made structures, broken power and gas lines, landslides, snow avalanches, tsunamis.



Figure 1: Earthquake



Figure 2: Earthquake

b. VOLCANIC ERUPTIONS

Volcanoes can cause widespread destruction and consequent disaster in several ways. The effects include the volcanic eruption itself that may cause harm following the explosion of the volcano or the fall of rock. Second, lava may be produced during the eruption of a volcano. As it leaves the volcano, the lava destroys many buildings and plants it encounters. Third, volcanic ash may form a cloud, and settle

thickly in nearby locations. In sufficient quantity ash may cause roofs to collapse under its weight but even small quantities will harm humans if inhaled. A specific type of volcano is the super volcano. The main danger from a super volcano is the immense cloud of ash which has a disastrous global effect on climate and temperature for many years.



Figure 3: Volcanic Eruption



Figure 4: Volcanic Eruption

c. CYCLONES

Cyclone in meteorology refers to any low pressure area with winds spiraling inwards. Cyclones rotate clockwise in the Southern Hemisphere and anti-clockwise in the Northern Hemisphere. Cyclone is the general term for a variety of low pressure system types, such as tropical cyclones, extra tropical cyclones and tornadoes. The largest of the low-pressure systems are the extra tropical cyclones and the cold-core polar cyclones which lie on the synoptic scale which in meteorology is a horizontal length of 1000 km or more. The Warm-core cyclones are the tropical cyclones, mesocyclones, and the polar lows that lie within the smaller mesoscale. The Subtropical cyclones are intermediate in size. Cyclones have also been on other planets outside of the Earth, such as Mars and Neptune. For example the Great Red Spot of Jupiter and the Great Black Spot of Neptune. Cyclones are also referred to as hurricanes and typhoons. They consist of the eye, eye wall and rain bands. The calmest part of a cyclone is its eye which is at the middle of a cyclone.



Figure 5: Cyclone



Figure 6: Cyclone "FANI"

d. FLOODS

A flood is an overflow of an expanse of water that submerges land. The Floods directive defines a flood as a temporary covering by water of land not normally covered by water. In the sense of "flowing water", the word may also be applied to the inflow of the tide. Flooding may result from the volume of water within a body of water, such as a river or lake, which overflows or breaks levees, with the result that some of the water escapes its usual boundaries. While the size of a lake or other body of water will vary with seasonal changes in precipitation and snow melt, it is not a significant flood unless the water covers land used by man like a village, city or other inhabited area, roads, expanses of farmland, etc.



Figure 7: Flood



Figure 8: Flood

e. DROUGHTS

Droughts occur in virtually all climates. Of all the weather-related phenomena that can cause severe economic impacts in the United States, droughts come in second only to hurricanes, according to the National Climatic Data Center. But unlike hurricanes, which are easily identified and straightforward to classify in terms of wind speeds, droughts are much tougher to define. Most people think of a drought as a period of unusually dry weather that persists long enough to cause problems such as crop damage and water supply shortages.



Figure 9: Drought



Figure 10: Drought

f. TORNADOES

A tornado is a violent rotating column of air extending from a thunderstorm to the ground. The most violent tornadoes are capable of tremendous destruction with wind speeds of up to 300 mph. They can destroy large buildings, uproot trees and hurl vehicles hundreds of yards. They can also drive straw into trees. Damage paths can be in excess of

one mile wide to 50 miles long. In an average year, 1000 tornadoes are reported nation wide. Most tornadoes form from thunderstorms.



Figure 11: Tornado



Figure 12: Tornado

g. TSUNAMI

A tsunami is a series of water waves caused by the displacement of a large volume of a body of water, generally an ocean or a large lake. Earthquakes, volcanic eruptions and other underwater explosions landslides, glacier calving's, meteorite impacts and other disturbances above or below water all have the potential to generate a tsunami. Tsunami waves do not resemble normal sea waves, because their wavelength is far longer. Rather than appearing as a breaking wave, a tsunami may instead initially resemble a rapidly rising tide. Tsunamis generally consist of a series of waves with periods ranging from minutes to hours, arriving in a so-called "wave train". Wave heights of tens of metres can be generated by large events. Although the impact of tsunamis is limited to coastal areas, their destructive power can be enormous and they can affect entire ocean basins; the 2004 Indian Ocean tsunami was among the deadliest natural disasters in human history with at least 290,000 people killed or missing in 14 countries bordering the Indian Ocean.



Figure 13: Tsunami



Figure 14: Tsunami



Figure 16: Baby effected by Nuclear disaster

MAN-MADE DISASTER

A man-made disasters is a disaster resulting from human intent, negligence, or error. Manmade disasters can be both intentional and unintentional. It results in huge loss of life and property. It further affects a person's mental, physical and social well-being.

The causes of man-made disasters are:

- Ignorance 52%
- Unawareness 20%
- Illiteracy 40%
- Carelessness 42%

Examples of Man Made Disasters:

- Nuclear disaster
- Chemical disasters
- Terrorism
- Fire disasters
- Deforestation

a. NUCLEAR DISASTER

A nuclear and radiation accident is defined by the International Atomic Energy Agency as "an event that has led to significant consequences to the people, the environment or the facility." Examples include lethal effects to individuals, large radioactivity release in to the environment, or reactor core melt. This is the types of disaster that falls in this category is nuclear bomb. When this occurs, it is often as a result of intent and the end results are even more catastrophic with a large percentage of those involved losing their lives.



Figure 15: Nuclear Blast

b. CHEMICAL DISASTERS

A chemical accident is the unintentional release of one or more hazardous substances which could harm human health or the environment. Chemical hazards are systems where chemical accidents could occur under certain circumstances. Such events include fires, explosions, m leakages or releases of toxic or hazardous materials that can cause people illness, injury, disability or death. By their nature, the manufacture, storage, and transport of chemicals are accidents waiting to happen. Chemicals can be toxic, and they may react, often explosively. The impacts of chemical accidents can be deadly, for both human being environments. While chemical accidents may occur whenever toxic materials are stored, transported or used, the most severe accidents are industrial accidents, involving major chemical manufacturing and storage facilities. The most significant chemical accident in recorded history was the 1984 Bhopal disaster in India, in which more than 3,000 people had died after a highly toxic vapour, (methyl isocyanate), was released at a Union Carbide Pesticides factory.



Figure 17: Chemical disaster



Figure 18: Chemical Disaster

c. *TERRORISM*

Terrorism is the use of fear and acts of violence in order to intimidate societies or governments. Many different types of social or political organizations might use terrorism to try to achieve their goals. People who do terrorism are called terrorists.

It is difficult to explain terrorism. Terrorism has no official criminal law definition at the international level. Common definitions of terrorism refer to violent acts which are intended to create fear (terror); are done for a religious, political, or ideological goal; and which target civilians. Some definitions now include acts of unlawful violence and war. The use of similar tactics by criminal gangs is not usually called terrorism, though these same actions may be called terrorism when done by a politically motivated group.



Figure 19: Terrorism



Figure 20: Terrorism

d. *FIRE DISASTER*

“Fire is a very good servant, but, a very bad master”. As long as fire is under our control, it serves a lot of useful purposes for us, but, once it goes out of our control, it can create a lot of destruction. However, despite the presence of fire safety measures, the occurrence of accidents is oftentimes inevitable. Because of the useful purposes that it serves, people keep sources of fire in/around their houses/workplace. These sources could sometimes result in "undesired" fire.



Figure 21: Fire Disaster



Figure 22: Fire Disaster

e. *DEFORESTATION*

Deforestation is when humans remove or clear large areas of forest lands and related ecosystems for non-forest use. These include clearing for farming purposes, ranching and urban use. In these cases, trees are never re-planted.

Forests cover 31% of the land area on our planet. They produce vital oxygen and provide homes for people and wildlife. Many of the world’s most threatened and endangered animals live in these forests 1.6 billion people rely on benefits forests offer, including food, fresh water, clothing, traditional medicine and shelter.



Figure 23: Deforestation



Figure 24: Deforestation

II. RISK ASSESSMENT

After the huge effect of Cyclone “Fani” in 18,388 villages and 51 towns in 14 districts of Odisha the report was presented to the visiting inter-ministerial Central team assessing the cyclone damages. The districts affected by Fani are: Puri, Khurda, Cuttack, Mayurbhanj, Keonjhar, Balasore, Bhadrak, Jajpur, Angul, Dhenkanal, Nayagarh, Ganjam, Kendrapara and Jagatsinghpur.

More than five lakh houses were damaged in the region, including 1,89,095 houses and apartments in Puri district alone. Puri district was in the eye of the storm which caused 64 human casualties. Lakhs of livestock also perished in the cyclone, which damaged summer crops, plantations and sanctuaries. While the cyclone caused losses to government properties and the Jagannath temple to the tune of ₹5,175 crore, an amount of ₹6,767 crore was required for relief and response.

The highest estimated loss of ₹1,159 crore was suffered by the power sector managed by the Energy Department. The losses in the Panchayati Raj and the Drinking Water departments stand at ₹587 crore.

The Works Department suffered losses to the tune of ₹597 crore, the Forest and Environment Department ₹537 crore, the Housing and Urban Development ₹524 crore, and the Rural Development Department suffered a loss of ₹435 crore, according to the preliminary report. As many as 44 teams of the National Disaster Response Force, 20 teams of the Odisha Disaster Response Force and 525 fire and disaster response teams, including around 200 teams from Andhra Pradesh and West Bengal were engaged in the post-cyclone work. While relief work was on in the affected areas, 339 tankers, 214 generator sets and 1,029 PVC tanks were deployed for ensuring water supply. While 100% water supply was restored in Bhubaneswar, 90% water supply was restored in Puri town.

“FANI” also caused great loss in Roadways transport, Railways transport & Airways transport. Around 220 trains along the Howrah-Chennai route have been cancelled keeping in view passengers' safety. Indira Gandhi International airport in Delhi issued a flight cancellation report due to Cyclone Fani. Ten departures were cancelled to Bhubaneswar while 15 departures were cancelled to Kolkata. Nine arrivals were cancelled from Bhubaneswar while 5 arrivals were cancelled from Kolkata.

Though human lives were saved, destruction could not be avoided in the eastern districts, especially in and around Bhubaneswar, Cuttack, Khordha and temple town Puri, more than 1.5 lakh electricity poles fell and high-tension transmission lines broke down.

The storm also uprooted lakhs of trees. In Bhubaneswar alone, some estimate, some two lakh trees fell, the city looks devastated with fallen trees all around. Many of the trees fell on transmission lines, further complicating the situation.

A large number of cattle are lost and the heavy wind and rain damaged the kharif crop, vegetable cultivation and cash crops too. The horticulture is worst affected, the riping mangoes have fallen off and the crop is almost destroyed causing a severe setback to the economy. The internal road blockades are still a major challenge to fasten the relief and

rehabilitation operations. The devastating cyclone has shaken the backbone of coastal Odisha and killed the hope and dreams of people in rural as well as urban slums.

The cyclone has damaged almost all the kuccha houses, polythene roofed houses, tin and asbestos roofed houses in the area and made more than 60% families homeless. The major source of income from coconut orchards has been devastated making more than 35% people out of their livelihoods. The most vulnerable section of the affected community includes the women, the children, the elderly people and the persons with disability.

Sanitary and hygiene conditions are extremely poor in the affected slums as toilets have been collapsed and damaged. Drinking water sources have been heavily contaminated; even the village ponds have fallen trees, debris and dead aquatics. Families have lost their household belongings (clothes, utensils, food grains etc) under the collapsed structures, Children have lost their study materials and their books, notebooks, pen, and pencils have been crushed into pieces. They have been deprived of food and drinking water since days. Families have lost their clothes, their accessories including bed, bed sheets, furniture and others and are living in the debris of their own assets.

The state and district administration along with local civil society and panchayatiraj institutions have been able to get some 1.1 million people evacuated soon after the warning was made by the Indian Meteorological Department (IMD) and prior to the land fall of Cyclone FANI. The massive evacuation was possible due to the improved community awareness created over the years of effort by the government and non-government humanitarian agencies backed by robust systems and processes put in place to evacuate and providing temporary shelters in some 850 Multi-Purpose Cyclone Shelters (MPCS) built during last twenty years with investments coming from the state as well as the civil society.



Figure 25: Destruction by Cyclone “FANI”



Figure 26: Roadways block by Cyclone “FANI”

III. DISASTER PREPAREDNESS

Word "Cyclone" is derived from the Greek, word "Cyclos" meaning the coils of a snake. "Cyclone" is an intense whirl in the atmosphere with very strong winds circulating around it in anti-clockwise direction in the Northern Hemisphere and in clockwise direction in the Southern Hemisphere. Cyclones are intense low pressure areas from the centre of which pressure increases outwards. The amount of the pressure drop in the centre and the rate at which it increases outwards gives the intensity of the cyclones and the strength of winds.

Cyclones are classified as:

- ✓ Extra tropical cyclones (also called temperate cyclones); and
- ✓ Tropical cyclones.

Extra tropical cyclones occur in temperate zones and high latitude regions, though they are known to originate in the polar regions.

Cyclones that developing the regions between the tropics of Capricorn and Cancer are called tropical cyclones. Tropical cyclones are large-scale weather systems developing over tropical or subtropical waters, where they get organized into surface wind circulation.

Although we know that natural disaster cannot be control by us as, but we can control it taking some steps towards saving our environment, by changing our behaviour towards environment. Natural disaster always causes a huge damage to the Human, Animal, Marine or aquatic life and it also cause destruction of Man-made things with a great loss in economy of the Country. It is right to say that government must take necessary steps to control the natural disaster but as a human on Earth we must take necessary steps along with government to save our Planet.

To control the Cyclone disaster in India, The Govt. of India establish in 1969, set up "Cyclone Distress Mitigation Committee" (CDMC) with the objective of preventing loss of life and minimizing damage to properties.

Some Indian Natural Disaster Controlling Associations are-

- Area Cyclone Warning Centres (ACWC)
- Cyclone Warning Centres (CWC)
- Numerical Weather Prediction (NWP)
- Northern Hemispheric Analysis Centre (NHAC)
- Cyclone Warning Research Centre (CWRC)
- Regional Specialized Meteorological Centre

CYCLONE OPERATION IN INDIA

- ✓ Meteorological Department, by providing Cyclone Surveillance Radars at Calcuta in the east coast and at Goa, Bombay in the west coast.
- ✓ Satellite picture receiving equipment's at Delhi, Bombay, Madras are receiving satellite pictures of the cyclones from the polar-orbiting Satellites of the U.S.A. and U.S.S.R. Since April 1982.
- ✓ A.V.H.R.R. (Advance very High Resolution Radio-meter) Indian Geo Stationary Satellite INSAT-LB has become operational since October 1983. Monitoring of the cyclone by taking hourly pictures has helped the

forecaster to improve his skill in issuing the timely warnings to the public.

HOW TO PROTECT YOURSELF DURING CYCLONE-

- ✓ If you are in the car, stop driving.
- ✓ Move away from electric poles, trees, etc.
- ✓ Close doors & windows
- ✓ Switch off electric appliances and stay in home.
- ✓ Keep a note of all the warnings given by the Meteorological Department.
- ✓ Keep emergency phone numbers of police, ambulance and fire brigade handy.
- ✓ Move people and valuable items to a safe place.

PLANS TO AVOID THE CATASTROPHE-

- ✓ A Cyclone Forecast - and Warning Service.
- ✓ Rapid dissemination of warnings to the Government Agencies, Marine interests like the Ports, Fisheries and Shipping and to General Public.
- ✓ Organisations to construct Cyclone Shelters in the cyclone-prone areas and ready machinery for evacuation of people to safer areas.
- ✓ Community preparedness at all levels to meet the exigencies.

CYCLONE WARNING:

- ✓ The first stage warning known as the "Cyclone Alert" is issued 48 hours in advance of the expected commencement of the adverse weather over the coastal areas.
- ✓ The second stage warning known as the "Cyclone Warning" is issued 24 hours in advance.
- ✓ Both cyclone "Alert" and "Warning" messages are passed to the AIR stations for repeated broadcast.

CYCLONES - DO'S & DON'TS:

BEFORE THE CYCLONE SEASON

- ✓ Check the house; secure loose tiles, carry out repair works for doors and windows
- ✓ Remove dead woods or dying trees close to the house; anchor removable objects like lumber piles, loose tin sheds, loose bricks, garbage cans, sign-boards etc. which can fly in strong winds
- ✓ Keep some wooden boards ready so that glass windows can be boarded if needed
- ✓ Demolish condemned buildings
- ✓ Keep some dry non-perishable food always ready for emergency use.

WHEN THE CYCLONE STARTS

- ✓ Listen to the radio about weather warnings keep monitoring the warnings. This will help you to prepare for a cyclone emergency.

- ✓ Pass on the information to others. Believe in the official information
- ✓ Ignore rumours and do not spread them; this will help to avoid panic situations.
- ✓ Believe in the official information when a cyclone alert is on for your area continue normal working but stay alert to the radio warnings.
- ✓ Remember that a cyclone alert means that the danger is within 24 hours. Stay alert.
- ✓ If your house is securely built on high ground take shelter in the safer part of the house. However, if asked to evacuate do not hesitate to leave the place.
- ✓ Provide strong suitable support for outside doors.
- ✓ Keep torches handy
- ✓ Small and loose things, which can fly in strong winds, should be stored safely in a room.
- ✓ Leave early before your way to high ground or shelter gets flooded
- ✓ When your area is under cyclone warning get away from low-lying beaches or other low-lying areas close to the coast
- ✓ If you are to evacuate the house move your valuable articles to upper floors to minimize flood damage.
- ✓ Get extra food, which can be eaten without cooking. Store extra drinking water in suitably covered vessels.
- ✓ Make provision for children and adults requiring special diets.
- ✓ Be sure that a window and door can be opened only on the side opposite to the one facing the wind.
- ✓ If the centre of the cyclone is passing directly over your house there will be a lull in the wind and rain lasting for half an hour or so. During this time do not go out; because immediately after that very strong winds will blow from the opposite direction.
- ✓ Switch off electrical mains in your house.
- ✓ Remain calm

WHEN EVACUATION IS INSTRUCTED

- ✓ Pack essentials for yourself and your family to last you a few days, including medicines, special foods for babies and children or elders.
- ✓ Head for the proper shelter or evacuation points indicated for your area.
- ✓ Do not worry about your property
- ✓ At the shelter follow instructions of the person in charge.
- ✓ Remain in the shelter until you have been informed to leave

POST-CYCLONE MEASURES

- ✓ You should remain in the shelter until informed that you can return to your home.
- ✓ Strictly avoid any loose and dangling wires from the lamp posts.
- ✓ If you are to drive, drive carefully.
- ✓ Clear debris from your premises immediately.
- ✓ Report the correct loss to appropriate authorities.

IV. DISASTER RESPONSE & HOSPITALITY

The cyclone affected 1.6 crore people, blowing away thatched houses, and swamping towns and villages. The Odisha government presented a preliminary report putting the losses at ₹11,942 crore. The districts affected by Fani are: Puri, Khurda, Cuttack, Mayurbhanj, Keonjhar, Balasore, Bhadrak, Jajpur, Angul, Dhenkanal, Nayagarh, Ganjam, Kendrapara and Jagatsinghpur. More than five lakh houses were damaged in the region, including 1,89,095 houses and apartments in Puri district alone. Puri district was in the eye of the storm which caused 64 human casualties. Lakhs of livestock also perished in the cyclone, which damaged summer crops, plantations and sanctuaries.

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After the cyclone Prime Minister has taken many steps to save the life of effected people. Govt. has given all the facilities like –

- ✓ Free kitchen extended for another 15 days, most kitchens running the MPCSSs.
- ✓ The State Government announced the rehabilitation package for the cyclone victims. The beneficiaries will get INR 95,100 for fully damaged houses under rural housing schemes. Similarly the families having partially damaged houses will get INR 5,200 and INR 3,200 for nominal repair
- ✓ The affected families in Puri and Khurda districts will get 50 Kg rice, INR 2000/- and a polythene each
- ✓ Additional one-month pension to the beneficiaries in the affected areas under Social Security Scheme

V. PLANNED INTERVENTION

Following activities have been planned-

- ✓ Provide drinking water to at least 6,000 affected families
- ✓ Complementary food support for 10 days to at least 1,000 families
- ✓ Provide temporary shelter material to at least 3,000 families. This will consist of a minimum of 5 plastic sheets per family. Sheets should be lightweight, foldable, with cloth lining if possible and with anchor holes and accompanying ropes for tying purpose
- ✓ Provide dignity kit to at least 3,000 women. Each kit will consist of washing soaps 2, bathing soap 2, Safety pin, comb 1, panties - 1 large & 1 medium, sanitary napkins 4 packets, match box & candle, thread & needle, 6 hair oil sachets, 6 sachets shampoo and nylon rope,
- ✓ Household kit to at least 1,000 families
- ✓ Education kit for 1,000 children
- ✓ Cash-for-work for at least 10 days for 500 people to restore community infrastructure, cleaning of water bodies, etc.
- ✓ Livelihood revival support to at least 500 families
- ✓ Setting up of an information centre to assist target families to access their claims from the state

- ✓ Strengthening the existing health committees and supporting health surveillance system to check on possible epidemics.
- ✓ Massive health awareness campaigns and health care camps
- ✓ Cleanliness camps and village cleaning
- ✓ Training of 100 volunteers on disposing off the dead birds and animals, cleaning water bodies and other contaminated areas
- ✓ Renovation of water bodies
- ✓ Installation of water ATMs in 5 locations
- ✓ Distribution of sanitation kit at the household level
- ✓ Distribution of dignity kit to women
- ✓ Psychosocial care programme in the worst affected villages; under this activity village level government and non-government front line workers will also be trained on psychosocial care.

HAI (Humanitarian Aid International) has responded to the situation through coordination with its local member organisations CYSD, Udyama and others. In collaboration with Tata Trusts, HAI and its member CYSD have installed a water purification unit in the CYSD campus, which treats water up to 3,000 litres per hour. Potable water was being carried to the affected areas for distribution. HAI was also initiating distribution of temporary shelter material and dignity kit for women in the affected areas. A medical team was also being deployed. The state needs medium to longer-term support to rebuild, reconstruct and revive its economy.

HAI aims to complement that effort by raising necessary resources through this appeal. HAI, through its member organisation, make sure that the entire humanitarian cycle gets completed with adequate thrust on recovery and rehabilitation. HAI will strive for multiyear financing so that a humanitarian-development nexus could be established to systematically address to mitigate risks and strengthen resilience. HAI firmly believe that the state is the primary duty bearer. All activities shall be implemented accordingly in consultation and coordination with the district and state authorities.

VI. REHABILITATION, RECONSTRUCTION AND RECOVERY

After the strongest cyclone the state suffered a loss of huge amount in Agriculture, Electricity, Transportation, Infrastructure, etc. The eastern Indian state Odisha, battered by one of the strongest cyclones in two decades which needs at least Rs 1,00,000 crore (\$14 billion) to rebuild damaged houses and public infrastructure.

The cyclone affected 1.6 crore people, blowing away thatched houses, and swamping towns and villages. The Odisha government presented a preliminary report putting the losses at ₹11,942 crore. The districts affected by Fani are: Puri, Khurda, Cuttack, Mayurbhanj, Keonjhar, Balasore, Bhadrak, Jajpur, Angul, Dhenkanal, Nayagarh, Ganjam, Kendrapara and Jagatsinghpur. More than five lakh houses were damaged in the region, including 1,89,095 houses and apartments in Puri district alone. Puri district was in the eye of the storm which caused 64 human casualties. Lakhs of livestock also perished in the cyclone, which damaged

summer crops, plantations and sanctuaries. While the cyclone caused losses to government properties and the Jagannath temple to the tune of ₹5,175 crore, an amount of ₹6,767 crore was required for relief and response. The highest estimated loss of ₹1,159 crore was suffered by the power sector managed by the Energy Department.

The cyclone has damaged almost all the kuccha houses, polythene roofed houses, tin and asbestos roofed houses in the area and made more than 60% families homeless. The major source of income from coconut orchards has been devastated making more than 35% people out of their livelihoods. The most vulnerable section of the affected community includes the women, the children, the elderly people and the persons with disability. The "FANI" also effected the transportation system of Odisha and other neighbouring states like West-Bengal, Assam, etc around 220 trains along the Howrah-Chennai route have been cancelled keeping in view passengers safety, Airports are also remain closed for several hours and Roadways also get effected due to the blockage of National Highways.

As many as 44 teams of the National Disaster Response Force, 20 teams of the Odisha Disaster Response Force and 525 fire and disaster response teams, including around 200 teams from Andhra Pradesh and West Bengal were engaged in the post-cyclone work. While relief work was on in the affected areas, 339 tankers, 214 generator sets and 1,029 PVC tanks were deployed for ensuring water supply. While 100% water supply was restored in Bhubaneswar, 90% water supply was restored in Puri town. All roads in Bhubaneswar and Puri were cleared. As regards power supply, 80% was restored in Bhubaneswar. While restoration work was started in Puri, the main areas of the coastal town were provided electricity 5 days after Cyclone.

Prime Minister of India announced immediate assistance worth Rs 1,000 crore to Odisha after undertaking an aerial survey of the cyclone affected areas. Even as life is limping back to normality in the districts ravaged by cyclone Fani on may 3 2019, the Odisha government on 8 may 2019 presented a preliminary report putting the losses at ₹11,942 crore.

Free kitchen extended for another 15 days, most kitchens running the MPCs. The State Government announced the rehabilitation package for the cyclone victims. The beneficiaries will get INR 95,100 for fully damaged houses under rural housing schemes. Similarly the families having partially damaged houses will get INR 5,200 and INR 3,200 for nominal repair. The affected families in Puri and Khurda districts will get 50 Kg rice, INR 2000/- and a polythene each. Additional one-month pension to the beneficiaries in the affected areas under Social Security Scheme.

The report was presented to the visiting inter-ministerial Central team assessing the cyclone damages. The cyclone affected 1.6 crore people in 18,388 villages and 51 towns in 14 districts of Odisha. A detailed memorandum on the damages and funds required for relief and restoration was submitted to the Centre after the estimation of the actual loss.

Along with the Govt. organization some NGO (Non-Government Organization) were also taken part in rehabilitation & reconstruction after the Cyclone "FANI". After reviewed by HAI (Humanitarian Aid International) it is found that the state suffered a loss of 1,71,00,000.

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