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Resilient India : Disaster free India

सत्यमेव जयते

Cyclone Fani
2019

A field based Report

LESSONS LEARNT

NATIONAL INSTITUTE OF DISASTER MANAGEMENT
(MINISTRY OF HOME AFFAIRS, GOVT. OF INDIA)
AND
ODISHA STATE DISASTER MANAGEMENT AUTHORITY

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CYCLONE FANI

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Resilient India : Disaster free India

सत्यमेव जयते

Maj. Gen. Manoj Kumar Bindal
VSM
Executive Director

राष्ट्रीय आपदा प्रबंधन संस्थान
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FOREWORD

I am glad to know that National Institute of Disaster Management, Ministry of Home Affairs, Govt of India has documented the lessons learnt of Cyclone Fani which devastated infrastructure of people of Odisha and Government assets. But on the other hand, it was commendable to note that the number of casualties was reduced to 64 only, when compared with the cyclone of 1999 which had almost similar severity where the number of deaths were almost 14000. This could become possible with not only being concerned about disasters, but taking very effective steps for capacity building at all levels. Govt of Odisha must be complemented for their outstanding efforts. The visit of the Hon'ble Prime Minister immediately after the disaster and roping all the support of National agencies/departments/ministries turned out to be exemplary. I am sure the report on Cyclone Fani of NIDM must have captured the essence of the centre –state coordination along with other lessons. Ministry is committed to undertake the Hon'ble PM 10 point agenda for disaster management where strengthening disaster response and building local capacity are the key. I am sure current document would help in this direction and other states should also draw lessons from Cyclone Fani and make their states resilient.

I complement study team members of NIDM who worked for the documentation process and writing of the report.

I wish all success.

MKBindal

(Manoj Kumar Bindal)

Government of Odisha
Office of Special Relief Commissioner

Shri P. K. Jena
Spl. Relief Commissioner, Govt. of Odisha &
Managing Director
Odisha State Disaster Management Authority
Bhubaneswar, Odisha



Address

Cyclone Fani, a summer cyclone, made a landfall in the holy city of Puri and made a devastating impact on infrastructure and assets of common man, business house and Government. However, with the efforts of Government of Odisha and Central Government, the casualty due to this cyclone was reduced to 64 only as compared to Odisha Super Cyclone 1999. Government of Odisha, after receiving the warning from India Meteorological Department, Government of India, made every effort to safeguard the lives of people of Odisha through a massive evacuation drive which resulted in evacuation of lakhs of people to multi-purpose cyclone shelters and other identified shelter buildings. Government of Odisha got appreciation from all corners of the world for this commendable effort. The whole hearted commitment and timely decisions taken by the able leadership of Hon'ble Chief Minister of Odisha galvanized the government machinery which resulted in reduction in loss. Hon'ble Prime Minister of India visited Odisha immediately after the disaster and assured all possible support to the State Government from national agencies and Government.

I am happy that the lessons learnt from the Cyclone Fani have been well documented by the National Institute of Disaster Management (NIDM), Government of India. This document has been prepared through consultations with various

stakeholders be it Government of NGOs. Efforts of all the stakeholders have been well captured in this document. The comparison of Cyclone Fani with Odisha super Cyclone 1999 has been also well documented. I am sure this document would help the State of Odisha as well as other stat and agencies in disaster preparedness towards building a disaster resilient country.

I thank Maj. General Manoj Kumar Bindal, Executive Director, NIDM for his guidance and continued support in documentation of Cyclone Fani. I also complement the study team members of NIDM for the report.



ACS & SRC, Govt. of Odisha and
Managing Director, OSDMA

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I would like to express my sincere gratitude to Major Gen. Manoj Kumar Bindal, Executive Director, National Institute of Disaster Management, New Delhi for his kind encouragement and support in carrying out the field study and in preparing the present document on "Study on extremely severe cyclonic storm FANI" in Odisha.

I am grateful to Shri Bishnupad Sethi, former Managing Director OSDMA, Shri Pradeep Kumar Jena, Principal Secretary to Government and Managing Director, OSDMA; Dr. Pradeep Kumar Nayak, Chief General Manager, OSDMA; Ms. Susmita Behera, General Manager, OSDMA; Dr.Bholanath Mishra, General Manager (Geo-technology), OSDMA; Sri Arabinda Ray, General Manager (Systems), OSDMA; Mr. Krushna Chandra Bisoi, General Manager (Shelter and Coordination), OSDMA; Shri. Sunil Kumar Sahoo, Deputy General Manager (T&C), OSDMA; Shri Sutanu Kumar Thakur, State Project Officer, OSDMA, Shri Gaurishankar Mishra, State Project Officer and Mr. Laxmi Narayan, State Project Officer, OSDMA and all the Staff of OSDMA; Shri Balwant Singh, Collector and District Magistrate of Puri District; Ms. Deepti, BMC and all the affected community for their kind cooperation during the field visit and meeting held with them on the matter. Their inputs and experience sharing have added a great value to this report.

Thanks are due to all the Energy Department; Health and Family Welfare Department; Fisheries and Animal Resources Development Department; Agriculture Department; Transport Department; Housing and Urban Development Department; Urban Water Supply Department; Panchayati Raj and Developmental Work Department; Department of Social Security and Empowerment of Persons with Disabilities; Tourism Department; Women and Child Development and Mission Shakti Department; Works Department; Telecommunication Department; Food Supplies and Consumer Welfare Department; Forest and Environment Department.

We would like to thank all the officials of response teams – Civil Defence; ODRAF; Fire Service; NDRF and Police Force. We would like to thank all the officials of districts administration – Cuttack; Ganjam; Jagatsinghpur; Jajpur; Kendrapara; Khordha and Puri for their valuable presentation and inputs. This has helped us immensely. We would like to thank all the NGOs and IAG who have helped by providing their valuable presentation and inputs.

All district and state officials as well as the local representatives and affected people who have shared information and experiences deserve appreciation for highlighting the response actions, preparedness actions, challenges and difficulties faced in managing the disaster. Special thanks to all the officials.

Special thanks to my colleague Shri Shekher Chaturvedi, Assistant Professor, Dr. Anuradha Maurya, Ms. Jekulin Lipi & Mr. Arun Verma, Young Professionals and Shri S. K. Tiwari, Librarian for their support and co-operation in publication of this book. Last but not the least; I would like to thank my family and friends for their consistent support.

Finally, I am grateful to the Almighty God with whose grace and kindness, I have been able to carry out this task successfully.



Prof. Santosh Kumar

ABBREVIATIONS

1.	BDA	:	Bhubaneswar Development Authority
2.	BMC	:	Bhubaneswar Municipal Corporation
3.	CWC	:	Central Water Commission
4.	DFO	:	District Forest Officer
5.	DRR	:	Disaster Risk Reduction
6.	FSOs	:	Food Safety Officers
7.	IMD	:	India Meteorological Department
8.	JLGs	:	Joint Liability Groups
9.	JTWC	:	Joint Typhoon Warning Centre
10.	LBAS	:	Location Based Alert System
11.	MHTs	:	Mobile Health Teams
12.	NDDB	:	National Diary Development Board
13.	NDRF	:	National Disaster Response Force
14.	NGOs	:	Non Government Organizations
15.	NIMHANS	:	National Institute of Mental Health and Neuro Sciences
16.	ODRAF	:	Odisha Disaster Rapid Action Force
17.	OFDC	:	Odisha Forest Development Corporation
18.	OFS	:	Odisha Fire Services
19.	OSDMA	:	Odisha State Disaster Management Authority
20.	OTDC	:	Odisha Tourism Development Corporation
21.	OUAT	:	Odisha University of Agriculture and Technology
22.	PGCIL	:	Power Grid Corporation India Ltd.
23.	RIMES	:	Regional Integrated Multi-Hazard Early Warning System
24.	RRTs	:	Rapid Response Teams
25.	SDRF	:	State Disaster Response Force
26.	ULB	:	Urban Local Bodies

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EXECUTIVE SUMMARY

FANI - A SEVERE CYCLONIC STORM

The methodology of the documentation was as follows: The collection of primary data was done through survey with OSDMA officials, affected people, personal view of the District Collector, Government officers, BDOs of the different blocks, daily passengers, district project officers, NDRF, Fire services of Odisha, NGOs, ODRAF people, OSDMA Shelter coordinator, and shops owners. NIDM also conducted a 3 Day workshop on Cyclone Fani for the documentation of the event, whereby different stakeholders were encouraged to share their experiences.

Secondary data was collected from the existing literature available in the form of books, processed documents, newspapers clippings, special document published by OSDMA on Fani, Damage Loss and Needs Assessment, research articles, newspapers etc.

LESSONS LEARNT FROM FANI

Timing and strength are two factors that made Cyclone FANI different from most other tropical cyclones during that time of the year. Cyclone FANI developed near the equator and gathered massive strength and moisture as it could travel a long distance over the sea. The government of Odisha used the opportunity presented before it to strengthen disaster preparedness in the state. The key highlights of the preparedness measures taken to mitigate the impacts of cyclone FANI are as follows:

- **Impact Based Early Warning**: Early Warning System was found to be accurate and helped a lot in bringing down the casualty by taking appropriate actions in time. In order to provide communities with such integrated weather and climate information, we need to develop the capacity along the entire service delivery chain.
- **Incentivising DRR**: Government has been thinking of incentivising risk reduction to all sectors, corporate and individuals. Those who were taking initiatives for risk reduction were to be given some incentive. A detailed policy and guidelines is to be drafted by the experts in this regard. 15th Finacne Commission is also deliberating on this issue.
- **Strengthening Federal Agencies**: The disaster response support provided by the national agencies- Hon'ble PM Visit, release of grant, NDRF deployment, Early Warning support provided by IMD, Flood inundation information by CWC, Coast Guard, Armed forces, Air force, Civil Aviation, Railways, Power Sectors etc turned out to be a great support. These agencies must be further strengthened for providing specialized support to the states.
- **Communities Sensitization**: Communities are the first responders. They must be informed and sensitized about the disaster preparedness and the importance of cyclone shelters. The key to reducing loss of life, personal injuries, and damage from natural disasters is widespread public awareness and education.
- **Establishment of Robust Communication Infrastructure System**: The failure of communication systems may cause catastrophic damage to human life and economic

activities. Therefore, the exchange of information is important for people in their everyday life or during disasters to prevent the death and injury of thousands of individuals.

- **Resilient Infrastructure**: Power and telecom infrastructure is very fragile. It should be designed in such a way that it can withstand high wind velocity keeping in mind the vulnerability of the state to cyclones.
- **Resilient Pathways**: States need to invest in the both physical and human capital while designing resilient pathways. Investments are required for a wide spectrum of community needs such as planning, organizing, training and equipping first responders to large infrastructure projects.
- **Alternative Energy Strategy**: The new syndrome has emerged in post disaster scenario. Every sector is thinking of adding Genset for power supply during the crisis. There is a need for looking into alternative source of energy such as battery based, bio-fuel based etc. The Diesel Generator (DG) set should be kept as the last choice.
- **Contingency Planning integration with Recovery Planning**: Disaster management contingency plan is very helpful in reducing the impact of disasters and it should be implemented at all levels. Contingency plans focus on certain events or risks, at a local, national or regional level. The plans include operational concepts and resource assessment amongst the others.
- **Clarity of Roles and Responsibilities**: Pre-defined roles and responsibilities of each department and individuals should be prioritized. For easy and synergic response, pre-defined role of individuals and sectors should be clearly laid down on the plan and rehearsed. Regular simulation should be made part of the preparedness drill.
- **Private Sector Resilience**: It is not just governments that need to consider resilience in infrastructure planning but the private sector too. Both can reduce disaster-related costs by following guidance and principles for infrastructure resilience planning and by incorporating these into their long-term operations. Mitigating disaster risk should be a priority for both existing and future assets.
- **Inclusiveness as an Integrated Policy**: Capacity building of disabled people for inclusive approaches; Disaster impact is not homogenous, it affects different people differently, especially children, aged people, people with various disabilities etc. Hence, capacity building for disaster responders should be increased as there are more vulnerable people in the society.
- **Community Based Capacity Building**: National Capacity building for strengthening civil society and communities are the integral part of response hence in the peace time, the efforts should be made for their capacity building by Odisha Disaster Response Action Force and Fire Service.
- **Building Local Capacity**: Local and regional response clearly provides a major and significant part of the overall crisis response, particularly in natural disaster situations. Furthermore, it can be clearly demonstrated in various disaster situations around the world that local and national disaster preparedness pays.

- **Women's Need to be Understood Differently**: Appropriate measures must be taken for providing women with equal opportunities in public life, education, employment, health care, economic and social life, marriage and family relations. In order to address disadvantages associated with gender, both contributory and non-contributory, social protection programmes should be made gender-sensitive.
- **Rural – Urban Divide**: The states must take appropriate measures to modify the social patterns that accord differential status to men and women and ensure the equality of women in rural and urban areas differently. The social protection programmes along with DRR should also be designed, implemented and evaluated differently.
- **Child Centric DRR**: The best interests of children should be respected at all times, and their special needs should be accommodated. A child-sensitive social protection programme is one which ensures the rights of the child and takes into account all the factors that might place children in a vulnerable position.
- **Risk Transfer Mechanism**: Insurance coverage should be implemented as an option for building financial resilience. The function of insurance is to spread the losses of the few amongst the many; whereby, the actual loss value is substituted by the average loss value. This function is also referred to as risk pooling.
- **Strengthening of School Safety and Youth programme**: Schools can teach curriculum covering meaning and concept of disasters, their consequences, and the possible implementation of preventive measures. The students and youth should be sensitized about the disaster prevention and mitigation.

******

Forecast Tracking and Intensity of Cyclone Fani

Date / Time	Position (Lat. 0N/long. 0E)	Maximum sustained surface windspeed (KMPH)	Category of Cyclonic Disturbance
30.04.19/0830	12.3/86.2	135-145 gusting to 160	Very Severe Cyclonic Storm
30.04.19/1130	12.5/85.9	145-155 gusting to 170	Very Severe Cyclonic Storm
30.04.19/1730	13.1/85.3	160-170 gusting to 185	Very Severe Cyclonic Storm
30.04.19/2330	13.5/84.7	165-175 gusting to 195	Extremely Severe Cyclonic Storm
1.05.19/0530	13.8/84.3	170-180 gusting to 200	Extremely Severe Cyclonic Storm
01.05.19/1730	14.4/84.0	170-180 gusting to 200	Extremely Severe Cyclonic Storm
02.05.19/0530	15.4/84.0	170-180 gusting to 200	Extremely Severe Cyclonic Storm
02.05.19/1730	16.7/84.3	170-180 gusting to 200	Extremely Severe Cyclonic Storm
03.05.10/0530	18.0/84.8	170-180 gusting to 200	Extremely Severe Cyclonic Storm
03.05.19/1750	19.2/85.4	160-170 gusting to 190	Extremely Severe Cyclonic Storm
04.05.19.0530	20.3/86.3	140-150 gusting to 165	Very Severe Cyclonic Storm
04.05.19/1730	21.4/87.3	125-135 gusting to 150	Severe Cyclonic Storm
05.05.19/0530	22.5/88.4	90-100 gusting to 110	Severe Cyclonic Storm

Source: Preliminary Report on Extremely Severe Cyclonic Storm 'FANI', OSDMA

Why Fani is Different from Others?

1. Fani was the first severe cyclonic storm to have formed since 1976 during summer.
2. Fani was a 'Pre- Monsoon Cyclonic storm' and the second severe April cyclone to make landfall in India in 118 years.
3. Period for the cyclone was of one and half day.
4. The landfall of the cyclone was during daytime.
5. The speed of the wind was like super cyclone 1999
6. No storm surge was formed.
7. The rainfall was very less as compared to the other cyclones.
8. The cyclone stopped for 15 minutes and suddenly started again, which later became a major cause of loss.
9. The path in which cyclone travelled was zigzag but IMD was constantly vigilant and tracked the path and gave warning.
10. The Cyclone uprooted the electric poles, which were not uprooted in the earlier cyclone even during the super cyclone 1999.
11. The cyclone did not create flooding situation.
12. Post cyclone, there was complete darkness due to failure of power.
13. Complete communications breakdown created problems in carrying out post disaster operations.

The Severe Cyclonic Events in Bay of Bengal, which Impacted Odisha

2019	2- 3 May 2019, FANI, Extremely Severe Cyclone, Crossed Odisha Coast at Puri and severe impact at Puri & Cuttack
2018	10-12 October, 2018 – TITLI, Very Severe Cyclonic Storm Crossed Andhra Pradesh Coast at Palasa and severe impact on south Odisha
2014	12-14 October, 2014, Hudhud, Very Severe Cyclonic Strom Crossed Andhra Pradesh Coast at Vishakhapatnam and impact on south Odisha
2013	12-14 October, 2013 Phailin, Very Severe Cyclonic Storm, Crossed Odisha Coast at evening of 12 October
1999	25-31 October, 1999 Super Cyclone Crossed Odisha Coast near Paradeep at noon of 29 October
1990	4-11 May, 1990 Super Cyclone Crossed Andhra Pradesh Coast about 40 Km S-W of Machlipatnam and had impact over Odisha
1970	14-20 November, 1997 Super Cyclone Crossed Andhra Coast near Nizampatnam and had impact over Odisha
1971	26-30 October 1971 Very Sever Cyclone Crossed Odisha Coast near Paradeep, Loss of life -10,000
1967	8-11 October, 1967 Very Severe Cyclonic Strom Crossed Odisha Coast between Puri and Paradeep
1942	14-16 October, 1942 Very Severe Cyclonic Strom Crossed Odisha Coast near Coast at Paradeep
1885	22 September 1885, Super Cyclone Crossed Odisha Coast at False Point, Loss of life -5000
1864	1-2 November, 1864 Very Severe Cyclonic Strom Crossed Andhra Pradesh near Machlipatnam and had impact over Odisha
1832	2-5 October, very severe Cyclonic storm Crossed West Bengal Coast and had impact over Odisha
1831	31 October 1831 Very Severe Cyclonic Storms Crossed Odisha Coast near Balasore, Loss of life -50,000

1999 VS 2019

FANI 2019

- Maximum sustained Wind Speed: 185-220 kmph
- Number of Deaths: 64
- Number of People Affected: 14 mn
- Districts hit: 14
- Villages Impacted: 16,000
- Urban Local Bodies: 51
- Electric Poles Damaged: 1.6 Lakh

SUPER CYCLONE 1999

- Sustained Wind Speed: 270-300 kmph
- Number of Deaths: Over 10,000
- Number of Affected: 25 Lakh
- Livestock killed: 2 lakhs
- Villages lost: nearly 100
- Houses destroyed: 3.5 Lakh

WHATS NEW

- Odisha Disaster Rapid Action Force in 2001
- State Disaster Management Policy in 2005
- Improved Forecasting Mechanism
- Improved Preparedness, Mitigation and Respone
- Improved Institutional Set-up

Methodology

Documentation Process Followed:

Primary Data:

Collection of primary data was done through survey with OSDMA officials, affected people, personal view of the District Collector, Government officers, BDOs of the different blocks, daily passengers, district project officers, NDRF , Fire services of Odisha, NGOs, ODRAF people, OSDMA Shelter coordinator, and shops owners.

Secondary Data:

Secondary data was collected from the existing literature available in the form of books, processed documents newspapers clippings, special document published by OSDMA on Fani, Damage Loss and Needs Assessment, research articles, newspapers etc.

Consultation with stakeholders:

Three one day workshops dedicated for different stakeholders, were conducted in which different stakeholder participated and shared their experiences.

(I) **Workshop – 1 (26th August 2019)** Executives of different departments of government of Odisha, OSDMA, district & sub district level officials and block panchayat level officials participated.

(ii) **Workshop – 2 (27th August 2019)** Participation was from disaster response agencies like NDRF, OFS, ODRAF, etc.

(iii) **Workshop – 3 (28th August 2019)** Participants were from UN and all other international agencies- UNDP, UNICEF, WHO, IRC, ILU, Go-NGO coordination group, Save the Children, representatives from civil societies etc.

Day-Wise Activities

21.08.2019, Team reached Bhubaneswar and had an interaction with officials of OSDMA and collected their processed documents





22.08.2019 Interaction was with officials of OSDMA and literature review and field survey at Bhubaneswar was done by the team



Day-Wise Activities

23.08. 2019 Literature review was done by NIDM team





24.08.2019 Literature Review and interaction with officials OSDMA



Day-Wise Activities

**25.08.2019 Field Visit to Puri District,
further visit to the Cyclone shelter**



Picture: Group Photo with affected people and villagers sharing their views, District Collector shared his view for managing Fani





Chapter 1 : Introduction

1.1 ODISHA AT A GLANCE

Odisha, often called as the soul of Incredible India is the 9th largest state in India that has varying climate types and cultures across diverse communities.The word "Odisha" is procured from the ancient Prakrit word "OddaVisaya" derived from the Tirumalai inscription of Rajendra Chola I, which is dated to 1025. (Patel 2010).



Source: OSDMA

Odisha is located on the eastern coast of India between the parallels of 17.49 N and 22.34 N latitude and meridians of 81.27 E and 87.29 E longitude. It is bounded by the Bay of Bengal on the east; Chhattisgarh on the west, Jharkhand and West Bengal on the north and Andhra Pradesh on the south. It has a coast line of about 480 km. It extends over an area of 1, 55,707 square km covering about 4.87 % of the total area of India. According to the 2011 census, it has a total population 4, 19, 47,358 (3.73% of the total population of India) out of which about 2, 12, 01,678 are men and 2, 07, 45,680 are women.

The State is broadly divided into four geographical regions viz. the Northern Plateau (18.3% area), Central Table Lands comprising mostly the river basins (23.9%), Eastern Ghats (32%) and Coastal Plains (25.8%). The areas of the state north of latitude 20º N have elevation up to 500 m above sea level in general and in the south western districts,they rise to 1500-1600 m above sea level.

The State is again divided into ten agro-climatic zones on the basis of soil, weather and other relevant characteristics. Its land can be classified into three categories, low (25.6%), medium (33.6%) and up-lands (40.8%) with various types of soils like red, yellow, red-loamy, alluvial, coastal alluvial, laterite and black soil, etc. with low and medium texture.



Source: OSDMA

Odisha is divided into 30 districts for administrative convenience. These are again regrouped into 3 revenue divisions (Central, Southern and Northern). Odisha has 58 sub-divisions, 317 tehsils and 314 blocks. These 314 blocks comprise 6,236 Gram Panchayats & 51,551 villages. There are 3 Municipal Corporations, 37 Municipalities, 67 Notified

Area Councils and 2 Industrial towns. There are 537 General Police Stations, 6 Women Police Stations besides 34 Energy Police Stations, 7 Vigilance, 10 Marine and 1 Cyber Crime Police Stations. The State is divided into 21 Lok Sabha Constituencies and 147 Assembly Segments.

All the rivers of Odisha are primarily peninsular rivers and have originated from (a) the Chhota Nagpur plateau in Jharkhand, (b) the Amarkantak plateau in Chhattisgarh, or (c) the Eastern Ghats within Odisha. All these rivers are non-perennial in character. There are six coastal districts. The district with the longest coastline is Puri (136.48 km) and with the shortest coastline is Bhadrak (52.61 km). The other coastal districts are Ganjam (60.85 km), Jagatsinghpur (58.95 km), Kendrapara (83.55 km) and Bhaleswar (87.96 km). The southern tip of the Odisha coast borders the state of Andhra Pradesh and the northern end connects to the state of West Bengal.

The East Coast of India is one of the six most cyclone-prone areas in the world. Of all severe cyclones that make landfall on the eastern coast, 20% hit Odisha, particularly during April – May and September – November. Once every 2 - 3 decades, a severe cyclone strikes Odisha. All the coastal districts are vulnerable to cyclones.



Source: OSDMA

The period from June to September constitutes the southwest monsoon season and the period of October and November is the post-monsoon season. During the period from December to February, generally low temperatures prevails over the state except in the coastal belt. In the hot weather season from March to May, weather is generally dry and uncomfortable in the interior, while due to lower temperatures, the plateau regions are comparatively less uncomfortable. Weather tends to be oppressive during July due to high humidity and high temperature. The rest of the period of the monsoon is fairly comfortable due to reduced day temperatures, although humidity continues to be high.

Nearly one third of the cyclones of the east coast of India visit Odisha coast. With the current trend of the climatic variability accompanied with global warming and increased greenhouse effects, the coastal areas of Odisha are likely to be affected by many more extreme cyclonic disturbances and low pressure systems of greater magnitude. Although the total number of cyclonic disturbances is more along the Odisha coast, as a natural hazard, the severe storms are of greater public concern in view of their large scale damage potentiality leading to loss of life and property. By taking together the storms and severe storms which mostly create havoc and incur greater amount of damage, the Odisha coastal zone is twice as much vulnerable in comparison with the other eastern states.

Disturbances which develop in the pre and post monsoon period intensify into severe storms of devastating nature. It is revealed from the past experience that the most vulnerable months for the occurrence of a severe cyclone is October followed by the month of September. The cyclones which had affected Odisha coast are normally of sea origin and

land dissipation. The cyclones of land origin and land dissipation or sea dissipation are negligible. There are some cyclones which originate in the sea adjacent to the Odisha coast and dissipate in the sea. Such events don't have much impact on the Odisha Coastal Zone.



Source: OSDMA

The source area of origin of the cyclonic disturbances in the Bay of Bengal extends over the entire sea surface. But however, the area to the west of Andaman coast is a high probability source area of origin for the severe storms. The second in the importance is the eastern part of the Andaman Islands.

With regard to storms, the source area of origin in the Bay of Bengal remains confined to two important locations, one to the 400 to 500 km east of the Gopalpur and Vishakhapatnam and the other patch is 500 to 600 km east of Chennai and Rameswaram. With regard to the severe storms which had affected Odisha coast, their source area of origin is located about 500 km. south of Paradeep and east of Vishakhapatnam.

It must also be emphasised that the impact of tropical cyclones and storm surges has dramatically increased in the last few decades. For example, less than 8 per cent of the present coastal infrastructure existed in 19th century Odisha and most of the increase in infrastructure began in the later part of the 20th century.



Source: OSDMA

After the 1999 super cyclone, the state government has taken various measures like installation of modern communication systems, construction of cyclone shelters and other resilient infrastructure including pucca houses for the poor in the cyclone prone areas to reduce the physical vulnerability of the coastal districts to cyclonic winds and tidal surges. However, poor socio- economic conditions, weak housing, large settlements (including densely populated islands near the sea coast) in areas extremely prone to tidal surges, depletion of mangroves and tree shelterbelts, location of highly hazardous industries in cyclone prone areas, poor road communication to many villages near the coast make the state vulnerable to cyclones.

The super-cyclone of the 28th-30th of October, 1999, close on the heels of the heavy cyclone of 17th-18th, October 99 had caused unprecedented damage to life and property in the coastal districts of Odisha. It destroyed 90% of the coastal vegetation creating ecological imbalance and the mangroves of Kendrapara and Jagatsinghpur including that of 250 sq.

km. coastal shelter belt plantations. The further magnitude of loss of life and property was of about 10,000 innocent people 2 million houses damaged & 18 lakhs hectares of cropped area damaged.

Hence the state government had finally decided to have a separate institutional structure for addressing disaster and enactment of suitable rules and guidelines for institutionalizing disaster management in the state to undertake a comprehensive restoration and reconstruction programme for revival of infrastructure and economy with multi-level links between different line departments. Thus, the disaster management frame-work have emerged in the state initially as an autonomous state agency called "The Odisha State Disaster Mitigation Authority"(OSDMA) registered under the Societies Registration Act, 1860 having Chief Secretary as the Chairman on 28th December 1999 notified in the State Gazetteer vide Finance Department Resolution No.IFC74/99.51779/F. The Revenue & Disaster management department has been notified as the nodal department for OSDMA.

Since its inception, OSDMA has been dealing with new concepts of interventions both - structural & non-structural - essentially coming from the learning, training & experiences gathered over a period of time while managing previous disasters to manage risk & reduce vulnerability to a minimal level in a disaster so that precious life can be saved. Some of the major accomplishments so far in the field of disaster managements are;

- Disaster Management Planning at all levels.
- Construction of cyclone-proof shelter buildings along the coast.
- Dedicated Odisha Disaster Rapid Action Force (ODRAF) raised in 2001 – 20 units set up so far.
- Fire Services strengthened and converted to Fire & Disaster Response Force – 335 units across the state
- Massive awareness raising activities from the grassroots to the top level in the state.
- State of art early warning dissemination systems across the coastline; Social media used for early warning communication.
- Paradigm shift in approach to disaster management helped overcome recent disasters with minimal casualty and damage.

After the lessons learnt in the super cyclone of 1999, Odisha has never looked back and proved its capacity and strength in successful management of extremely severe cyclone storm Phailin in the year 2014 with the vision of 'Mission Zero' casualty followed by Hudhud in the year 2014 and ESCS Titli of 2018. Though Odisha has suffered a lot with regards to property loss, it has shown its state of art preparedness in securing lives. The following is a broad detail of the major cyclones that hit Odisha after Super cyclone 1999.

S. No.	Particulars	Phailin-2013	Hudhud -2014	Titli -2018
	Landfall date	12th October, 2013	12th October, 2014	12th October, 2018
1.	Affected District (In Nos.)	19	15	17
2.	Affected Blocks/ULBs (In Nos.)	159	136	163
3.	Affected Villages/Wards (In Nos.)	24470	1165	8125
4.	Affected Populations (In Lakhs)	134.5	33.43	60.11
5.	Houses Damaged (In Nos.)	359612	44413	57131
6.	Affected Livestock (In Nos.)	7058703	39350	32492
7.	Crop Damaged (In lakh Ha.)	6.51	2.47	2.73
8.	Financial Loss (In crores)	5751.41	777.12	2770.28
9.	Human Casualties (In Nos.)	21	3	57

Odisha had not been fully recovered from the wrath of ESCS Titli -2018 that the rarest summer cyclone Fani ravaged the east coast of Odisha. The Cyclone "Fani' made landfall at about 8.30 AM on 3rd May 2019 between Satpada and Puri as an Extremely Severe Cyclonic Storm. As reported by IMD, the maximum sustained surface wind speed of 170-180 kmph gusting to 205 kmph was observed during landfall. After the landfall it continued for 06 hours, then it decreased thereafter.



Source: OSDMA

The Doppler radar image at Paradeep shows that the cyclone completely made landfall at 9.42 AM on 3rd May 2019.The damages caused by the cyclone were mainly due to gusting action of wind of high velocity and torrential rainfall on 03.05.2019. Thousands of trees had been uprooted in the affected area. As per preliminary report received from Collectors, 165.56 lakh people in 159 Blocks and 52 Urban Local Bodies in 14 Districts had been affected. 64 persons had lost their lives due to cyclone. The standing crops including horticulture crops and orchards of 1.43 lakh hectares had been damaged. The fishing communities had been severely affected due to huge loss to their boats and nets. The artisans had lost their looms, equipment, accessories and raw materials. There was also substantial loss to livestock and sericulture farms. Massive damage had been caused to public properties like canal / river embankments, roads, bridges, culverts, drains, water works, tube wells, LI points, electrical installations, telecommunications infrastructure, government buildings, etc.

Table: Number of People Evacuated from each District

S. No.	Name of the Districts	Number of Person Evacuated
1	Angul	5587
2	Balasore	238520
3	Bhadrak	62475
4	Cuttack	197744
5	Dhenkanal	6147
6	Ganjam	301460
7	Jagatsinghpur	92326
8	Jajpur	96156
9	Kendrapara	116693
10	Keonjhar	6352
11	Khordha	84987
12	Mayurbhanj	84687
13	Nayaghar	52850
14	Puri	29800
15	Kandhamal	15255
16	Gajapati	48975
17	Rayagada	15375
18	Koraput	691
19	Boudh	1090
	Total	1557170

Source: OSDMA, booklet Special issues on FANI

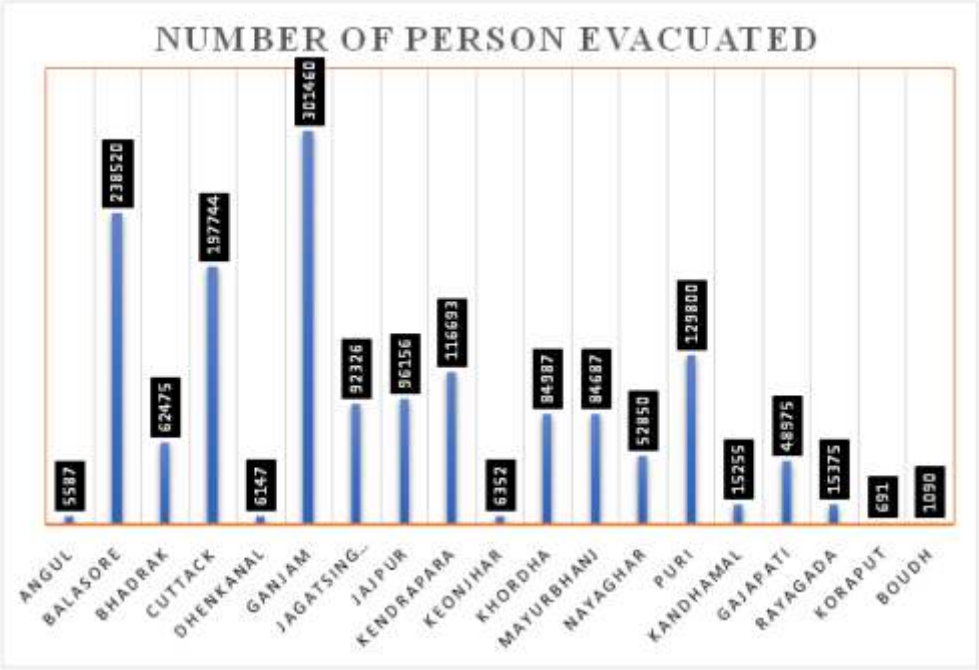


Fig 1: Number of people evacuated during FANI from 19 prone districts of Odisha

The evacuation process started on 1st May 2019. A total number of 15,57,170 people had been evacuated from vulnerable areas in the above districts of the state to cyclone shelters, schools and other safe places. The above graph (Fig 1) is showing the number of people evacuated from the 19 district of Odisha during the landfall of extremely super cyclone Fani. Ganjam district evacuated highest with 301460 number of people from vulnerable areas followed by Balasore 238520, Cuttack 197744 and Puri 129800. As Puri was more prone to the landfall of the Cyclone Fani, there were special arrangements made by the administration for evacuation purposes.

- Database management
- Logistics for transport
- Logistics for shelter
- Logistics for providing water/medicine/ food/ clothings
- Role of community in response and rescue.



Pic. 1 : People evacuated from prone area to MCS & Distribution of food to affected people at MCS (Source: OSDMA)



Pic 2 : People sleeping at MCS & Volunteers help in evacuation of old people from their vulnerable places. (Source: OSDMA)

Preparedness for the Extremely Severe Cyclone FANI (Shelters)

With regard to the construction of the multi-purpose cyclone shelter, a survey was conducted through IIT, Kharagpur (Bhubaneswar branch), to identify the location (villages) in the aftermath of Super cyclone 1999. Indian Institute of Technology Kharagpur had submitted the reports with a list of identified locations for construction of multiple- purpose cyclone shelter buildings in the 1st phase. Based on the reports of IIT, some MCS were constructed in phase-1 and another survey was conducted through IIT, Kharagpur in the year 2005-06 to reassess the needs and identify locations within 10 Km of the coast and Chilika lagoon area.

After the 2nd survey of IIT Kharagpur in 6 costal districts and Chilika lagoon surrounding another list of the vulnerable areas, villages with detail study was submitted to OSDMA and construction of multi-purpose cyclone shelters were started. Similarly, the concerns were also with the flooding in Odisha for which multi- purpose flood shelter was constructed suggested by the district administration under the guidelines of OSDMA.

Till now, OSDMA has constructed 503 MCS and 311 MFS with total of about 814 shelter building in different location which are more prone to these disaster. Further to this, there are 65 Multi-purpose cyclone shelters which are constructed by the Indian Red Cross society Bhubaneswar in different locations. So there are total 879 MCS and MFS in 25 districts of Odisha. As Odisha faced at least 1or 2 cyclone and flooding disaster each year, these shelters are utilised to shift the people.

On receiving the weather forecast from IMD, all collectors of 14 cyclone prone districts were alerted through e-mail, telephone, mobile phone messaging, wireless message etc. They were all directed to start the preparedness work and stay alert as any time disaster may hit their districts and also were advised to take immediate meeting of the District Disaster Management Authority (DDMA).

The preparedness of the local authorities in the districts may also be assessed and ensured. The District Emergency Operation Centers (EOC) were directed to be activated immediately to function round the clock with adequate manpower, essential equipments and logistics. District administration were also directed that they should start the evacuation process as soon as possible and ensure the readiness of the MCS in their district.

All the community mobilizers of OSDMA were directed to visit the Cyclone shelter and help the needy people. District project officer of all the districts were also directed to take relevant steps, visit the cyclone shelter and take care of the readiness of the shelters. The community mobilizers were made to contact the President-cum-Sarpanches and Secretary of each Cyclone/Flood Shelter Management & Maintenance Committee (CSMMC/ FSMMC) of 835 MCS/ MFS (including 65 MCS of IRCS) of above 14 districts coming in most vulnerable zone. All the community mobilizers were contacted & ensured on the meetings of the CSMMCs & FSMMCs and readiness of the shelter buildings time to time and the same were intimated to OSDMA.



Pic. 3: Multi-Purpose Cyclone shelter (Source: OSDMA)

- Cyclone shelter came as a boom to the people who were evacuated and kept in the multipurpose cyclone shelters.
- Volunteers were trained for supporting big evacuation & helping people in the shelters.
- Community capacity building programme was found out to be very successful in the management of people and in logistics.
- Strengthening capacity of Panchayat and local blocks.
- Flood prone and cyclone protected districts were strengthened by building infrastructure and disaster management system-EOC, data base management.
- Transport sector was mainly instructed to mark all logistic arrangements well in advance for evacuating to the safe sites.
- Early warning dissemination system was strengthened which helped the people to get ready for evacuation.

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Chapter 2 : Sector Wise & District wise Preparedness to Cyclone Fani by Government of Odisha

AN OVERVIEW

FANI was one of the rarest of rare summer cyclones, the first one in 43 years to hit Odisha and one of the three biggest to hit the state in last 150 years. Another peculiar coincidence that it struck India at a time when the general elections for Lok Sabha had already commenced. In Odisha where Fani made landfall, the four phase polls for Lok Sabha in the state, and Odisha Legislative Assembly, had just ended on April 29, only four days before the cyclone made landfall. It was a challenge for government authorities to ensure safety of polled EVMs that were kept in strict security. It was yet another challenge to mobilise manpower in polling mode to work for disaster.

Since the formation of the cyclonic storm, the state government started closely monitoring the situation. Based on the forecast issued by India Meteorological Department (IMD) and other international agencies like Regional Integrated Multi-Hazard Early Warning Systems (RIMES), Thailand and Joint Typhoon Warning Centre (JTWC), USA etc continuous tracking and analyses of the data on GIS platform were being regularly conducted and monitored. Massive preparedness measures were undertaken by the government soon after the receipt of warning from IMD and analysis of forecast from different meteorological agencies. The districts were alerted based on the probable cyclone track and impact area.

There are number of government departments which are directly or indirectly part of the preparedness. Government departments showed a tremendous way to deal with this monsterous cyclone Fani. All government departments started working just after they received the forecast warning of the IMD and guidelines of government of Odisha. Preparedness done by various departments is detailed out as under:

2.1 ENERGY (ODISHA POWER TRANSMISSION CORPORATION LTD)

A meeting, that was chaired by Hon'ble Secretary, Energy, government, cum CMD, OPTCL on 1st May 2019 in view of the forecast about the apprehension of striking of cyclonic storm Fani & it's landfall in Odisha coast was conducted. The main control centre was at the headquarter (Bhubaneswar) that had been established under the leadership of Director (Operation) & Director (Project). The control centre was in operation 24x7, for patrolling the different lines of assignment that were to be issued to the designated officials/workmen of the respective control centre. Vehicles like two wheelers with fuel, rain coat; torch light, food, drinking water, SLD of the line were arranged as accessing the location was not possible by using four wheelers.

The officials/workmen so engaged, immediately moved after the disaster to the assigned sites for assessing the damage & reporting the same to the control centres for scrutinising and further to the Main Control Centre (MCC) at Bhubaneswar. List of materials, its quantity and its available location was prepared and shared to the officials available at Main Control

Centre. Transport agencies with the cranes were identified and their contact details with responsible persons were made available with the officials of MCC. The instructions were issued by the officials of the MCC for effecting transportation of the materials from the stores to the affected sites. A group of designated officials were made to monitor the materials transported and the materials reaching at site by the designated officials. A detailed record to be maintained by such designated officials responsible for material transaction was prepared for future compilation of materials.

The HR officials were made available at different control centres, MCC and at site for assisting officials in meeting the requirement. They were also instructed in arranging the preparation of food round the clock to the workmen/officials engaged for the restoration work at strategic locations after assessing the damaged locations based on the report issued by the MCC. Apart from this, arrangements for the first aid treatment facilities to the workmen & others as desired were also made. Accommodation for workmen engaged for the said works were arranged at strategic location. The financial assistance so required was immediately met by the financial officials engaged for the said activities. Division-wise priority mapping for identification of feeders supporting with supplies to critical infrastructures like hospitals, water supply points, communication networks, railway stations, district and block headquarters was done.



Pic. 4: Before the Monster Cyclone Fani (source: ppt of department)

Division-wise action plan was prepared for mobilization of manpower, materials, tools and transport. Senior officers were sent as nodal officers to all the field division. Deployment of CESU officials at Multi Agency Control Rooms at district level with a manpower mobilization of 249 gangs (2500 workers) was made by different divisions through the local contractors. Advertisement in the local newspaper and TV was broadcasted on precautionary measures to be taken up by the consumers on safety and contact phone number in case of emergency. For precautionary measures, field offices were instructed to shut down their power supply once the wind speed crossed 50 Kmph.

2.2 DEPARTMENT OF HEALTH AND FAMILY WELFARE

Lots of administrative decisions were taken as IMD issued early warning signs of severe cyclonic storm Fani. Just after receiving the early warning, the department started series of meetings with senior officers & development partners on 1st May for contingent planning & strategy development by Hon'ble Minister and Commissioner-cum-Secretary (Pic. 5). Various departments of the government started the operations of control room, health & family welfare department started the control room at state, district and block level. Precautionary measures of do's and don'ts were printed and issued in electronic media. On Whatsapp, Fani health action group was created for better coordination and the whole staff was directed to join their duties as soon as possible due to emergency while cancellation of

leave of all staff was done. Alert was issued and Rapid Response teams for the immediate actions at the field with full equipment's were deployed.

Prepositioning of the Ambulance, Mobile Health Teams (MHTs) and Doctors and Paramedics were the main focus. Some extra teams were provided to the more prone districts mainly in Puri with the presence of the State Nodal Officers at high focus districts. Administration focussed on the prepositioning of essential drugs, First Aid Kits and logistics at all facilities & Cyclone shelters. Administration made the establishments of medical relief centres at strategic locations for better health and medical support to the vulnerable populations at different positions.



Pic 5: Prior meeting of government officers (Source: ppt of Health and Family Welfare)

Mobile health teams with proper training and equipment were deployed in affected districts, The MHTs ensured the provision of free sanitary napkins at all cyclone shelter homes which was the primary motive of the department. Provisioning of adequate stock of essential medicines at all health facilities and immediate shifting of the vaccines from high risk areas to low risk area became the immediate action. All pregnant women with EDD within next 15 days, were shifted to the nearest Maa Gruha delivery points for safe delivery. Approximately 1945 pregnant women were shifted (Pic. 6).

The government ensured 24X7 power backup with prepositioning of gensets on rental basis with full back up and with adequate diesel for existing generators. Some generators were also arranged from other states by the health departments. They also arranged 3 days dry food for the people prone to the cyclone.



Pic 6: Shifted pregnant women at MaaGruha before cyclone Fani (Source: ppt)

The department also provided some funds to the more prone districts to purchase the required goods and materials prior to the cyclone.

2.3 FISHERIES & ANIMAL RESOURCES DEVELOPMENT DEPARTMENT

Mike announcements were made at the fishing harbours and some special evacuation steps were taken by the department with the help of government of Odisha. Evacuation of fishing communities in vulnerable areas started as warning generated in the coastal areas, so that zero causality to the lives of fishermen could be achieved.

Sensitization of CDVOs through a video conference on 1st May, 2019 was done, to remain alert and active to manage cyclone Fani. About 80,000 livestock farmers were made aware through mobile voice messages, large hoarding on the vehicles and announcements about

safeguarding of animals and severity of the cyclone. Mobile mass messaging was the key factor for alerting the people about safeguarding of animals.



Pic 7: Animals being shifted to cyclone shelter (Source: ppt of ARD department)

Alert messages were also published on televisions and radio at small intervals. About 40,000 large & small animals were shifted to 635 multipurpose shelter points for protection (Pic. 7). There was 300 MT of cattle feed stored at strategic locations at block level to meet the emergency situation during cyclone. Emergency stock of medicines at state/district level was kept for the animals during Fani. Many nodal officers were appointed at Dist-CDVO, State-JD, AH &VS to perform emergency support functions during and after the Fani.

2.4 DEPARTMENT OF AGRICULTURE AND FARMER'S EMPOWERMENT



Pic. 8: Damage assessment of farmer's losses (source: ppt of Department)

Agro-based crop advisory prepared by Odisha University of Agriculture and Technology (OUAT) and Directorate of Agriculture on crop management before and during the cyclonic storms were issued to the district level officers for wide circulation among the field functionaries and farmers. The crop advisory was also circulated as an information through All India Radio. Further, this advisory was also disseminated through 15 community level radio stations across the state Door Darshan Kendra's. Padif and mobile Kissan were delivering the voice response and SMS since 1st May 2019 to 26 lakhs 88 thousands farmers. Several programs were telecasted with detailed crop management information through "Programmes of OD Odia". Several steps for early warning were also taken by department for precautionary measures to save life of farmers.



Pic. 9 : Awareness to the farmer's (Source: ppt of department)

2.5 ODISHA MOTOR VEHICLE DEPARTMENT

On receipt of Indian Metrological Department warning, State Transport Authority (STA) directed all RTOs and field functionaries not to leave the headquarter and assist the district administration by providing required vehicles to cater to various needs. RTOs supplied required number of vehicles to the district administration for evacuation of people from low lying area to safer places. Prior to Fani, more than 111 vehicles were mobilized in most



Pic. 10. JCBs are pre- planned for clearance of the road. (source : ppt of transport department)

affected districts of Odisha. The distribution of the vehicles was pre-defined for evacuation and restoration purpose in which districts such as Cuttack got 31 and Puri got 80 vehicles. Control Room was opened with 24 hours of service by the transport department prior to the landfall of Fani.

Some vehicles were used for the purpose of dissemination of the early warning prior to the landfall of the cyclone in more prone areas and were also used for distribution of food materials to cyclone shelters.



Pic. 11: The loaded trucks with food and water pouches. (source: ppt of department)

Some heavy vehicles were busy in the supply of rice and water pouches to the cyclone shelters prior to the cyclone Fani as shown in the (Pic 11). Some big machines were also placed in the more prone areas prior to Fani for immediate restoration of the work, Transport department provided 2596 nos. of vehicles to the district administrations of Cuttack, Khurdaand Puri for evacuation, relief and restoration work.

2.6 DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

In order to mitigate the challenges of natural calamities like Fani, one advisory (SOP) was issued to all Urban Local Bodies (ULB) & PHEO that has also listed the measures for preparedness.

About 600 senior officers were mobilized to 42 different likely to be affected ULBs. Rescue machineries and equipment's were made available as precautionary measures including mike announcement for evacuation of people from low lying areas to safer shelters, (in the cyclone shelter or in some pucca house). They set up the control room in all ULBs for better co-ordination, and also focussed on the supply of the drinking water for the affected people. Technicians or water plants required were also airlifted from Kolkata by IAF helicopters in view of emergent need for additional water. Arrangements of all logistics, chemicals requirements for smooth managements of water supply to all ULBs were made before the cyclone hit the coasts of Odisha. There was a huge demand for the DG sets for which the department arranged 101 DG sets and for further requirement they arranged 69 sets along with POP. PHEO also mobilized 45 number of senior officers and arranged 171 DG sets, 211



Pic. 12 : JCB clearing uprooted trees. (source: ppt of department)

tankers, 1356 PVC tanks along with chemicals etc, were positioned to ensure the water supply to urban areas. Food being the basic need of all the living beings on earth, keeping this is mind, the department stored sufficient stock of disinfectants, food stuff, drinking water and cattle feeds in all the identified cyclone/ flood shelters. Tools and machinery were kept in the safe place along with the skilled people for clearance of the roads after the disaster. Specific whatsapp group was created for the effective management by the officers and the workers involved in this whole operation which included 5000 sanitation workers and 600 senior officers from within the ULBs and who were brought from other ULBs and deployed round the clock for cleaning the roads, removal of fallen trees and piled up garbage. More than 800 JCBs, Dumpers, Tractors and TATA ACE were pressed into service in these cleaning operations.

2.7 PANCHAYATI RAJ AND DRINKING WATER DEPARTMENT

Just after the IMD forecast, departments held a meeting and discussed the preparedness measures that were suitable for mitigation. Work related to identification of vulnerable population started and shifting of population from kaccha houses to the cyclone shelters or Pucca houses began. People also started working in the cyclone shelters to make it habitable providing amenities including electricity, water and sanitation. About 1, 00,000 cooked food and dry food packets were arranged and dropped by air. Building-wise officers were allotted under the close supervision of BDOs with Standard Operating Procedures (SOP). Control rooms were opened which worked 24 hours at department with 1916 number and similarly control rooms were opened in block offices, DRDA office and RWS & S division offices. Advanced arrangement of 734 PVC tanks and 668 vehicles were kept for the use. As drinking water is the basic need of the human, for that about 32 lakh water pouches were ready for distribution among the affected communities. As speed of Fani was more than the previous cyclone, the department deployed about 203 electricians in different location of the districts. In anticipation of increased need for the DG sets during a disaster, for this reason, the department arranged 337 DG sets in advance.

Shortage of water is generally seen in any emergency, for that 3840 overhead water tankers were pre planned by the department. Repairs of the tube well was carried out before the Fani became a priority consideration of the department for drinking water. Around 250 generators were arranged from nearby districts and states with POL for supply of drinking water through pipes as water is a basic necessity, and water resources usually get contaminated during disasters. Another important feature of the department was the activation of a whatsapp group for better coordination among the department.

2.8 DEPARTMENT OF TOURISM

Electronic Media played a major role in dissemination of early warning to the people who were planning to visit Odisha. Allotment of trains & buses (OTDC & private hires) to evacuate tourists from the vulnerable areas as soon as possible, Seamless coordination among local police, ODRAF cadre, lifeguards, etc in issuing disaster warnings & carrying out evacuation were some of the tasks fulfilled. Risk consideration determined the



Pic. 13: Konark Temple

prioritisation of evacuation, advisories to stakeholders (hoteliers, guides, etc.) on evacuation & do's – don'ts. Ground force aggressively reached out to the high risk groups such as boatmen & landfall zone service providers, specially unorganised sector workers. Health department food safety officers conducted hygiene checks of FBOs & segregated contaminated foodstuffs. Tourists from outside Odisha were the prime concern and were evacuated and placed in safe places prior to the landfall of the cyclone Fani.

2.9 WOMEN AND CHILD DEVELOPMENT AND MISSION SHAKTI

The aim of the department was to maintain zero casualty with a major concern of pregnant women and their shifting to the nearby cyclone centers/ relief centers/ Maternity waiting homes/ CHCs. Another focus was on the evacuation of the children, adolescent girls and women to cyclone shelters/ relief centers. Department made well planned preparatory

arrangements, advisories and action plans, prior inspection of AWCs buildings/food stock and essential items, and the required materials was placed. There were special concerns of the abuse/trafficking of children/ adolescent girls/ women. Safety protocols in cyclone shelters/relief center were maintained by the department and special storage of adequate stock of food- rice, THR, eggs, food stuff and medicine kits in all AWCs, CCIs, in cyclone shelters/relief centers was maintained. For ensuring the health and well-being of children/adolescent girls/women, instructions were issued to adequately store the home ration, THR and food stuff in all AWCs. The NGO run institutions like child care institution Swadhar and Ujjwala homes were instructed to give THR (Chhatua and dry food) egg for the children in the age group of 6 months to 3 years and pregnant & nursing women in advance for 7 days.

2.10 WORKS DEPARTMENT

Materials, manpower and machineries were arranged for the deployment in the more vulnerable areas. As in, the forecast bulletins it was clearly seen that Puri would be more prone to cyclone Fani, keeping this in mind, the department deployed 1 chief engineer, two SEs and other senior engineers at Puri, one day before for 24×7 monitoring. Central control rooms were made operational at the departmental level at the heads of the department level and at division level, to monitor every hour activities. Proper planning was done for further arrangements and requirements. All the field officials were instructed to be fully prepared with sufficient equipments, materials & man power at strategic locations to clear the roads at first instance and for restoring connectivity. Departments also arranged the camps for alerting the people and advised them for shifting from vulnerable places to safer places like multi-purpose cyclone and flood shelters. Department also advised the communities not to come out of the safer areas till any official announcements were made by the administration. They stressed on not making the shelters under the kuchaa houses, as kuchaa house are more vulnerable to any disasters. All the field executive engineers were sensitized for the water tightness of the EVM strong rooms and post cyclone restoration works of the PWD roads and government buildings.

2.11 FOOD SUPPLIES AND CONSUMER WELFARE DEPARTMENT

Department had seen an adequate rise in stocks in 30 districts which was later distributed to free kitchens in cyclone shelters. Special arrangement were made of the dry food and non-cooked food items like Rice flakes (Chuda), Molasses (Gur), salt, biscuits, match boxes, candles, kerosene oil etc. There was a special arrangement for delivering point of the goods and had special networks with the transporters. Pre arrangements were made for dropping of the packed food materials.

2.12 FOREST AND ENVIRONMENT DEPARTMENT

Control rooms were setup in division offices of the more vulnerable districts as well as in the office of PCCF, Odisha and PCCF (Wild life) to be operational for 24x7 till situation became normal. Immediate shifting of the campus which was located in vulnerable areas to the safe

locations of the districts with necessary steps, taken for the protection of the infrastructure boats, barges and vessels were some of the initiatives. Precautionary steps were taken by the DFO, Puri wild life division to sensitize the villages located in and around Balukhand-Konark Sanctuary area with pre- deployment of the special squads in the vulnerable areas for the protection of the animals. Adequate quantity of dry food, fodder and medicines were kept ready in the vulnerable divisions.

Adequate amount of feeds and fodder medicines, storage of drinking water, provision of Gen Sets in all captive facilities housing wild animals was important. The Nandankanan zoo was closed for 2-3 days to avoid any causality of life. Important messages related to the cyclone Fani situation was submitted periodically through Whatsapp/email to the headquarters of Forest department. Tourists were advised not to volume in nature campus/eco-tourism destinations in the coastal divisions which were closed for tourist for 5 days. Power chains saws were used for cutting of uprooted trees for roads clearance.

2.13 DEPARTMENT OF SOCIAL SECURITY AND EMPOWERMENT OF PERSONS WITH DISABILITIES

The department took active steps in the preparedness of cyclone FANI. The early warning was disseminated with the abandoned and destitute differently abled individuals and they were evacuated by the department. The department focused on multisensory information dissemination for better understanding across all disability categories. All the department staffs were trained under 'Disaster Preparedness and Disaster Management Training' in collaboration with UNICEF and NIMHANS. For the evacuation of the disabled persons the district administration provided all the logistics support.

2.14 TELECOMMUNICATION

Immediately after the cyclone warning a preparatory meeting was held with Hon'ble CM along with all mobile service providers. All telecom operators had mobilized CoW (Cell on Wheels); had deployed manpower; mobilized material equipment; and fuel reserve. The telecommunication played a significant role in early warning dissemination. The early warning was sent via SMS/Cell broadcast issued by government.

2.15 DEPLOYMENT OF DISASTER RESPONSE FORCES

S. No.	Districts	ODRAF Units Deployed	NDRF Teams Deployed	Fire Teams Deployed
1	Puri	02	03	39
2	Jagat Singhpur	02	03	26
3	Kendrapada	02	03	33
4	Balasore	02	02	35
5	Bhadrak	02	02	30
6	Ganjam	02	01	78
7	Khordha	02	03	24
8	Jajpur	01	02	35
9	Nayagarh	01	01	-
10	Cuttack	02	01	64
11	Gajapati	00	01	24
12	Mayurbhanj	01	01	79
13	Dhenkanal	-	01	-
14	Keonjhar	-	01	-
15	Bhubaneswar	01	03	25
	Total	20	28	525

Source: OSDMA, Booklet Special Issues on FANI

Table: District-wise deployment of Disaster Response Teams across Odisha

For precautionary measures, 20 teams of ODRAF, 28 teams of NDRF and 525 fire service teams with emergency equipment were deployed in 14 districts of the Odisha and Bhubaneswar city for search, rescue and relief operations in vulnerable areas. 16 additional NDRFs were deployed in 10 most affected districts. 6 NDRFs teams from Ganjam, Gajapati, Khordha and Dhenkanal were mobilised to other districts for expediting quick response. Besides this deployment, AapdaMitra Volunteers, Multi-purpose Cyclone / Multi-purpose Flood shelters task force members and community level volunteers in Gajapati were kept in readiness for any eventuality.The District-wise deployment is given below:

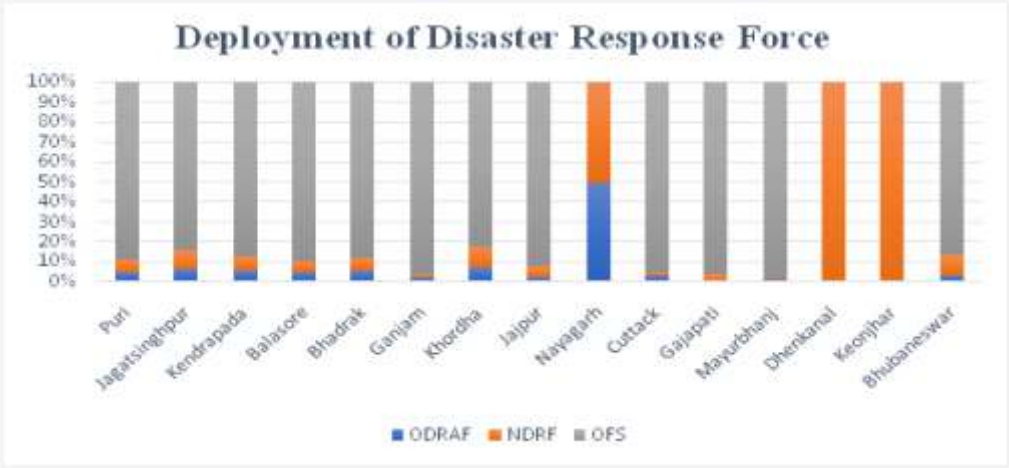
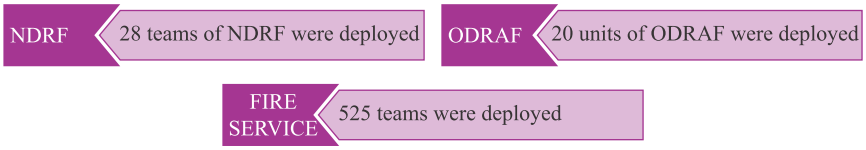


Fig 2: Disctrict wise Deployment of Disaster Response Force

According to the Fig. 2 the districts of Dhenkanal, Kheonjhar and Nayagargh had the maximum deployment of NDRF teams. Whereas, Nayagarh district also had maximum engagement of ODRAF teams. Whereas Ganjam and Mayurbhanj had the maximum deployment of the fire - service teams.



2.15.1 NDRF: National Disaster Response Force

Prior to this cyclone, sensing the seriousness of the situation, a cyclone preparatory meeting was held under the chairmanship of the Chief Secretary of Odisha on 29.04.2019 and decided to keep 18 NDRF teams in readiness for pre-positioning for the various districts with full equipped materials.

On 01.05.2019 and 02.05.2019, 18 teams of 3rd NDRF Bn Mundali were pre-positioned in the districts of Balasore, Bhadrak, Jajpur, Kendrapara, Cuttack, Jagatsinghpur, Puri, Khorda, Nayagarh, Ganjam and Gajapati. In addition to it, 04 teams of 11th Bn NDRF and 06 teams of 9th Bn NDRF were also pre-positioned in these districts.

2.15.2 ODRAF (Odisha Disaster Response Action Force)

20 teams of ODRAF were pre deployed to the vulnerable areas for repose work and helped the community in evacuation and shifting in the cyclone shelters. ORDAF teams were well equipped with all the necessary tools and machineries. As Puri, Jagatsinghpur and Kendrapara were more vulnerable to the cyclone this time, keeping this in mind 3 teams in each districts were deployed.

2.15.3 Fire Services

Just after receiving the bulletin from IMD for monster cyclone Fani, a meeting of senior officers for preparations measures was called. One fire officer exclusively remained in the charge for Krushnaprasad block of the Puri district. All officials were directed to test their equipment's immediately after the meeting was over. Sufficient fuel for machinery like JCB and cranes were mobilized prior to the cyclone. About 525 fire service teams with emergency equipment's were deployed in the different districts of Odisha which were more prone to the cyclone. About 222 man power was mobilized from less vulnerable areas to more vulnerable pocket areas where cyclone hit badly. Further, 283 personals were mobilized from unaffected areas to the more vulnerable areas like Ganjam and Gajapati. Control room were setup and started functioning 24x7. Chief Fire Officer, Cuttack remained the overall in-charge of the entire operations in all the districts. More than 20 trailor pumps were mobilised to Puri and Bhubaneswar for dewatering. Fire services also pitched 10 pumps in Cuttack district to drain out water.

2.15.4 Police

Police played a vital role in managing Fani. Early warning was issued by the police administration just after the IMD forecast of the cyclone. Police administration cancelled all the leaves of personnel's. 100 % home guards were mobilized and kept in respective police stations. Extra manpower was mobilized and reinforcement was sent to those police stations in advance, both from districts and state police headquarters. In favour of boosting the capacity of the police stations logistics requirements such as generator sets, Aska lights, basic equipment's like power axes, and other equipment's and accessories were provided. There was an advanced direction to arrange tree cutter equipments and earth moving machinery locally.

Police administration also focused on the sufficient dry food, gas candles, solar lights emergency lights, torches in advanced arrangements. All the station house officers were directed to keep stock of excess dry food for at least 7 days in the police stations and outposts so that it can cater to the mobilized personnel and in emergency to local public , who may take shelter there.

2.15.5 Civil Defence

The Civil Defence took all the necessary steps after IMD issued the warning on severe cyclone FANI in Odisha. The civil defence had called for volunteers immediately after the warning and groups were formed with inventory in stock. The control room had been set up in close collaboration with district administration and teams were pre-deployed with all the equipments for immediate search and rescue. As a preparedness level, civil defence had established a depot at Kalpana fire station, Bhubaneswar and deployed civil defence volunteers in five community development blocks and in municipal corporation. They also worked in evacuation of people before cyclone made a landfall with special attention to people with disability.

2.16 DISTRICT-WISE PREPAREDNESS OF CYCLONE FANI

2.16.1 PURI

A Multi Agency Control Room at collectorate under the supervision of a district officer was functioning from 8 AM to 10 PM for better coordination among all agencies related to preparedness and evacuation of the vulnerable areas. There was an NGO co-ordination committee which took care of the co-ordination with all the NGOs. Another control room was activated in district emergency operation centre for 24x 7. Department of fire services was directed to keep ready with machines and other facilities like JCBs to clear the blockage if incident happens due to cyclone Fani. All the over head water tanks at Puri and nearby shelters areas were filled with water prior to the cyclone Fani. Special arrangements were made for drinking water and food. Generators were tested and arrangement of fuel was made earlier.

Immediate steps for shifting of old people, women, disabled people and other people who were living in the vulnerable areas and in kaccha house was made. They were shifted to the

Multi-purpose cyclone shelters or Multi-purpose flood shelters and some were shifted to the school buildings. There was a megaphones announcement to aware the general public not to stay in kaccha houses within 1.5 kilometres from the sea shore. At the same time announcement were made to inform the fishermen not to venture into deep sea areas & whoever was in the deep sea was advised to return to coast, these announcements were made with the help of vehicles with loud speakers as seen in (Pic. 14).



Pic. 14: Announcement for early warning given by Administration with the help of Speakers (source: OSDMA)

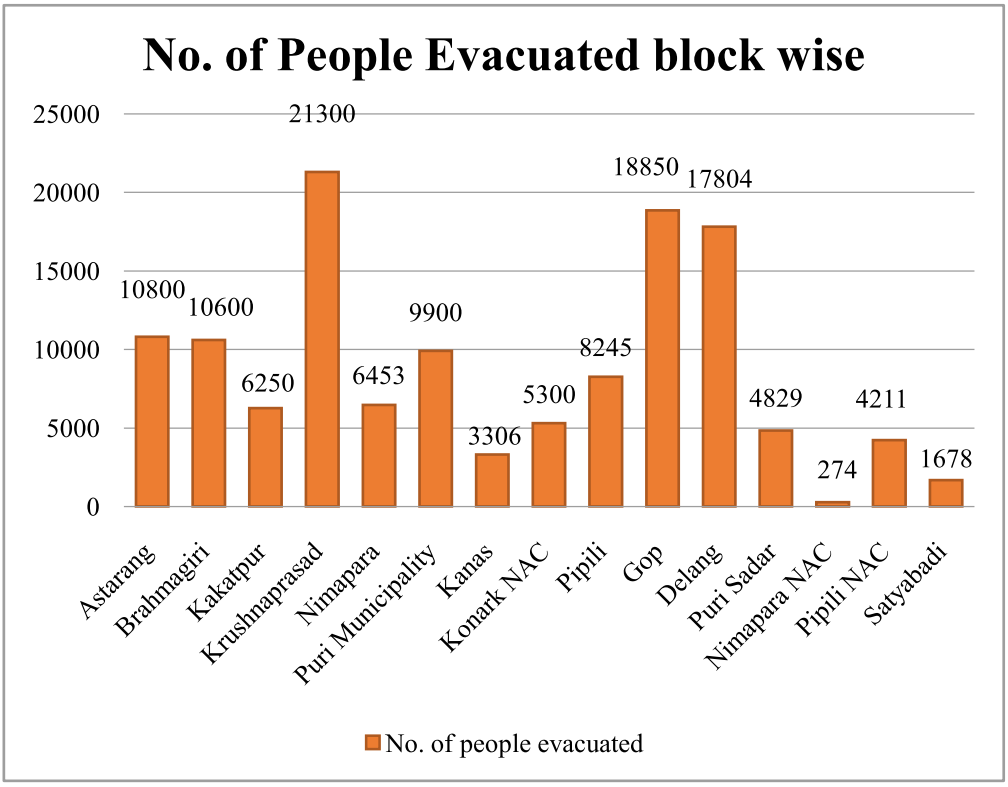


Fig 3: Number of People Evacuated in District PURI, during Cyclone Fani

2.16.2 CUTTACK



Pic. 15: Official Meeting of Officers and Volunteers (source: OSDMA)

Just after the warning was issued, collector of Cuttack called a meeting with DDMA officers, all line department officers and filed staff and briefed them about the severity of the disaster while advising them to start the evacuation work immediately (Pic.15). Commissioner CMC, executive officers of NACs, BDOs and Tahsildars were also instructed to identify the suitable schools and evacuate the people to safe places. Evacuation plan was made and discussed with officers about aiming for identified slums and low-lying areas at 91 locations tagging to 65 safe shelters. All BDO and Tahsildars were also advised to make their own plans according to the situation and evacuate all the vulnerable group of people.

Co-ordination had been set up with Police, volunteers (local) in tagging the CMC tax collectors, community organizers and sanitary inspectors for better management of response to cyclone FANI. District Emergency Office Control Room & Cuttack Municipal Corporation Control Room functioned round the clock under the supervision of senior officers.

2.16.3 KHORDHA

After the IMD forecast, all district officer assembled in the collector office and discussed on the preparation measures that would work immediately as shown in (Pic. 16). All officers gave their suggestions for the evacuation plans and multi-agency control room were made operational at different locations.



Pic. 16: Discussion on Evacuation Plans (source: OSDMA)

A team started working on the identification of the safe places for shifting of the evacuees. Preparations at the District Emergency Operation Centre started just immediately after the meeting was over. Following steps were taken:

- Control rooms were made operational at all Blocks, Tehsils & Line departments
- DG sets were made available at the DEOC for uninterrupted power supply because IMD predicted that the wind speed would go up to 250 km/hour so there were chances for brake down of light.

- Few of the senior officers of districts were in- charge of the evacuations and they all closely monitor the operations.
- Alert messages were issued to all line people of all departments / Blocks / Tehsils and mike system was also used to alert the vulnerable people of the district as shown in (Pic. 17).
- PRIs were actively involved in evacuation and free kitchen process setups. They made the shelters habitable for the people and arranged the drinking water arrangement as well as for food.
- Police also helped in the evacuation of the local people.



Pic. 17: Announcement are made by speakers for early warning dissemination



Pic. 18: Advanced Generator was kept



Pic. 19: Storage of Vegetables and Water Pouches stored in Shelters (source: OSDMA)

2.16.4 KENDRAPARA

Just after the warning was issued by the Indian Meteorological Department, district administration became alert and they started sharing the information with the people who were living in vulnerable areas. The evacution process continued for 2-3 days and about 178186 number of people had been evcuated and shifted to the 741 shelters including cyclone shelters (Pic. 20).

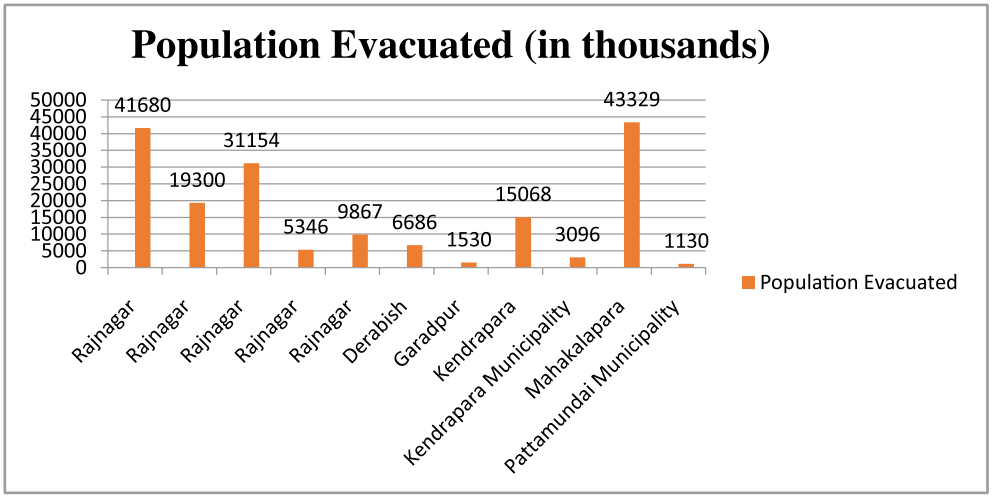


Fig 4: Population Evacuated in Kendrapara District



Pic. 20 : Vulnerable people shifted to the safe shelter and people sitting in vehicle and waiting for their turn to reach shelters (source: OSDMA)



Pic. 21 : Seniors Officer is reviewing the conditions of evacuation and dry foods are being distributed to the affected people (source: OSDMA)

2.16.5 JAJPUR

In Jajpur, the early warning was disseminated to the last man of the community through different modes like face to face, local media, social media and mike announcements. People were further advised to take shelter in some safe places. A mock drill was conducted by the administration at flood shelters and made everything in readiness for the affected people. A large number of people were mobilized by vehicles to flood shelters. While shifting the vulnerable population, there were many challenges for administration like old people, women, disabled people and children. This shifting operation was done under nodal officers who were involved in shifting the people.

On the other hand, administration also made arrangements for food and drinking water facilities. There were 11 fire services that were available for clearing the roads and bringing the situation as normal. Special arrangements were made for the road clearance by administration. About 50 large machines were available before the cyclone was hit. For drinking water supply advanced DG sets were installed in every cyclone and flood shelters.

Pre-deployment of the response teams was made to clear the roads and help the affected people. Administration involved Police, PRI Members, BO, NGOs and local community in evacuation, search & rescue and guided item in this work.

2.16.6. GANJAM

The forecast issued by IMD indicated the quantum of intensity and wide impact for which administration was ready with all senior officers and local community. Community was made aware and people who were already in the sea were called back to the home and were ordered not to come out from the safe house or shelters. People who were living in unsafe houses/weak houses were shifted to the safe shelters/school building with proper

arrangements of food, drinking water facilities, dry ration, emergency lights. For the evacuation purpose, vehicles were provided by the concerned authority/ local/ administration.

Individual department contingency plan & fully fledged preparedness efforts by all stake holders made all the operation successful. Free kitchen were operated at every shelter to feed the numbers of people who lost their houses.

2.16.7. JAJAT SINGHPUR

The district was prepared by ready to use school-cum-shelters facilities. The districts had trained AapadaMitra volunteers before cyclone made landfall. There was proper coordination among all departments and an establishment of strong public redressal mechanism was made. The vulnerable population had been timely evacuated with involvement of Panchayati Raj institutions.

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Chapter 3 : Sector-Wise & District wise Response to Cyclone Fani by Government of Odisha - An Overview

3.1 ENERGY (ODISHA POWER TRANSMISSION CORPORATION LTD)

High level meeting was called by Hon'ble Chief Minister of Odisha on the 3rd evening itself to take stock of the devastation caused by cyclone. Hon'ble Chief Minister directed to immediately address the plight of the citizens and restore back the infrastructures, facilities and amenities to normalcy within a shortest possible time. Power supply being pivotal to everything was the first priority. The Headquarter Control Room for restoration was immediately shifted to power house square office (BCDD-I) for easy accessibility. The partially affected areas under the districts of Nayagarh, Angul and Dhenkanal were directed for immediate restoration of power supply to critical infrastructures and by midnight of 3rd May, power supply was restored in these three districts. On 4th day, Energy Secretary to Government of Odisha along with CEO-CESU called a meeting of all senior officers of CESU. A joint action plan was formulated for quick restoration of damaged power infrastructure to resume the power supply. Five teams of senior officers were formulated as under:

- Team for Material Procurement & Management
- Team for Manpower Arrangement and its Deployment
- Team for providing all kind of facilities like Logistic, Transportations, Lodging and Boarding, Food etc.
- Team for Collection of Field Information and preparing (MIS report for Review by Management and Government)
- Team for coordination with field offices through [Messengers (as there was no mobile network)]

The first priority was given to restore power supply to 33/11 KV. Then the prioritization was made for restoring power supply starting from capital city of Bhubaneswar, critical infrastructures like Government hospitals, Private hospitals, Water supply points, Telecommunication establishments, Governor's house, High court, State secretariat, District head quarters, Railway stations, and Airport. Feeder wise damage assessment was made based on field reports and accordingly officers were deputed to oversee restoration works and coordinate with control room for resource mobilization. Separate WhatsApp groups had been formed for this purpose for coordination among all the officers and groups. For supervision of works, the following officers were deployed:

- Senior General Managers and General Managers for Divisions
- DGM and AGM lever officers at 33/11 KV Substations
- Deputy Manager and Assistant Mangers at Feeder Level
- Line Staffs for Gangs (of 10 persons)

Separate gang was formed for HT and LT restoration work. “Material Procurement Officers” were deputed for the transit store management at 33/11KV structures. The department had sought the help of district administration / commissioner of police to avoid the law and order situation due to public agitations / oppositions at different places during the restoration process

MANPOWER MOBILIZATION FOR RESTORATION WORKS

Manpower have been mobilized from all the DISCOMs of Odisha (CESU - Central Electricity Supply Utility of Odisha; WESCO – Western Electricity Supply Company of Odisha, NESCO – North Eastern Electricity Supply Company of Odisha & SOUTHCO – (The Southern Electricity Supply Company of Odisha) and other states viz, Andhra Pradesh, Telangana, West Bengal, Kerala, Karnataka, Bihar, Jharkhand. Organizations like NTPC, PGCIL, and TATA Power & L&T also came forward to support the energy sector. More than 20,000 people including officers from the other DISCOMs and agencies were also engaged in the restoration works.

MATERIAL PROCUREMENT AND DISPATCH TO FIELD OFFICES

Material requirement based on field reports on damages were assessed by the material management team headed by Director (Finance) of GRIDCO (Grid Corporation of Odisha); OPTCL (Odisha Power Transmission Corporation Limited) and CESU. The procurement of major materials was done by the head office and for minor materials it was done by the executive engineers and superintending engineers from local sources. The procurement committee was constituted with senior officers of different organizations in power sector of Odisha. A SOP (Standard Operating Procedure) was developed for emergency procurement of materials and equipments. Direct procurement of Joist poles from SAIL was requested as requirement was huge and to deliver it at the earliest and they started the delivery within a period of seven days. All the purchases were made at earliest as per government order rates. Transit stores were opened at field/ sub-station offices and material procurement officers were given responsibility for hassle-free movement of materials. Manpower was also deployed through labour contractors and Partial Turnkey Contractors (PTC) having valid license. The contractors could use materials of CESU as Owner Supply Materials (OSM), if available or from his stock as Contractors Supply Material (CSM). Safety team was deputed to all the field offices for adherence of safety norms. The following guidelines were issued to help the field officers to execute various works for restoration of power supply: Handling bank account and payment of labour expenses, food expenses, hire charges of equipment, reimbursement of bills claimed by the officials deputed from other three DISCOMs of Odisha, viz WESCO, NESCO & SOUTHCO. Remuneration was provided to outsourcing/contractual employees, and special incentive and supervision charges to concerned agencies. The monetization of scrap materials and clearance of debris and scrap like pole, conductor, cable, DTR etc. had been done immediately.

3.2 DEPARTMENT OF HEALTH AND FAMILY WELFARE

Firstly, all the fallen trees and other heavy debris were cleared from all hospitals within a week. Uninterrupted electricity and water were ensured at all referral facilities through

back-up facilities. The overhead water supply was restored within ten days at all hospitals. Routine immunization programme continued uninterrupted after cyclone FANI affected Odisha. The facilities of the all government hospitals were restored immediately. Within ten days of cyclone FANI, all the emergency dialysis services were restored. In order to prevent the spread of vector diseases, fogging, drain cleaning and medication of mosquito nets had been done in all the villages along with village cleanness drive. The house-to-house distribution and in time replenishment of ORS sachets (2.69 Million), Halazone/Chlorine tablets in bottles (4.05 Million) were done. The disinfection of open wells had been done on weekly basis (0.13 Million). Free distribution of sanitary napkins to adolescent girls & women for 2 months had also been done (2.4 Million). The department had also provided door-to-door medical services through mobile medical services. The 83 unsafe water bodies were barred from public use. Massive IEC/BCC campaign through print, electronic & social media had been done post disaster. The 265 TV spots, 244 radio spots & 82 newspaper advertisements were given on health awareness to prevent any spread of diseases. More than 0.6 million leaflets were distributed through ASHAs (Pic. 22).



Pic. 22: Newspaper advertisements (source: OSDMA)

The Mobile Food Testing Unit were utilized for food and water testing and creation of awareness. A total of 219 on spot sampling were done for water and food. The food in relief camps was tested thrice a day by a team of two FSOs (Food Safety Officers). Eight Teams from Mental Health Institute, Cuttack, visited all six highly affected blocks of Puri district and provided psychological counselling to the people in distress. District Mental Health Teams of different districts have also visited affected areas and gave the psycho-social care. The department worked in close collaboration with Ministry of Health and Family Welfare, WHO, UNICEF, UNFPA and NIMHANS.

3.3 FISHERIES & ANIMAL RESOURCES

3.3.1 Fisheries

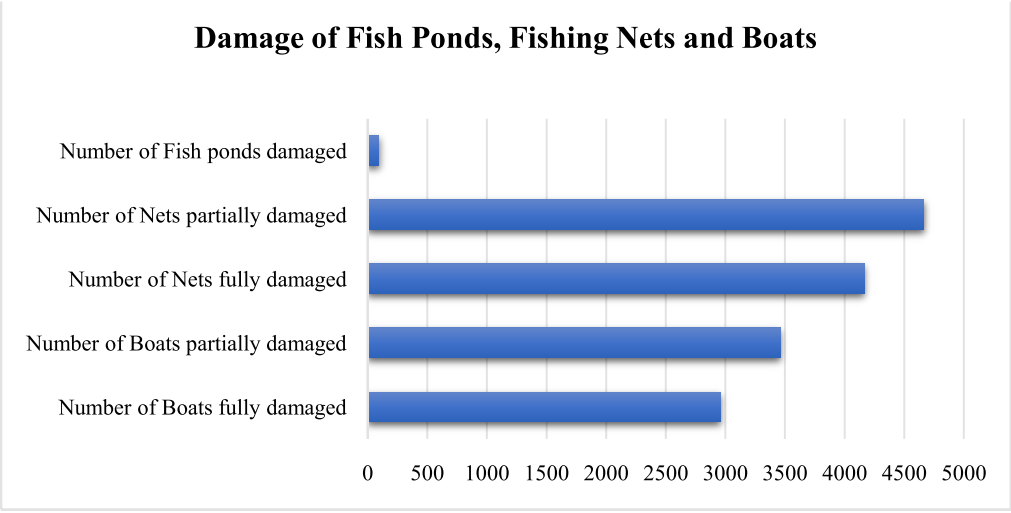


Fig. 5: Damage of Fish ponds, Fishing nets and boats.

Fig. 5 shows the damage to fish ponds, fishing nets and boats due to cyclone FANI. Large number of fishing nets and boats were damaged partially. This had impacted the livelihood of the population mostly staying near the coastal areas.

Assistance to the fisheries was divided into assistance to marine & Chilika fishermen; assistance to inland fishermen, and assistance to fish farmers for freshwater/brackish water aquaculture. Assistance to the marine & Chilika fishermen for boat & net was 50% of Rs.80,000/- for a new FRP (Fiber Reinforced Plastic) boat on replacement basis and 50% of Rs.20,000/- for net was provided for fully/ partially damaged boats and nets. Assistance to the inland fishermen for boat and net was 50% of Rs.30,000/- for a new FRP boat on replacement basis and 50% of Rs.20,000/- for net to be provided for fully/partially damaged boats and nets. Financial assistance of Rs.12,200 per hectare was provided to the fish farmers (freshwater and brackish water) for repair of damaged dykes.

3.3.2 Veterinary Health Care:

Fig. 6 shows that livestock were highly affected during cyclone FANI. The highest number of livestock was affected in Puri district, followed by Cuttack, Khorda, Jajpur, Jagatsinghpur, Kendrapada, Nayagarh, Ganjam and Balasore. For the immediate response to the huge loss of livestock, the department had taken certain measures. Following measures were taken by the ARD department in the immediate aftermath of the cyclone. The department had supplied feed and fodder. A total of 2006.5 million tons of cattle feed were supplied to the severely affected districts, i.e., 99 million tons to Cuttack, 1326.5 million tons to Puri, 211 million tons to Jagatsinghpur, 367 million tons in Jajpur and 3 million tons to Kendrapada district. The department had also supplied two thousand quintals of green fodder from the departmental fodder farms to the affected areas. The department had

procured 100 million tons fodder from NDDB (National Diary Development Board) for supply to affected areas.

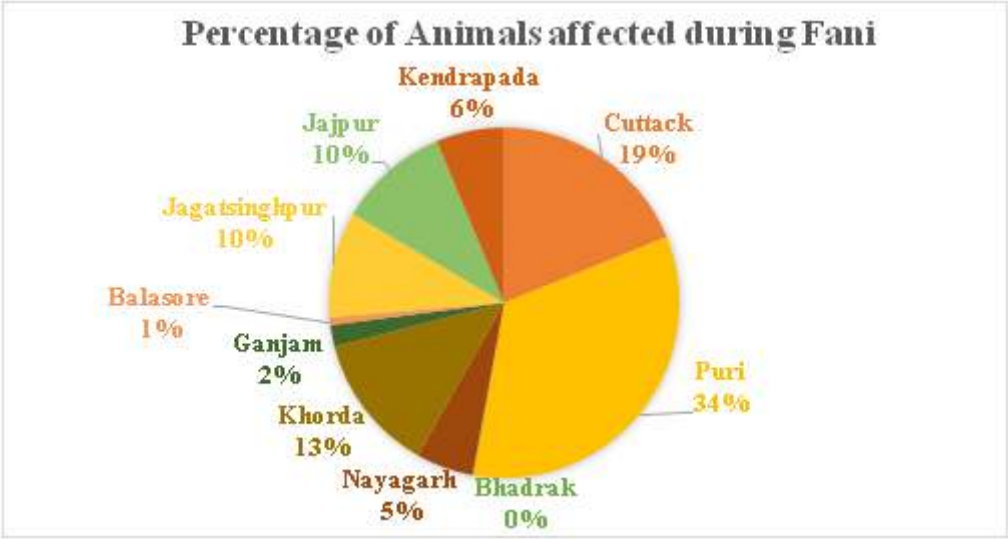


Fig. 6 : Ward self help group

Mobile veterinary unit consisting of one veterinary doctor, one livestock inspector and one attendant was deployed in each affected block at the veterinary dispensary level to move about in the affected areas for treatment of animals. The 115 Rapid Response Teams (RRTs) were used for conducting veterinary camps in the affected areas wherever necessary at district level. The additional 64 Rapid Response Teams (RRTs) from nearby districts which were not affected by cyclone were deployed (61 in Puri district, 3 in Khordha), to carry out animal health camps, carcass disposal, distribution of cattle feed and fodder. The 359 veterinary doctors, 1177 para-vets and support staff were engaged for ensuring health care measures in cyclone affected areas. The 4105 number of animal health camps were organised, and 5.08 lakh animals were treated. The department had ensured supply of required medicine for treatment of sick and injured animals at the doorstep of farmers in the cyclone affected villages. All blocks of severely affected districts of Puri, Khordha and Cuttack were kept under the supervision of senior officers to look after the restoration activities in animal husbandry sector.

3.3.3 Carcass Disposal

Pro-active measures were taken by the department with the help of revenue authorities, NGOs and local people for disposal of animal carcasses including dead poultry birds to avert any public health problems. Arrangements of necessary logistics like JCBs were also made to facilitate quick disposal of carcasses. Carcasses of 3333 large animals, 2924 sheep & goats and over 53 lakh birds were disposed off. After recession of water in Chilika lake, carcass of nearly 90 buffaloes were retrieved from Chilika near Gamhari of Krushnaprasad block and promptly disposed. All the carcases had been disposed as per the standard protocol to prevent epidemic.

3.3.4 Support Under Chief Minister's Package

The CM package covered assistance to owners of poultry, dairy sector, and small animals, who had lost their goats, cowshed, poultry farm etc. The package supported 50000 affected farmers whose cowsheds were damaged, assistance for fodder cultivation, deworming medicine, mineral mixture, and nutritional supplement were being provided for dairy animals. The livelihood support had been provided under the Odisha Livelihood Mission. The support was extended for revival of poultry units and to entrepreneurs for poultry farming.

3.4 DEPARTMENT OF AGRICULTURE AND FARMER'S EMPOWERMENT

The team work of the department officials both at head quarter & field level was the key to overcome the immediate effect of disaster and to restore various farming activities post disaster. For the agricultural loss, CM had announced a relief package. Agriculture input subsidy was provided to the small and marginal farmers who had sustained crop loss of 33% and above of Rs. 6,800 per hectare of land in rain fed/non irrigated areas, Rs.13,500 per hectare of land in areas under assured irrigation, and Rs.18,000 per hectare for all types of perennial crops. Perennial crops included mango, cashew, coconut, kewra, betel vine etc. The assistance was provided to the actual cultivators. Agricultural input subsidy to any affected farmer was not be less than Rs.2000 for perennial crops and Rs. l000/- for other crops. One lakh number of vegetable mini-kits was supplied to the FANI affected districts during Kharif 2019-20. In 50,000 acres of demonstration programmes of different crops was taken up in affected districts in the post disaster Kharif season. Special assistance was provided to the affected area of about 5,000 hectares under sugarcane for demonstration on Sustainable Sugarcane Initiative of Rs.20,000 per hectare or Ratoon Crop Management of Rs.12,500 based on the farmer's requirement.

The 5000 pump sets were provided with 50% subsidy limited to a maximum of Rs.15,000. The 10,000 number of sprayers were made available at subsidized rate. The seed treatment campaign has been initiated in two lakh acres. Immediate steps had been taken to arrange and distribute quality seeds and other inputs in enough quantity for the Kharif season. Farm mechanisation subsidy of Rs 150 crores had been disbursed to the affected districts. An incentive of Rs. 15,000 per farmer was provided to 5000 farmers / WSHGs for Betel Vine cultivation. The Rs. 40,000 unit was provided for construction of Shade Net / thatched structure for development of 1000 mushroom units for farmers / WSHGs and Rs. 2,000 boxes were provided to 500 farmers / WSHGs for livelihood support to honeybee growers. The distribution of fruit seedlings to 5 Mango grafts and 5 Coconut seedlings to each farmer was provided for 50,000 affected farmers for their livelihood sustenance. 4 lakh numbers of Nutri-Gardens were promoted in the affected households. The 10,000 hectare of fruit tree plantation (Cashew, Mango and Coconut, etc.) was taken up along with support for inter-cropping package for three years, in order to provide income support in the initial period to the farmers, while the plantations reach the fruit-bearing stage. Incentive of Rs. 25,000 hectare was provided to banana farmers covering 1650 hectares.

2. Ward Self Help Groups

Farm Credit:

- Short term Rabi loans advanced in the affected areas during Rabi 2019 having crop loss of 33% and above was converted into medium term (conversion) loans.
- Due date of Rabi short term loans advanced in the affected areas were extended up to 30th June 2020 to facilitate conversion of such loans into medium term (conversion) loans.
- Expeditious steps were taken to organise Joint Liability Groups (JLGs) by covering maximum number of sharecroppers / oral lessees to provide them credit during the current Kharif season.
- Expeditious steps were taken to conduct crop cutting experiments to settle the claims of the affected insured farmers under crop insurance scheme (PMFBY- Pradhan Mantri Fasal Bima Yojana), with risks of localized calamity and mid-season adversity.
- Government of India was requested to provide interest incentive of 3% for medium term (conversion) loans i.e. at par with crop loans for prompt paying farmers.
- Farmers affected by FANI were provided fresh finance for Kharif cultivation during current Kharif season, which has commenced from 1.4.2019.



Pic. 23 : Department visit to the affected Paddy crop area in Khordha District (source: OSDMA)

3.5 ODISHA MOTOR VEHICLE DEPARTMENT

The devastation caused by cyclonic storm "FANI" on 03.05.2019 in the district of Puri urged quick attention to restore normalcy which required mobilization of various types of vehicles in large numbers. The demand was promptly addressed by pooling the vehicles from various regions. As many as 2,596 number of vehicles were provided to the district administrations of Cuttack, Khurda and Puri for evacuation, relief and restoration work as they were the most affected districts. The requisition and deployment of vehicles was monitored by State Transport Authority and report was sent to CM office on daily basis. Vehicles were provided to the district administration of Khurda for transportation of food materials to the affected population of the districts. Restoration vehicles were provided by requisitioning on priority. Vehicles were also provided for shifting of debris and fallen trees.

The Principal Secretary, Commerce & Transport department was in-charge of restoration of electricity in Bhubaneswar. The department had deployed vehicles to other affected districts as well for relief and restoration work.

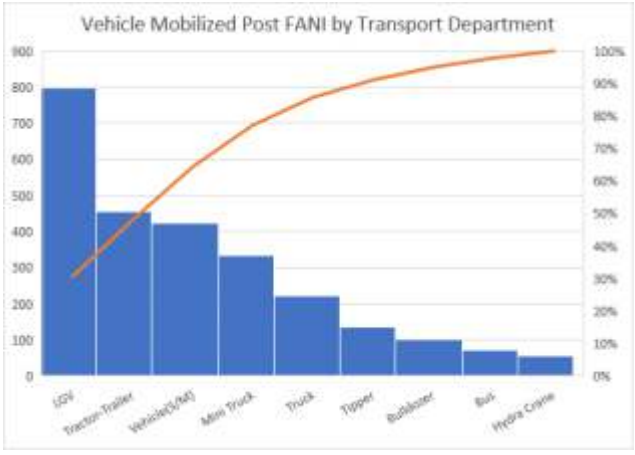


Fig. 7 : Vehicle Mobilized Post FANI.

The graph shows the number and type of vehicles deployed for relief and restoration work post disaster. The large goods vehicle was deployed in highest number for post disaster relief and restoration work. It was followed by tractor-trailer and both small and medium side vehicles. The mini trucks, trucks, tipper, bulldozer, bus and hydra-crane were also deployed by department for relief and restoration work. The first priority was given to the most affected district for immediate restoration post disaster.

3.6 DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

The department had undertaken removal of blockages and desilting of critical drains post disaster. All vulnerable road points were under vigil to prevent breaches and heavy rush of flood water and water logging. The required technicians were airlifted from Kolkata by IAF (Indian Air Force) helicopters in view of emergent need for additional water. Control rooms were setup in all the urban local bodies to manage the water supply situation round the clock and were coordinated through specific whatsapp group for effective management. A team of 5000 sanitation workers and 600 senior officers were formed within the urban local bodies for cleaning the roads, removal of fallen trees and clearing of piled up garbage. More than 800 JCBs, dumpers, tractors and Tata Ace were pressed into service in these cleaning operations.

The Urban water supply department was well prepared for the disaster and works as per Disaster Management Plan. Central control room was made operational at department level, at heads of the department level and at division level, to monitor the activities. All the field officials were instructed to be fully prepared with sufficient storage of water, Water tankers, Fuel, Diesel Generator sets, PVC Tanks, manpower for restoring of water supply. Full restoration was achieved within 72 hours of landfall of the extremely severe cyclonic storm-Fani. The main challenges were interruption of wireless communication & power supply. Water supply is essential for everyday life and it had affected livelihoods of all in addition to the sanitation and hygiene. But the department was able to restore it within 72 hours.

3.7 PANCHAYATI RAJ AND DRINKING WATER DEPARTMENT

Repair of tube wells were taken on priority and completed by 30th April 2019. Around 250 generators were arranged from nearby districts and state for supply of drinking water

through pipe water supply. The department had mobilized the manpower from non-affected districts and each minute detail, small requirement for shifting as well as restoration were taken care of and instructions were disseminated through whatsapp.

3.8 DEPARTMENT OF TOURISM

The cyclone had the maximum impact on the non-hospitality sector (day tourism services and facilities) in which

- Over 4,000 direct employment were severely impacted in Puri and Khordha.
- Indirect employment impacted was approximately INR 16,000 crore.
- Total income losses had been estimated at INR 45 crore.

Short Term Relief:

- INR 5.79 crore from the Chief Minister's Relief Fund (CMRF) for relief assistance for tourism dependent persons had been provided in Puri district.
- 79 guides, 897 photographers and 304 life guards had received per capita assistance of INR 10,000 under a special package.
- Over 1100 tourist boatmen had received a subsidy component of INR 40,000 per boatman per boat.

Long Term Imperatives:

- Rebuilding into the organised sector.
- Registration and insurance of the people working in tourism sector.
- Geographical dispersion and decongestion from golden triangle.
- Community managed ecotourism initiatives had been encouraged, apart from prime luxury tourism oriented private sector investments.

3.9 WOMEN AND CHILD DEVELOPMENT AND MISSION SHAKTI

The women and children are the most vulnerable sections in any disaster. The department had been working in order to mitigate the vulnerability of women and children. The department had supplied 'Chhatua' for a month to the children of the age group of six months to three years; three to six years and to pregnant and nursing women of Puri districts during the cyclone affected month, May, 2019.

Districts were instructed on the following for immediate relief and restoration:

- Taking up repair and maintenance of AWC buildings in convergence with MGNREGS, out of CFC/ SFC funds wherever necessary.
- Making toilets in AWCs functional for use by the pre-school children and inspection and disinfection of water sources.

- Assessment of damage of food stock, replacement of damaged stock with fresh ones and making the production units of SHGs functional.
- Early resumption of AWCs, provision of supplementary nutrition and resumption of Early Child Care & Education (ECCE).
- Operation of AWCs in the nearest school building, wherever damage had been occurred.
- Provision of eggs to all the children of the age group 6 months-3 years and pregnant and nursing women as per norms under SNP (Supplementary Nutrition Programme).
- Strengthening convergent activities like weight measurement of children, sensitization on proper washing of hands and maintenance of hygiene, conduct of Mamata Diwas and ensuring immunization, health check-ups, referrals and health and nutrition education.
- Safety and wellbeing of women/ adolescent girls to prevent violence or abuse and ensure facility for privacy at shelters and provision of dignity kits.
- Psycho-social care & support and counselling to the distressed children. Passing on information on missing/ found children to the local police or child line.
- Vigil on trafficking of women/ adolescent girls by sensitization of the community at large, particularly socio-economically vulnerable women/ adolescent girls to prevent trafficking; bolstering anti trafficking operations and deployment of adequate police personnel, particularly lady officers, in strategic locations such as railway stations, bus stands, local markets and any such vulnerable areas.
- Monitoring of women's homes (Swadhar/Ujjwal) to ensure safety & security of children/ women.

The following additional provisions were made through partner agencies:

- Distribution of one lakh dignity kits containing toiletries, sanitary napkins etc. amongst adolescent girls/ women with support from UN agencies.
- Distribution of five lakh tetra packs of flavoured milk from NDDB (National Diary Development Board).
- The ward self help group had set up community kitchen, helped in clearing of debris and in evacuation.
- The department had also produced monetary assistance to self-help groups to revive their livelihood.
- The bank was also requested for advances of one-year loan and zero interest loans.

3. Central Finance Commission/ State Finance Commission

During the devastating cyclone Fani, the Anganwadi were badly affected. The highest number of damages were in the district of Ganjam followed by Puri. The Anganwadi centre was the most critical infrastructure. The anganwadi centres were also damaged in Cuttack, Dhenkanal, Jagatsinghpur, Jajpur, Khordha and in minimum number in Angul, Bhadrak and Mayurbhanj (Fig. 8).

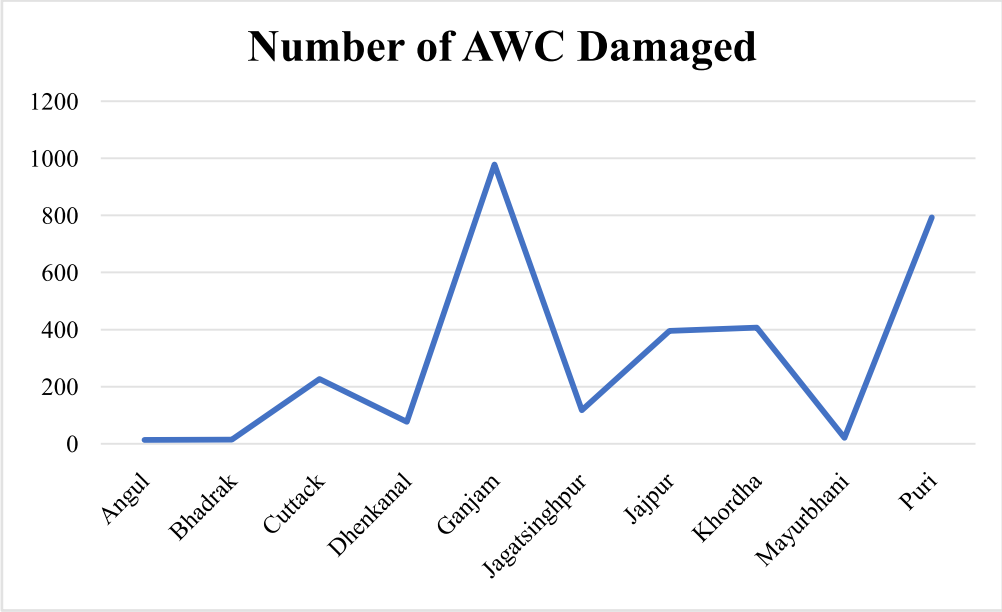


Fig. 8 : Number of AWC Damaged

3.10 WORKS DEPARTMENT

As Puri district was badly affected, the department responded immediately to Puri.

- Immediate concern of the department was to restore different routes to Puri.
- At PuriZilla, food and water were served to police personnel engaged in restoration. Water bottles were given to CESU for distribution among electricians in the field.
- Close coordination with NDRF, ODRAF, state fire service, CESU for cutting of large trees and shifting of fallen electrical utilities on 24 x 7.
- Road connectivity and normal traffic movement was completely restored by the department within 48 hours of cyclone.
- The restoration/repair works such as replacement of A.C sheet roofing, door & window shutters and reconstruction of compound walls. All the restoration was done in collaboration with other concerned departments.

3.11 FOOD SUPPLIES AND CONSUMER WELFARE DEPARTMENT

The department had supplied food to Puri, Khordha, Cuttack, Kendrapara, Jagatsinghpur, and Nayagarh. Chuda, gur, biscuits, match box, wax candles, salt, rice and kerosene oil had

been provided by the department. The management of supply of petrol and diesel was monitored closely by the department. As a market intervention measure to keep market price of essential commodities like potato and onion stable, these items were procured from wholesale points and made available to consumers in Puri at affordable prices.

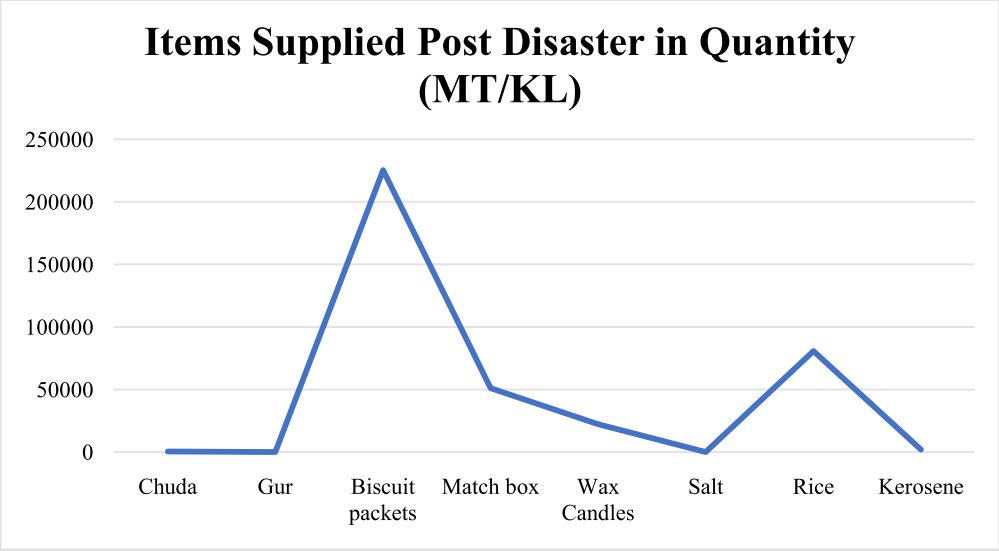


Fig. 9 : Items supplied post disaster in quantiy (MT/KL).

The department had supplied highest quantity of biscuit packets, and rice followed by match-box and wax candles.

3.12 FOREST AND ENVIRONMENT DEPARTMENT

For the restoration of green cover which was severely damaged by cyclone Fani, it was decided to plant 80,000 tall seedlings in the urban areas of Bhubaneswar, Cuttack and Puri. Further it was decided that, 25000 tall seedlings were to be planted by OFDC Ltd (Odisha

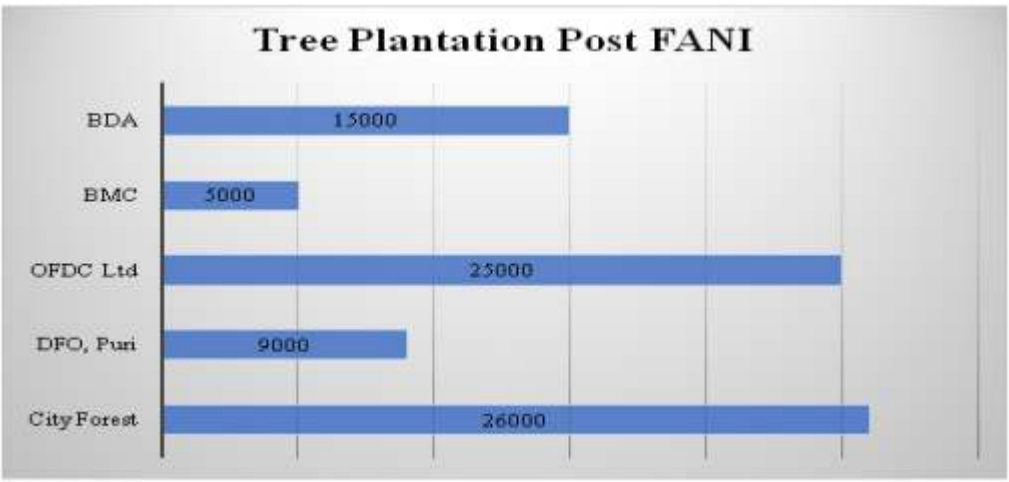


Fig. 10 : Tree plantations Post FANI.

Forest Development Corporation) in various places of Bhubaneswar city. The district forest officer, city forest division had planned to plant 17,000 tall seedlings in institutional areas in the capital city. Besides, plantation of 20,000 tall seedlings was to be planted in the capital. The most affected Puri district, DFO was instructed to plant 9000 tall seedlings in urban areas.

Fig. 10 shows the tree plantation by various departments in order to maintain the green cover of the state. The cyclone had uprooted large number of trees. The government had adopted a nature-based solution to mitigate the natural disasters. The Bhubaneswar Municipal Corporation (BMC); Bhubaneswar Development Authority (BDA); Odisha Forest Development Corporation (OFDC) Ltd; District Forest Officer (DFO); and city forest had planted large number of tress post FANI in cyclone affected districts especially Puri, as it was badly affected. The highest number of trees were planted by city forest followed by OFDC Ltd, BDA, and BMC. The DFO, Puri had planted 9000 tree seedlings post cyclone Fani.

3.13 DEPARTMENT OF SOCIAL SECURITY AND EMPOWERMENT OF PERSONS WITH DISABILITIES

Gender, disability and age–sensitized empathetic and trained personnel were deployed to support and facilitate recuperation of the target groups. The focus was on inclusive approach, multisensory approach, cathartic venting, psychological hand holding and creating an enabling environment for the differently abled persons. The department provided support to damaged assistive devices, aids and appliances, sanitary kits, medical assistance and relief material. The department also deployed women and child-friendly taskforce. Volunteer groups were being formed for supporting and helping the targeted population. Sanitary and hygiene kits for women, children and senior citizens were provided.

Immediate medical interventions for the ailing senior citizens and medically unfit women as well as children were set up. The safety and social security of the target groups was ensured through the field level functionaries. Follow up mechanisms and maximum outreach work in the best interest of women, children and senior citizens were done. Evacuation, relief and restoration in the maximum disability-friendly way possible have been done. Less-reaction threshold relief, medical assistance and psychological first-aid were provided. Advance payment of monthly disability and social security pensions to all the beneficiaries had also been done. Home based interventions / management training to the parents/caregivers of the affected children and individuals (who could not reach their service delivery locations) were provided. The assistive devices, aids and appliances that were damaged in the cyclone were distributed on case to case basis in a coordinated manner ignoring the existing norms. The department keeping in mind the vulnerability of the women, children and differently abled persons had framed short- and long-term measures:

- SHORT TERM MEASURES: Interventions for relief, restoration and recuperation as early as possible; training and capacity building; development of multisensory

[4] BBSA – Bhima Bhai Bhinnakshyama Samarthya Abhijan

resources for recuperation; optimal outreach activities through BBSA[4] and Khyamata Express; development of State Portal for effectual disaster management across functionaries and beneficiaries; Monitoring and evaluation mechanisms.

- LONG TERM MEASURES: Establishing disability-friendly and social security based multi-use intervention cum 'disaster-shelter' centres; evidence based anthropometric research and development activities; ongoing preparedness and system strengthening programs with the functionaries and communities; provisioning of livelihood kits in advance; developing neo-humanitarian hand holding support groups for proactive altruistic involvement beyond stereotypes and inhibitions.

3.14 TELECOMMUNICATION

As the state and central government promoted an ambitious agenda to deliver a range of citizen services over digital platforms, the sustainability and robustness of the platforms was ensured. A resilient telecom network contributes to economic growth, and in times of disasters, becomes the back bone of the response and recovery. Alternatively, a failure to do so may have a cascading effect on the development trajectories of many interlinked sectors. A Control Room was operating at IT center, state secretariat with the representative from each operator - DOT, BSNL and E&IT department to monitor and support the activity of restoration. NDRF/ODRAF teams were engaged for clearance of the blockages caused due to the uprooted trees, and for restoration of OFC (Optical Fiber Cables). Human resources from other states were mobilized for restoration of OFC cuts. All MSC (Mobile Switching Centre/BSC (Base Station Controller) locations were provided with alternate power supply through DG sets till the restoration of normal power supply. COW (Cell on Wheels) were being mobilized from other states such as Andhra Pradesh, Kerala for immediate deployment at Puri district. Intra Circle Roaming permitted in Puri district till end May.

3.17 DEPLOYMENT OF DISASTER RESPONSE FORCE

3.17.1 NDRF

Initially NDRF teams started search and rescue operations wherever they were pre-deployed in different districts of Odisha. NDRF teams carried out main route clearance, shifting of hanging tree branches, removing of fallen electric poles and wires and other debris obstructing traffic in main routes. The teams were divided into sub teams and professionally executed various operations in cyclone hit area with consent of civil administration and state emergency operation centre. Apart from this, medical teams of NDRF provided free medical treatment to the needy. On dated 10.05.2019, 06 more teams arrived from second battalion which immediately joined CESU at Puri district for quick restoration of electricity work.



Fig. 11 : Restoration work of NDRF Team.

The NDRF teams did multiple restoration work such as clearance of uprooted trees, medical camps, cutting of electric poles, cutting of fallen walls, cutting of iron rod, high mast lighting, mobile towers, rescue to affected peoples and of livestock, road clearance, electric transformer, setting up poles, cutting of iron angle, installation of tower lights and also

3.17.2 ODRAF

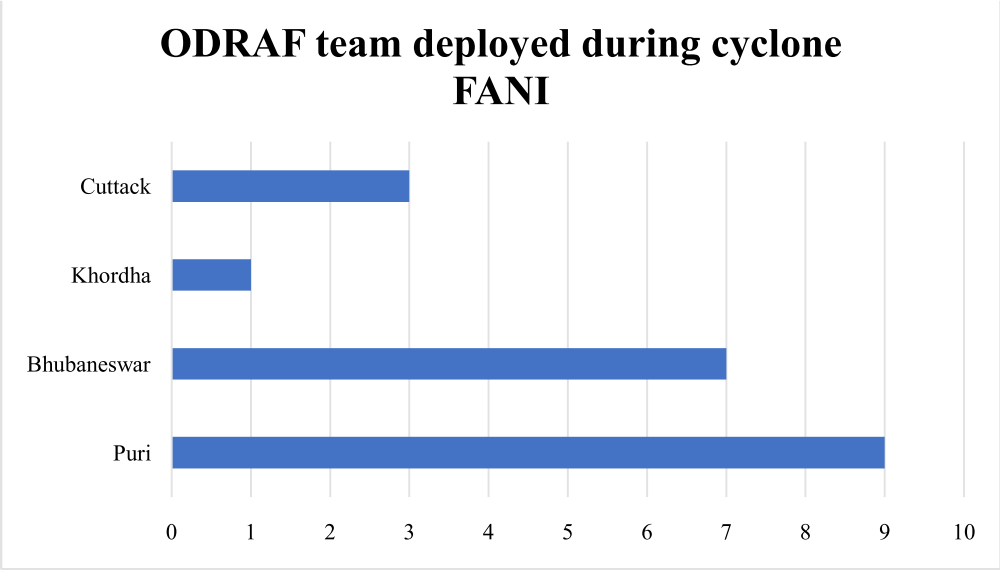


Fig. 12 : Deployment of ODRAF team to cyclone affected districts.

medical assistance to the people (Fig. 12). The highest restoration work was done for the clearance of uprooted trees, clearance of fallen walls and cutting of affected mobile towers.

Fig. 12 shows the deployment of ODRAF teams to cyclone affected districts. They were deployed in the badly affected district. The highest number of ODRAF teams were deployed in Puri, followed by Bhubaneswar, Cuttack and Khordha.

The main operational areas were Puri and Cuttack district including state capital Bhubaneswar. Emphasis was given on search & rescue operation followed by road clearance. The primary aim of ODRAF team was to restore road connectivity in all the affected National Highways, Hospitals and important offices. On priority basis these were established within 2 - 3 days due to the ceaseless and tireless effort of dedicated ODRAF teams. Approximately 200 number of petrol operated tower lights of ODRAF teams were installed in the important places and chowks of the affected rural and urban areas to eradicate darkness. A fully equipped 5 persons of ODRAF team were attached to each electric restoration teams for speedy restoration of electricity in the affected cities and rural villages. The affected prime cities could be re-electrified within a week due to the 24x7 hours of joint operation by electricity department with the help of ODRAF & NDRF teams. Relief line clearance was established by ODRAF team with in one day in all affected districts. Very severely affected interior roads of Puri, Bhubaneswar and Khordha were cleared by ODRAF teams within a week. Government office, public places and private houses where uprooted trees were present, were cleared by ODRAF teams subsequently.

They were also engaged in restoration of water supply system and restoration of electricity in the affected districts.

3.17.3 FIRE SERVICE

After extremely severe cyclonic storm - "FANI", all the teams along with the personnel of the respective fire stations were pre-positioned in the districts, started their work for immediate restoration. The trees/poles fallen on the main roads were cut and cleared for movement of vehicles. The illuminated tower lights had been stationed in the important places of the city like Cuttack, Bhubaneswar, Puri and other affected districts. Fire service teams were engaged for the entire night to clear up the national highways and main roads under the supervision of senior officers. The officials of fire service camped at OFDRA Bhubaneswar for monitoring and reviewing of the works. The fire service personnel were kept stand by at Dhenkanal and Angul mobilized to Bhubaneswar as the capital city was seriously affected. Personnel pre-positioned at different fire stations of Ganjam and Gajapati were re-mobilized to different blocks of Puri district. The fire service teams along with ODRAF had done tremendous work for immediate restoration of the state post disaster.

The 74 inflatable tower lights along with man power were mobilized to Puri. One control room was made functional at OFDRA, Bhubaneswar to receive individual complaints from the public through civil defence volunteers and the complaints were redressed by deputing the team. The 75 teams consisting of 468 personnel with 268 power saws were engaged for cutting of trees at different places of Bhubaneswar city to clear up the roads/offices and other premises. The 300 more manpower was mobilized from different districts of northern range, Sambalpur and deployed at Cuttack, Bhubaneswar and Puri for rescue and restoration. The 16 teams consisting of 80 personnel was provided to BMC for cutting of trees. The 10 teams consisting of 50 personnel with power saw was provided to CESU for assisting in restoration of power supply. The 25 teams consisting of 125 personnels along with power saw and lights were provided to R & B authority of Bhubaneswar for cutting of trees. The 25 dedicated teams consisting of 125 personnels utilized for cutting of trees of residential building of individuals of Bhubaneswar. The 30 teams consisting of 150 personnels were utilized at Puri for cutting of trees at different areas. The teams pre-positioned at Balasore, Bhadrak, Kendrapara, Jagatsinghpur and Jajpur were de-mobilized after completion of their work to Bhubaneswar and Puri. One work shop was made functional at OFDRA, Bhubaneswar and Cuttack for repairing of power saws and lights. The fire service had mobilized 15 high capacity water tankers of 15,000 liters or more and utilized at Bhubaneswar and Puri for supply of drinking water to the public. The 14 fire tenders utilized for sprinkling of water in 32 green garbage dumping yard of Bhubaneswar city to avoid fire accident was setup. Altogether 2,228 fire service personnels of different fire stations along with 371 power saws and 292 tower lights were deployed to different districts likely to be affected in cyclonic storm "Fani" for pre-positioning to meet any eventualities effectively. The team constituted for rescue & restoration worked specially for Bhubaneswar and Puri city continued their work till 21.05.2019.

Fig. 13 shows the number of fire service teams deployed with various departments for immediate restorations post disaster. The fire service teams worked tirelessly post Fani to

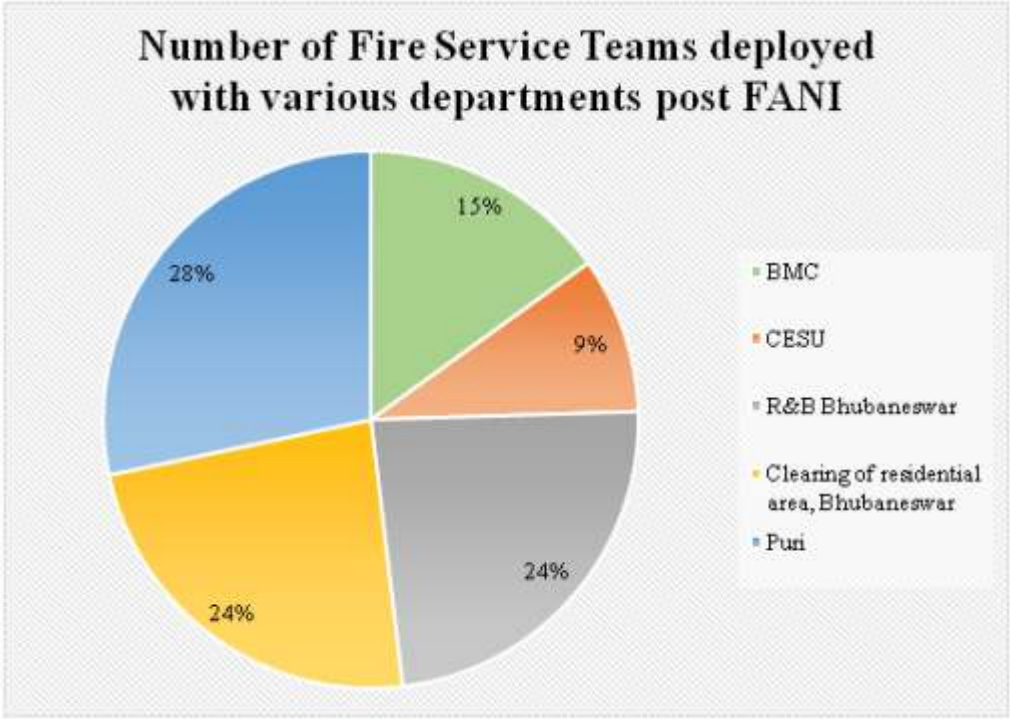


Fig. 13 Number of Fire service teams deployed with various teams.

bring the state in normalcy. The highest number of teams were deployed in Puri District as it was badly affected by the cyclone. This was followed by the deployment of teams with roads and building division of Public Works Department and with clearing of residential area in Bhubaneswar. The fire service teams were also deployed with Bhubaneswar Municipal Corporation and with Central Electricity Supply Utility.

3.17.4 POLICE RESPONSE

The Odisha police managed the law and order for initial 36 hours since the cyclone had hit. Police provided security to the local markets, government and private ware houses, where food grains were stored as well as sold and prevented looting / food roits. Police helped in the distribution of relief by ensuring that all roads were safe for transportation of relief materials, proper police arrangements for smooth distribution and escorted to vehicles carrying the relief from the state capital to the affected districts.

3.17.5 CIVIL DEFENCE

The civil defence worked along with ODRAF and fire service. They worked in cutting of fallen and uprooted trees, supply of drinking water, disposal of dry and green debris, restoration of electric poles and watching fire hazard at different dumping yards. They had also established first aid post for treatment of injured pubic, fire personnel and for civil defense volunteers engaged in cutting of trees and in different rescue operations.

3.18 DISTRICTS WISE RESPONSE OF CYCLONE FANI

3.18.1 PURI

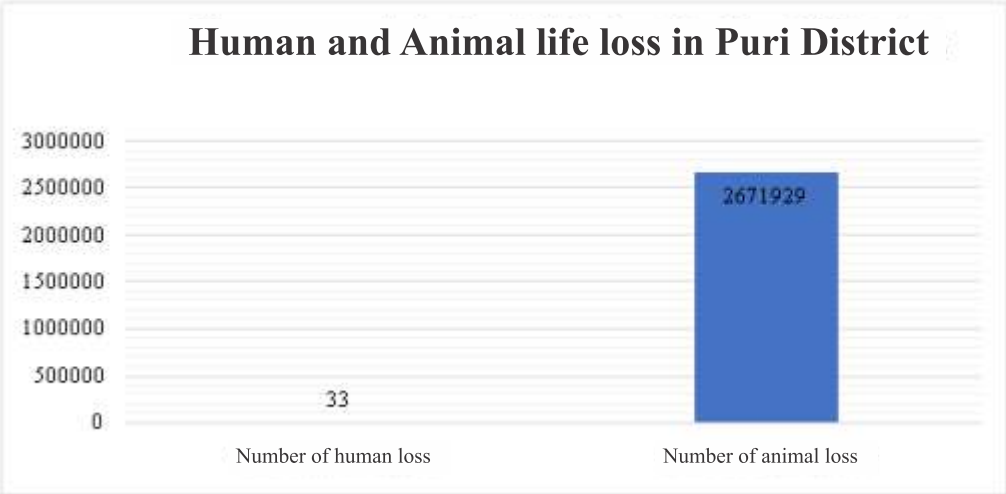


Fig. 14 Number of Human and Animal life lost in Puri district.

Puri was hit by cyclone Fani in Satpada village with wind speed of 274 km per hour. It had affected 11 blocks with approximately more than 19 lakh population. For immediate relief and restoration, 45 police platoons, 9 ODRAF teams, 23 NDRF teams, 52 fire service units, 50 works department team, 25 rural development team, 457 ASKA lights and 45 medical and veterinary team had been deployed as Disaster Response Force. The teams worked in restoration of roads, drinking water supply to the affected population, and power supply restoration. The government had provided free kitchen in all the cyclone shelters, five shops were made functional, polythene sheets were distributed and rice, chuda, gur, kerosene and candles were distributed to the affected population. The 50 Cell on Wheels (COW) had been

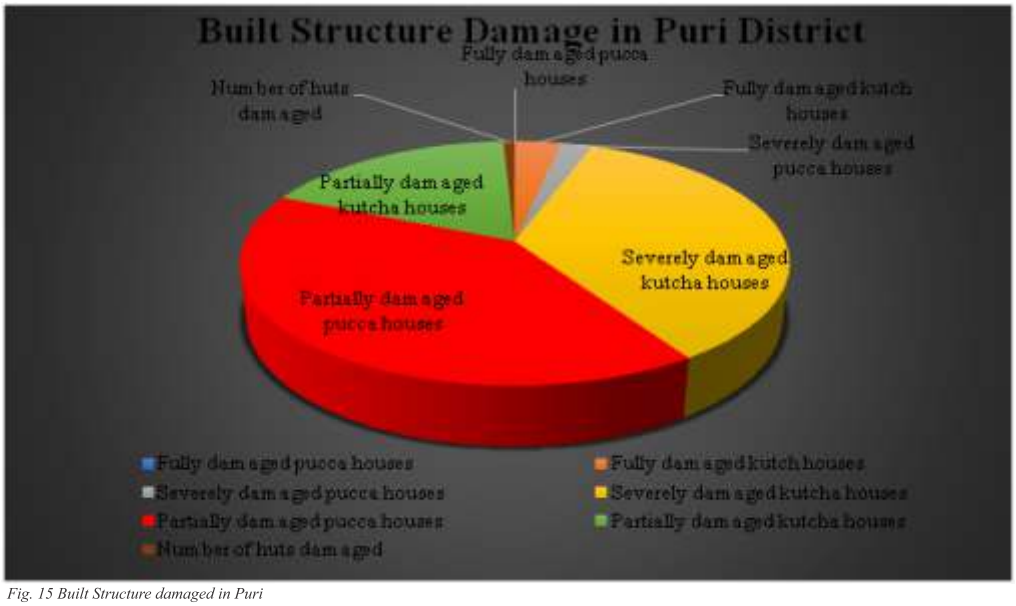


Fig. 15 Built Structure damaged in Puri

put in place by different operating agencies. 14,023 tube wells had been disinfected and 90% of urban pipe water supply had been restored within ten days of the cyclone. The Puri district was badly affected by cyclone Fani. The district had 33 deaths and huge number of animal loss which can be inferred from Fig. 15.

In Puri district, cyclone made a landfall and it had a huge impact on built structure. The highest pucca houses were partially damaged followed by severely damaged kutcha houses. The kutcha house was also partially damaged during the cyclone. Fig. 15 shows the fully, severely and partially damaged pucca houses, severely, fully and partially damaged kutcha houses and the number of huts damaged.

3.18.2 CUTTACK

The executive engineer, Roads and Building Division of Public Works Department was instructed to clear the broken trees from ring road, cantonment road and the major connecting roads as soon as possible for ensuring smooth communication. The 4 NDRF, 3 ODRAF and 15 fire fighter teams had been deputed for this purpose. Aska-lights were used while working for restoration work in the night. The electricity of major buildings was restored within 72 hours after the cyclone had made the landfall. The water supply and electricity to the district was restored immediately and in few areas water had been supplied through tankers for few days. A NGO coordination cell was formed for coordination with NGOs. 40 NGOs were actively involved in the relief work. The department of social welfare was instructed to coordinate with the NGOs and monitor the activities of the NGOs.

CUTTACK OVERALL DAMAGE

Number of affected blocks	15
Most affected blocks	2 (Niali and Kantapada)
Number of villages affected	1959
Population affected	1689432
Total Land area affected (lakh ha)	21649.8
Number of human lives lost	6
Animals lost	1187403

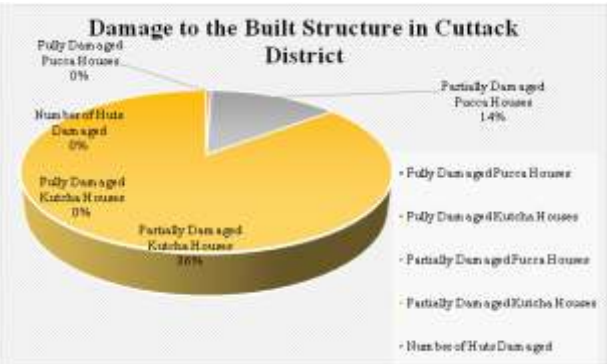


Fig. 16 : Damage of Built Structure in Cuttak.

The Cuttack district had highest damage to the partially kutcha houses, that is 86% and 14% damage to the partially damaged pucca houses.

The Cuttack district medical and public health department had undertaken various activities for vector control, medical camps, disinfection of wells, distribution of ORS, Halogen/ Chlorine tablets, awareness through IEC and posters and psychosocial care.

Number of Medical Relief Camps	28
Mobile Health Teams	35
Paramedical Staffs Deployed	599
Ambulance Engaged	55
Pregnant Women shifted	439
Deliveries	13
Disinfection of wells (1st round)	48675
(2nd round)	29711
Number of ORS distributed	195841
Number of Halogen/Chlorine distributed	548668
Number of village cleaning drive	1452
Psychological Counseling by Mental Health Team Members	10
IEC	59000 leaflets & 59 banners

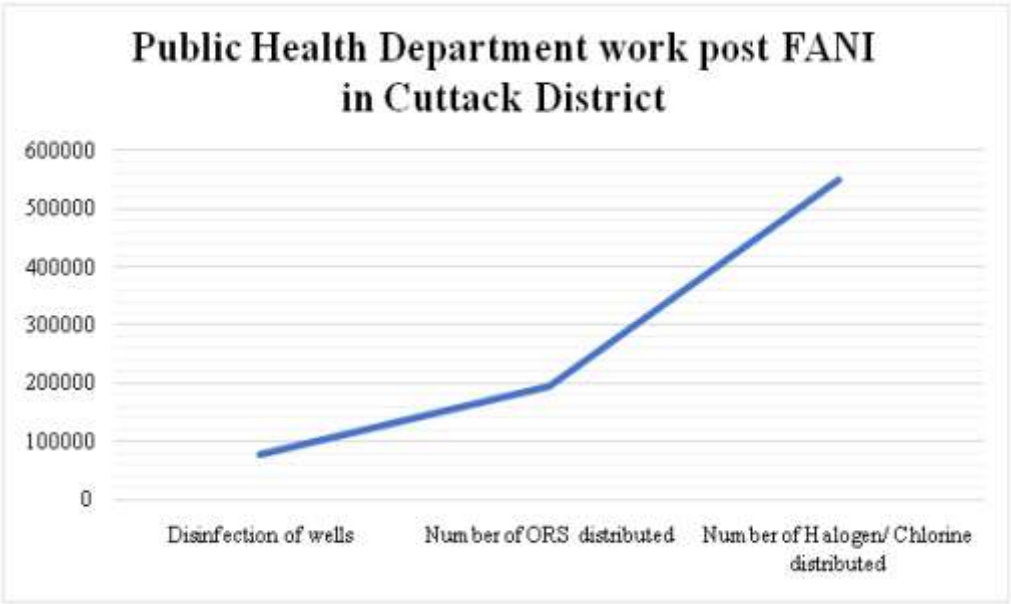


Fig. 17 : Public Health Department work post FANI in Cuttack.

The Public Health Department of Cuttack district had done tremendous work for prevention of vector diseases and necessary measures had been taken regarding the same. The disinfection of wells had been done along with ORS distribution and distribution of Halogen/Chlorine tablets. The highest number of Halogen/ Chlorine tablets had been distributed so that community could disinfect the wells by themselves under the supervision of the ASHA workers.

3.18.3 KHORDHA

The district is mainly agrarian and had huge agricultural loss. So, both long and short term measures to support the farmers had been planned. The 26 team of medical and 10 team of veterinary doctors had been deployed for immediate relief.

3.18.4 KENDRAPARA

A total of 277 number of pipe water supply systems had been restored by Rural Water Supply and Sanitation Department, Kendrapara. The 91 quintals of rice had been distributed to 15,22,901 people in Kendrapara. Under the Chief Minister Relief Package of Odisha, 2,97,902 families got Rs.500 cash, 2,92,000 families got 5 kg rice per person and 1,77,015 number of pension holder got additional one-month pension.

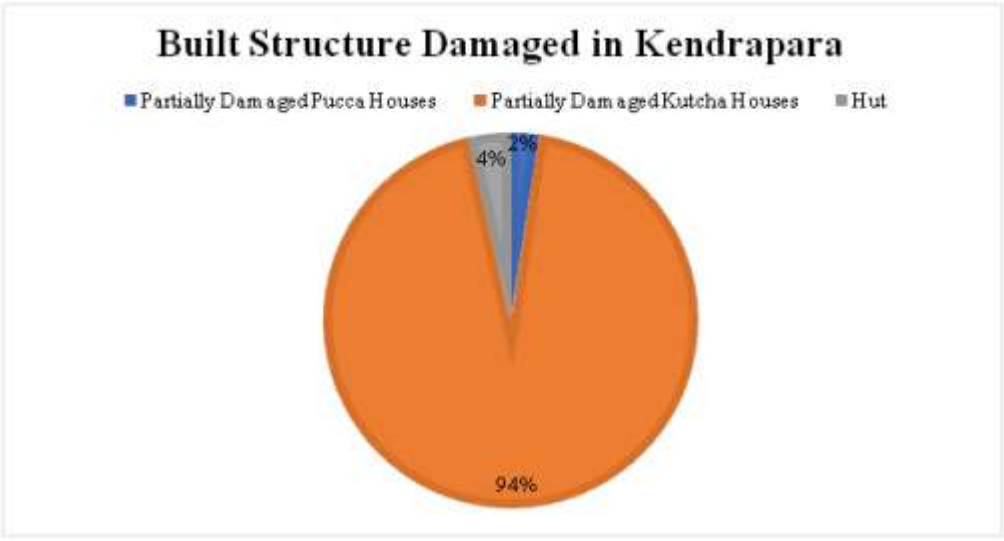


Fig. 18 : Built structure damaged in Kendrapara.

In Kendrapara district, highest number of kutcha houses were damaged partially, followed by huts and pucca houses. The district administration had provided relief materials as well as cash as immediate relief and rehabilitation.

3.18.5 JAJPUR

The district had highest number of damages to the houses followed by livestock and agricultural crops (Fig. 19). The district administration had worked relentlessly for the restoration of the district.

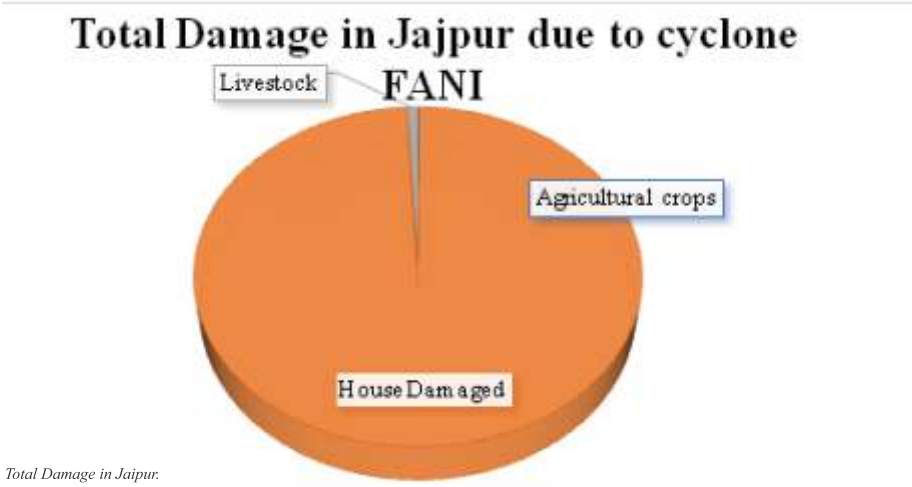


Fig. 19 : Total Damage in Jaipur.

The district administration had put in place 10 JCBs for the restoration work. The 23 medical teams had been deployed and 60 medical relief centres had been opened. The veterinary team had deployed 10 team for the immediate restoration work.

3.18.6 GANJAM

The district was not affected much by cyclone FANI. But Ganjam had a history of number of super cyclones – Phailin (2013), Hud Hud (2014), Titli (2018) and Fani (2019). Ganjam Transport Authority has pickup vans/mini truck which were provided to NDRF/ODRAF/District Fire Officers for movement of rescue teams and emergency equipments to different vulnerable locations. Trucks / mini trucks were provided to the district administration for movement of emergency relief materials including food products to different shelter points for the people in disaster. The 10-wheeler/12 wheeler trucks were provided to different block development officers of the coastal region of the district for transportation of boats to different vulnerable locations. The affected people were provided with assistance under SDRF/NDRF[5] as well as special package announced by state government to mitigate the miseries and for individual sustenance in every field. After the cyclone, the few long-term measures for recoveries undertaken by the district were crop planning and seed varieties, resilient houses, restructuring bank loan, fresh bank credit, extending scope of livelihood mission, good plantation and growth of milch animals and pucca cowshed.

3.18.7 JAGATSINGHPUR

Fig. 20 shows the number of damages to the built structure. The district had the highest damage to the partial kutcha houses followed by huts. The pucca houses were damaged during the cyclone Fani.

For immediate relief, government had provided suji and sugar for women, children, and elderly who had taken shelter in cyclone shelters. Additional pension (OAP) for elderly was

[5] SDRF – State Disaster Relief Fund; NDRF – National Disaster Relief Fund

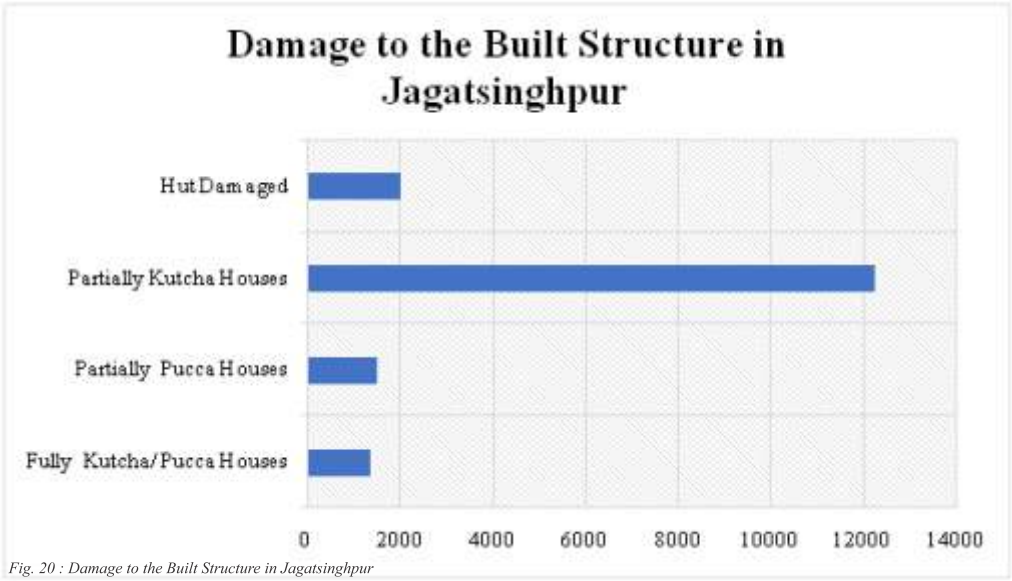


Fig. 20 : Damage to the Built Structure in Jagatsinghpur

provided immediately in cash. Immediate release of additional pension in cash had been initiated. Door step health check ups by mobile health units were set up. Immediate release of additional ration had been done in the district. The three NDRF teams, one ODRAF and sixteen fire services teams were deployed from state and were reporting to the collector for restoration work in the district. The teams moved as per the instruction of the collector depending upon need, grievances and block development officer/ tehsildars requisition.

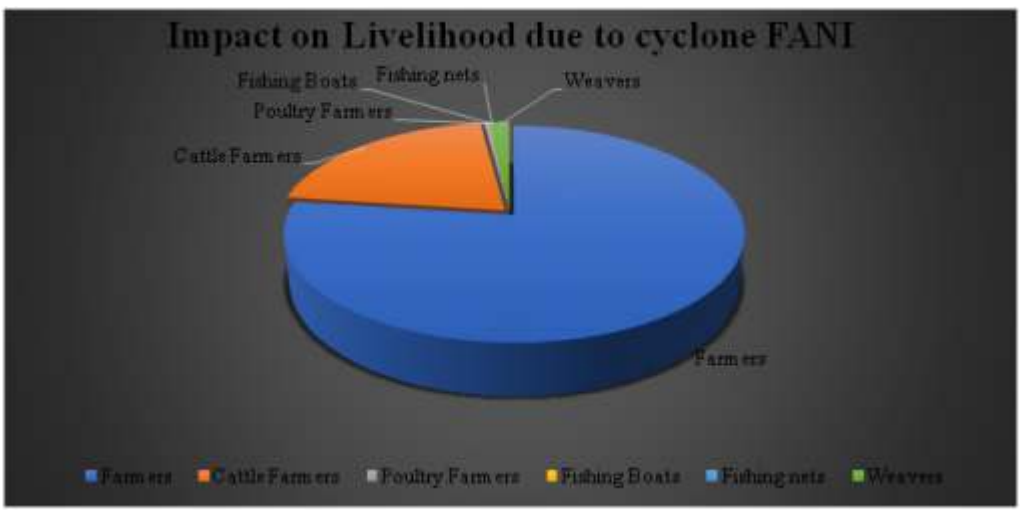


Fig. 21 : Impact on Livelihood due to cyclone FANI in Jagatsinghpur

The cyclone had a huge impact on the livelihood of the Jagatsinghpur district. The highest number of damages was caused to the farmers where crops had been destroyed. It was followed by cattle farmers, weavers and poultry farmers (Fig. 21).

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Chapter 4 : Role of National Agencies

Fani, the way it was handled with the collective wisdom of federal, state and local government leading to reduction of deaths, reinforced the need of strengthening the concept of cooperative federalism where federal state and local governments interact cooperatively and collectively to solve common problems.

- The role of central government was very important and they worked in absolute coordination as required. Over the years, the Centre has strengthened its capacity for improving their forecast, application of technology for building capacity of forecast system has lead to building accuracy. However, predicting weather is always a challenge. The predicted path of Fani and the observed path did not have any deviation, and that helped the state government in deployment of their resources for smooth evacuation of people at risk.
- IMD kept the track and monitoring of the cyclone pattern on a regular basis. Fani cyclone was frequently changing their path. But because of scientific capability of the IMD, it helped in giving prediction correctly on an hourly basis.
- NDRF swung into action and went for the pro-active deployment of the forces in absolute coordination with the state government. 28 super specialized teams of NDRF were deployed. Pre- deployment of the forces along with the local forces worked very well. They were further deployed in phase II with 10 more teams. Propositioning of the forces helped in reducing the losses and optimizing the response in golden hour.
- In such kind of cyclonic storms, highly specialised equipments were carried by NDRF which could help in making the response swift and effective. Some specialised equipment's and their maintenance that is expensive in nature are turning out to be useful investments at the central level were utilized. For initial few days, there was loss of power in communication which was a greater challenge to the responders.
- Government of India crisis management committee chaired by Cabinet Secretary was monitoring Fani on a regular basis and providing its support as per requirements. Hon'ble Prime Minister had also visited Odisha and was constantly monitoring Fani.
- The smooth financial assistance from the government of India within a short span of time also helped in facilitating quick relieve to the victims. Hon'ble prime minister's reassurance to the state on extending central government support for rebuilding the state also helped in a stronger centre-state coordination.
- Other than IMD, ISRO, NDMA on the direction of the Hon’ble Prime Minister, power, telecom, railways, surface transport ministry also provided their support. Ministry of Finance with insurance companies helped in assessing farmer's loss and

in settling their claims such initiatives were good measures in responding to disasters jointly taken by centre and state.

- It is important to highlight the Supreme Court's decision regarding drought management in 2016, where along with the state, the role of the centre was also highlighted and direction was given to take proactive measures in drought mitigation, assessment, planning and relief as prescribed under the Disaster Management act, 2005. The same was depicted at the time of Fani.

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Chapter 5 : Applying a Lens of Inclusiveness

5.1 INTRODUCTION

Odisha, as a state, is well known for its disaster readiness and mitigation measures across the country and beyond. These measures have always stood tall and strong against the disasters that came lashing across decades. Since the ferocious 1999 cyclone that took lives of 10000, state never had any kind of setbacks in devising and strengthening the management strategies to defend and defeat the disasters with all its might. Among its ventures and pioneering sagas setting up of a state disaster management authority much before the country itself came up with the paradigm shift in disaster management, can always be remembered with pride.

The state has been able to earn accolades in bringing the causalities to its minimum, in the past disasters. Even in the recent summer cyclone Fani, though being the severest cyclone that the state has witnessed ever since Super Cyclone 1999, state won in limiting the causality to 64 in number. Mass evacuation was the key in achieving this, which got recognition and praises across the globe. Even then, reducing causality is not the only factor that determines the success in defending disasters and fighting back to normalcy. It further requires many factors to be looked upon in determining this. Inclusiveness in the approach of disaster management is one prime factor in doing so.

5.2 INCLUSIVENESS – A KEY FOR DRR AND DRM

The nature of disasters to disproportionately affect the people is giving the approach of Inclusiveness, its relevance in the field of DRR and DRM. Certain groups, even in the days of normalcy require special assistance, support from their care givers and service providers for leading a dignified life. Children, differently abled, aged, ethnic minorities, women, transgenders all come under this group with their own differential needs owing to their physical constraints, economic barriers, social and cultural barriers which compound to their vulnerabilities. With a higher degree of vulnerability, disasters worsen their vulnerabilities further, thereby their risks as well. Inclusion of these vulnerable groups in the management strategies is the only way in bringing them to the mainstream out of all barriers (economic, cultural, social, physical) to the best of their evolving capacity for achieving a better resilience.

As a state that has set high standards of disaster management and as a role model to other states, it is vital in assessing how much the state has won in imparting the inclusiveness factor in its strategies in safeguarding its vulnerable communities from the extremely severe cyclonic storm Fani. Now let's have a look into the management of Fani and its inclusiveness factor. As each vulnerable group is characterized with a unique and differential need, a well-managed inclusive approach will be one, where each of these needs are identified and addressed. Uninterrupted services as per their need have to be ensured during and post phases of disasters.

Evacuation strategies revolved around giving priorities to pregnant women, children, aged and differently abled. Inclusiveness was the highest when women were considered. The mass evacuation during Fani also saw a mass evacuation of pregnant women. The state with the help of stakeholder departments could evacuate a total of 1945 pregnant women safe to MaaGruha/delivery points/hospitals.Through this initiative state not only won in safeguarding women but also ensured the right of life of children that starts from their days in the womb.

Right to Education (Ar. 21(A) of Constitution of India;Ar. 28 of UN Convention on Rights of Child) of children is non-alienable in any circumstances, even in the days of emergency. As part of ensuring this, out of 1,606 damaged schools, repairing works of 1,14,9 have been completed and repair & restoration work of balance 457 nos. of schools was going on. Continuity of education of students in damaged/ collapsed schools that were still under construction was being taken care by running classes in other schools that came in the radius of 1 km or else in the nearby multipurpose shelters.

Menstrual hygiene was another aspect taken well into account during Fani and in the immediate days after the disaster. Health and Family Welfare Department, Women and Child Welfare Department, civil societies held their hands together in ensuring provision of free sanitary napkins at all cyclone shelters. Free distribution of sanitary napkins (2.4 Millions) to adolescent girls & women for 2 months were done as part of this initiative.

Administration has strived to an extent in reducing the impacts of the deadly cyclonic storm Fani on the differently abled persons. The district administration of Puri had taken up a noble initiative for rehabilitation & restoration of PwDs/ Differently Abled affected by severe Cyclonic storm 'FANI' under the banner named 'PRAFUL' (PwD's Rehabilitation after FANI &Unfolding Lives). For this purpose, a District Level Programme Management Unit had been formed for looking after following requirements such as Social Security Schemes, Aids and Appliances, Housing and Toilet.

A total of 8,152 online disability certificate under UDID had been generated & distributed to the PwDs. Foreseeing the need of capacity building as a disaster risk reduction initiative Education & Skill Development, Livelihood had also been included under the PRAFUL scheme.

5.3 PROPOSED ACTIONS AND INCLUSIVENESS IN RECOVERY STRATEGIES

- Moratorium of 1 year on loans, as well as zero interest loans of Rs. 1 lakh to women SHGs.
- 4 lakh numbers of Nutri-Gardens would be promoted in the affected households.
- Additional seed money of Rs.10,000/- would be given to the affected women SHGs in the affected areas.
- School fees and School examination fees up to high school level in government schools shall be waived in the affected areas.

- Two extra pairs of school uniform shall be provided in the extremely affected areas and one extra pair in the severely affected areas to the children up to elementary school level.
- 268 CFCs to be provided at Gram Panchayat level @Rs.4 lakh per CFC in the extremely affected districts.
- Community Investment Fund (CIF) @ 1 lakh per SHG to 15,000 SHGs would be provided to facilitate loans for needy households for livelihoods activities in the extremely affected districts.
- As a social security coverage, over 10 lakh SHG members / households would be enrolled under AamAdmiBimaYojana (AABY) in the affected districts.
- Promotion of Livelihoods Value Chain and Cluster Promotion, a total of 100 numbers of potential cluster formations would be supported for value addition and market linkage @Rs.2 lakh per cluster in the extremely affected districts.

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Chapter 6 : Innovations

6.1 EARLY WARNING DISSEMINATION SYSTEM

Cyclone Early Warning had been disseminated through Location Based Alert System (LBAS). SMS to the BSNL subscribes of the likely affected districts and group based alert messages had been disseminated based on the treat status to the particular vulnerable place. All messages were in Odia language of different categories. Early warning sirens were activated and voice messages were disseminated every hour in coastal area. All cyclone bulletins and warning messages of IMD had been disseminated with key state level officers, collectors and with media. The media such as print, electronic and digital played a vital role in early warning dissemination system.

The cyclone path and its forecasted intensity and magnitude were highlighted by TV channels/ print media/ social media on a real time basis in the 72 hours before the landfall. This helped in creating massive awareness among the mass. Media played a proactive role in covering the government's move to shift more than 15 lakh people to safe locations. The media awareness helped the vulnerable population to shift to a safe cyclone shelter. This has made evacuation process easier and helped in reducing the number of casualties. Apart from reporting on media platform such as newspapers or in TV channels, media houses and journalist had disseminated real time information in social media Twitter, Facebook and whatsapp group. Information shared in government's social media handles such as special relief commissioner were immediately shared by media houses with title "CycloneFANIupdates" and #CycloneFani, thus making the EWS spread to wider audience. The media management was done by designated officers who had organized press brief at fixed time. Emergency control room were used to monitor various media channels to keep a track of media reporting. The role of media in various stages is as follows:

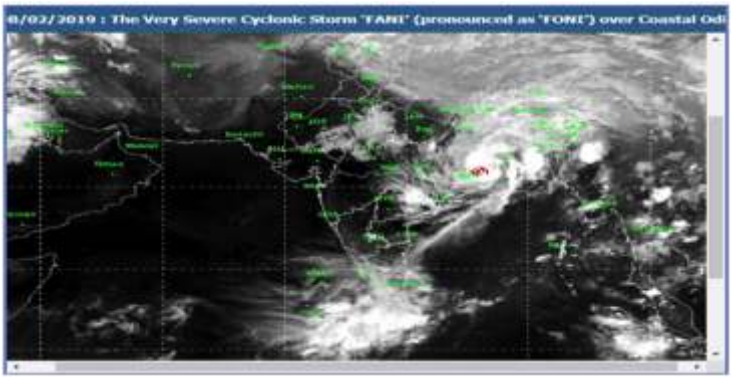
During the pre-cyclone Fani phase, the media house helped in creating awareness and information to the vulnerable population, helped in removal of myths on cyclone, built

Forecast track and intensity are given in the following table:

Date/Time(IST)	Position (Lat. ^{0}N/ long. ^{0}E)	Maximum sustained surface wind speed (Kmph)	Category of cyclonic disturbance
30.04.19/1130	12.6/85.7	145-155 gusting to 170	Very Severe Cyclonic Storm
30.04.19/1730	13.1/85.3	160-170 gusting to 185	Very Severe Cyclonic Storm
30.04.19/2330	13.5/84.7	165-175 gusting to 195	Extremely Severe Cyclonic Storm
01.05.19/0530	13.8/84.3	170-180 gusting to 200	Extremely Severe Cyclonic Storm
01.05.19/1130	14.4/84.0	175-185 gusting to 205	Extremely Severe Cyclonic Storm
01.05.19/2330	15.4/84.0	175-185 gusting to 205	Extremely Severe Cyclonic Storm
02.05.19/1130	16.7/84.2	175-185 gusting to 205	Extremely Severe Cyclonic Storm
02.05.19/2330	18.0/84.7	175-185 gusting to 205	Extremely Severe Cyclonic Storm
03.05.19/1130	19.2/85.3	175-185 gusting to 205	Extremely Severe Cyclonic Storm
03.05.19/2330	20.3/86.2	150-160 gusting to 175	Very Severe Cyclonic Storm
04.05.19/1130	21.4/87.3	125-135 gusting to 150	Very Severe Cyclonic Storm
04.05.19/2330	22.5/88.4	90-100 gusting to 110	Severe Cyclonic Storm
05.05.19/1130	23.5/89.6	50-60 gusting to 70	Deep Depression

Source : Preliminary report on extremely sever cyclonic storm "Fani"

partnerships between media and other organizations. During the landfall, media broadcasted the damage assessment and details of measures being undertaken towards relief and rehabilitation. Media house had broadcasted the assistance of the public health department, police, civil defence and food, water, medicines and other materials for immediate need and created awareness for disaster prevention measures. The media helped to spread the requirement of each district affected by cyclone to mobilize the resources from state, national and international agencies along with governments.



Source : Preliminary Report on Extremely severe cyclone storm "Fani"

The print media played a qualitative role in community preparedness and helped in better management of the disaster. As we say "Seeing is believing" so electronic media played a vital role in dissemination of warning to the huge mass prior to disaster. A continuous contact and cooperation were maintained with national and local TV channel along with radio stations by the authorities. The media involved professionals and specialists in broadcasting; regular show case of scrolling script on TV screen which continuously gave warning messages. The real time information using sophisticated images, graphics like radar and satellite images, GIS maps had been used by media houses. The information on occurrence of cyclone Fani, the number of causalities and injured, help line number and control room were all relayed to the press, digital and electronic media.

6.2 SATARK APP DEVELOPED BY RIMES

The project with OSDMA with title "Operational Systems for Integrated Disaster Risk Management" had been signed between OSDMA and Regional Integrated Multi-Hazard Early Warning System (RIMES). The main aims of the project were supporting risk assessment and evaluation, dissemination of risk and resource management actions, informed by climate information at different timescales. The capacity building of OSDMA personnel in decision support system; application of decision support systems for managing risks and resources; and dissemination of early warning to the general mass were also taken under the project.

Under the project, a web/smart phone-based platform called "SATARK" (System for Assessing, Tracking and Alerting Disaster Risk Information based on Dynamic Risk Knowledge) was developed to provide real time Watch, Alert and Warning information for different hazards like Heat wave, Lightning, Agriculture risk (Drought), Flood monitoring Ocean state information & Tsunami risk, Earthquake monitoring, Cyclone/ Storm surge, Road accident and Snakebite monitoring for improved disaster management. The system

translated generic weather forecast products into user-friendly actionable advisories, based on thresholds drawn from historical patterns, to ensure effective preparedness in place to minimize the risk. The system utilized a "machine learning algorithm" for self-learning from each seasonal cycle of operation, and improving on its own advisory generation process, over seasons. Advisory clearly underlined the guidelines set by the state government for the user to be aware about what they need to do before, during and after a disaster event. This was outlined both in odia and english language. The application was developed by using cutting edge technologies to provide location specific alerts. The system integrated model forecast data, observational data, sensor data and other available data in different format.

SATARK App was the mobile version of the SATARK web portal which was a one stop hub to monitor and evaluate various risks associated with different disaster forecast for Odisha. The App allowed user to stay updated about various forecasts and its potential impacts along with respective advisories based on the registered and added blocks. The app acted as a two way communication between user and state emergency operation centre, which allowed the user to report regarding the accuracy of forecast and disasters in their area.

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Chapter 7 : Lessons Learnt and Recommendations

7.1 WHAT HELPED?

i **Ex-ante Investment in DRR**: The impact on disaster mortality was substantially reduced in case of Fani and earlier also in Hudhud and Phailin, which recently struck Odisha. In super cyclone 1999, more than 13,000 people lost their precious lives. The success of Fani and others too could be attributed to the last twenty years of work of the government of Odisha. The key points for success were mainly institution building, setting up of ODRF, Early warning system, shelter development, community capacity building, last mile connectivity etc. In-fact ex-ante investment in DRR helped in reducing mortality.

ii **Improved Early Warning**: Due to the improved warning system of India Meteorological Department, with the inclusion of high end technology, Doppler Radar etc, the accuracy of predicted path of the cyclone and observed path of the cyclone in predicting cyclone had almost been the same with very limited or no deviation. This helped in building confidence of the local government in the warning given. This helped the government in acting immediately on evacuation of people to safer places. For swift response, improved warning system helped tremendously.

iii **Fast Warning Dissemination System** helped in dissemination of warning well within the time. It is the most critical factor in the success of reduction in disaster mortality. When it comes to the preparedness to dissemination of information to the last mile, the government of Odisha invested in strengthening the system of dissemination on the basis of redundancy.

iv **Investment in Cyclone Shelters** has paid the dividend to the people of Odisha. These are multipurpose shelters that are being used for schools, panchayat ghars, community centers, banquets etc during the peace time. These shelters helped the government in putting the evacuated people in a better and safe condition. The maintenance of the shelters also helped them in utilizing it at the time when it was most needed.

v **Positive Response of People**: Evacuation warning given to the people almost 3-4 days in advance, community responded positively on the warning given. This could become possible because the government invested ex-ante in spreading awareness through various training, workshops, awareness programs, community capacity building initiatives etc.

vi **Forced Evacuation**: In few cases, government also applied forced evacuation where people were reluctant to follow the instructions. As per the provision of the DM Act, 2005, the local authority also applied force for evacuation where few people were resisting and not going for evacuation.

vii **Improved DRR Governance**: Government of Odisha explored various options of disaster risk reduction, preparedness and mitigation. This lead to the establishment and strengthening of the institutional system at state, district and local levels.

viii **Community Based Disaster Management**: Community based disaster management and regular capacity building programmes have helped the government in reducing the number of deaths due to disaster. In the response to Fani, large number of volunteers participated and helped the national and local specialized agencies in carrying out the effective search and rescue.

ix **Volunteers Strength**: During the disaster, volunteers are the biggest strength. Without their support such an exemplary task would have been impossible to execute. Pre- disaster engagement with volunteers could help in large-scale activities spread all over post disaster operations.

x **Investment in Capacity Building**: Pre-disaster capacity building programme, disaster management plans, standard operational procedure for disaster response and regular mock drills helped in understanding the roles and responsibilities and helped in a well-coordinated response.

xi **Inclusive Response**: Special strategies were worked out for differently abled people. Specific arrangements were made for the evacuation by making a provision of instruments and gadgets required for accessibility and mobility. Inclusive response planning helped catering the need of people with special ability.

xii **Application of Technology**: Technology was very helpful in designing operations and its executions for supply chain management. Mobile apps, GPS enabled vehicles, high quality control room, video conferencing system, application of drone, warning dissemination technology etc are few examples.

xiii **Support of Govt of India's agencies**: Support extended by federal agencies/government was recognized by the state government especially for warning, National Disaster Response Force, armed forces, support from other ministries, financial support, disaster management support system technical support by NDMA, and NIDM for capacity building, all worked in complete synergy.

xiv **Pre-engagement with Private sector**: Prior engagement with private sector/ corporate houses with state in disaster management planning were very useful in getting support during the crisis.

xv **Every day monitoring by the highest authority in the state** : Special monitoring by the Hon'ble CM and constant dialogue and support with national government helped in building synergistic response.

7.2 WHAT HINDERED?

i **New Type of Cyclone**: The cyclone was different and despite of all preparedness, it posed various challenges especially in the protection of infrastructure. The loss was huge to housing, agriculture, horticulture, power, telecom etc, as during the development process, disaster resilient infrastructure could not be made possible leading to the loss of INR 26,000 crores.

ii **No Prior Recovery Plan**: In the absence of long term recovery plan, revenue loss is likely to increase every day. As the loss is dynamic, it is having impact on a daily basis. The longer the recovery period, the higher is the loss.

iii **High Intensity Cyclone**: Critical infrastructure/social sector also could not withstand the speed of the wind. The design parameters failed in continuity of the services and it got affected severely. Failure of communication due to the collapse of communication tower and electricity made the operations challenging and difficult. High dependency on the traditional system, satellite phone and HAM radio, radio/transistor worked well.

iv **Livelihood was a Challenge**: Due to loss in agriculture, fisheries, tourism, horticulture and productive sector further made it worse. These sectors are fragile. There was no specific immediate and medium term livelihood recovery plan in place. Especially Puri district faced larger challenge due to loss of tourism.

v **Long failure of Power**: For almost a month, there was a complete black out which created great inconvenience to the responders. Subsequently, it created a huge demand of generator sets, across the sectors and across the districts; this was arranged from other states. This is not a good sign for environment friendly disaster response. Therefore, an alternative has to be worked out.

vi **Uprooting of Trees**: Road side plantation in cities had fallen flat during the Fani. Fallen trees were right in the middle of the roads, which created havoc in carrying out relief operations and supplying goods to the victim as responders did not have adequate equipment for clearing the roads.

vii **Disaster Inclusive**: Inclusiveness definition has to be seen in a broader context- in terms of caste, class, gender etc too as people from low case faced problems in equity-based response and relief.

viii **Investment in DRR**: Pre-Disaster risk reduction requires more focus during the pre-disaster, as it is becoming inevitable. Complacency disrupts preparedness, as each disaster is different from the others.

ix **Role of Central Government/Agencies**: Federal agencies in pre-disaster planning requires more engagement with the state in capacity building, bringing international best practices, new tools, technology etc.

x **Need for Cyclone Shelters**: Cyclone shelters that have been built by the state or by national agencies are mostly in the coastal areas, which were helpful but did not cater

the required needs as accessibility during disaster becomes a major problem. Some more shelters in the inland would have helped and added value.

xi **High End Equipments**: Deficiency of high-end equipment was felt badly which delayed the process of clearing of debris, road clearances, tree cutting etc. Despite of so many disasters having occurred in the state, there is a serious challenge of keeping the required equipments for the future.

xii **Data Base of Resources:** Absence of database of equipment was also not available. India disaster resource portal and support of state data base could have been very useful.

xiii **Trauma Management**: People were traumatized. Own inbuilt system of trauma management would have helped well. Response from the specialized agencies was there but this could have been done better if there would have been pre engagements.

xiv **Compensation Vs Ex-Gratia**: Compensation to the people who have lost their movable and immovable assets is the biggest crisis. Government does not have any device other than the ex-gratia /relief, to support financial recovery. Building financial resilience and market driven approach/tools is needed.

xv **Absence of Long-Term Recovery Plan**: There is no long-term recovery and financial plan available with the state. Every delay in recovery is hurting the state both financially and socially.

7.3 RECOMMENDATIONS

i **Impact Based Early Warning**: EWS was found to be accurate and helped a lot in bringing down the casualty by taking appropriate actions in time. Now the expectations are that the federal agencies should issue the warning which is easily understandable to the general public. In order to provide communities with such integrated weather and climate information, we need to develop the capacity along the entire service delivery chain. By doing so, they will improve targeted impact-based forecasting timely dissemination of accurate and easily understandable information, and delivery to the public and other sectors. The adoption of robust multi-hazard impact-based forecast and warning services which will fall in the line of Sendai Framework for Disaster Risk Reduction 2015-2030 will be useful.

ii **Communities to be Sensitized** : It is very important to sensitize the communities about the disaster preparedness and the importance of cyclone shelter instead of their own houses. The key to reducing loss of life, personal injuries, and damage from natural disasters is widespread public awareness and education. People must be made aware of what natural hazards they are more likely to face in their own locality. They should know in advance what specific preparations to make before an event, what to do during a cyclone, which is a safe location for shelter and what actions to take in its aftermath. Equally important are public officials and media – television, radio, and newspapers – must be fully prepared to respond effectively, responsibly, and speedily to large-scale natural emergencies.

iii **Establishment of Robust Communication Infrastructure System**: The failure of communication systems may cause catastrophic damage to human life and economic activities as people are unable to communicate with each other in a timely manner and with a convenient quality of service. Therefore, the exchange of information is more than necessary for people in their everyday life or during disasters to prevent the death and injury of thousands of individuals. The telecommunication department can work in the line of establishing underground cabling which will help to combat the cyclone wind speed. The department should also work in the skill development of the state manpower and database should be available of skilled manpower for future reference.

iv **Resilient Infrastructure**: Power infrastructure should be designed which can withstand high wind velocity keeping in mind the vulnerability of the state to cyclone. Improve the redundancy and reliability within power services and ensure last-mile connectivity by deploying alternative communication systems for emergencies and testing it frequently with standard operating procedure at community, blocks and districts level.

v **Natural Resilience Strategy**: Coastal states should include coastal belts and tree covers like mangrove plantation. This would limit the damage caused by winds and flooding into coastal settlements. Mangroves play a vital role in providing ecological and societal goods and services to local communities as well as in reducing the

adverse effects of natural disasters. In natural settings of mangroves, they are capable of lowering the storm surge height and of dampening the waves on the top of the surge within the first few hundreds of metres of mangroves. Mangroves as a stand-alone can protect us against large magnitude hazards like tsunami or cyclones. Mangroves add additional value in the form of enhanced fisheries, carbon storage, forest products and recreation activities. Mangroves thus provide food security, climate change mitigation and human well-being which can mitigate the impact of major hazards.

vi **Resilient Pathways**: States need to invest in the both physical and human capital while designing resilient pathways. The potential benefits of being resilient to hazards and disasters make abundant sense. To increase the resilience of the community, large-scale investment of money, human resources and time is required. Investments are required for a wide spectrum of community needs such as planning, organizing, training and equipping first responders to large infrastructure projects. The owners of the community assets are primarily responsible for their own resilience investments, yet community leaders from both the public and private sectors recognize that community assets are interconnected and interdependent and that holistic planning, programming, investing and execution create common and interrelated resilience benefits for the community. Realizing the maximum benefits requires close collaboration among public and private sector leaders aided by a shared approach and commitment to investment.

vii **Integrated and Coordinated Resilience**: Concept of building resilience cannot be a stand-alone agenda. It needs to be incorporated into overall developmental efforts and have sound funds in place for its implementation. Resilience is the capacity of the individual, communities, institutions, business and systems within a state to survive, adapt, and grow no matter what kinds of chronic stresses and acute shocks the state experiences. A disaster can weaken the fabric of the state. They can include high unemployment, overtaxed or inefficient public transportation systems, endemic violence and chronic shortages. Resilient cities adapt and transform in the face of challenges, preparing for both the expected and unexpected thereby strengthening cities during the peace days as well. Building resilience requires a holistic understanding of urban systems and their interdependencies and risks.

viii **Integrated and Coordinated Resilience**: Most cities face a combination of shocks and stresses that can undermine resilience. The compounding pressure of unaddressed or inadequately addressed challenges weakens local resilience. An integrated approach, merging with developmental schemes and working to build resilience is the key. Resilience, while planning DRR must be understood.

ix **Alternative Energy Strategy**: The new syndrome has emerged in post disaster scenario. Every sector is thinking of adding Gensets for power supply during the crisis. This will lead to another set of environmental issues. There is a need for looking into alternative source of energy such as battery based, bio-fuel based etc. The Diesel Generator (DG) set should be kept as the last choice.

x **Contingency Planning Integration with Recovery Planning**: Disaster management contingency plan is very helpful in reducing the impact of disasters and it should be implemented at all levels. Contingency plans focus on certain events or risks, at a local, national or regional level. The plans include operational concepts and resource assessment amongst the others. Contingency planning is part of holistic disaster management planning and a critical activity for organizations and communities to prepare themselves to respond well to a disaster event and its potential impacts. Developing a contingency plan with long term recovery involves making decisions in advance about the management of human, financial, and material resources and of coordination and communication procedures to ensure timely and effective provision of assistance and humanitarian aid to those most in need when a disaster occurs.

xi **Clarity of Roles and Responsibilities**: Pre-defined roles and responsibilities of each department and individual should be prioritized. For easy and synergic response, pre-defined role of individuals and sectors should be clearly laid down on the plan and rehearsed. Regular simulation should be made part of the preparedness drill. The Incident Response system that the government of India has adopted, helped the government of Odisha immensely which further helped them in working with panchayats, local bodies, private sector & community based institutions.

xii **Resilient Recovery & Developemnt**: Building of resilient infrastructure should be prioritized. Government of Odisha could bring down the mortality during disaster but could not do much in reducing the infrastructural loss which was assessed as approx. 26-27 thousand crores (as per World Bank PDNA). Critical infrastructure is highly vulnerable to, and a major casualty of, natural disasters. Repairing or replacing infrastructure assets after a disaster is often difficult and costly, which can exacerbate the suffering of affected communities. Embedding resilience into the planning process for critical infrastructure could prevent unnecessary disruption and generate significant reductions in disaster costs.

xiii **Private Sector Resilience**: It is not just governments that need to consider resilience in infrastructure planning but the private sector too. Both can reduce disaster-related costs by following guidance and principles for infrastructure resilience planning and by incorporating these into their long-term operations. Mitigating disaster risk should be a priority for both existing and future assets. Improving the resilience of our infrastructure assets will reduce the costs and impact of natural disasters and lead to a safer and more resilient Odisha. As such, it should be a priority for government, communities and the private sector.

xiv **Inclusiveness as an Integrated Policy**: Capacity building of disabled people for inclusive approach as disaster impact is not homogenous. It affects different people differently, especially children, aged people, people with various disabilities etc. Hence capacity building for disaster responders should be increased as there are more vulnerable people in the society. It should be designed to ensure older people and people with disabilities are included during emergency responses, both accessing

assistance and participating in the decision-making processes that affect them. The aim is to improve understanding of the needs and capacities of older people and people with disabilities by developing resources, strengthening capacity and collecting evidence on organisational change towards more inclusive practices.

xv **Research & Development**: Government should invest in the science of weather and in the governance capacity to move rapidly to avert disasters. The importance of weather, climate, and water information is rising because of the need to serve more elaborate societal needs, minimize growing economic losses, and help countries adapt to climate change. Weather, climate, and water affect societies and economies through extreme events, such as tropical cyclones, floods, high winds, storm surges, and prolonged droughts, and through high-impact weather and climate events that affect demand for electricity and production capacity, planting and harvesting dates, management of construction, transportation networks and inventories, and human health. The government is the authentic source of weather, climate, and water information; providing timely input to emergency managers, national and local administrations, the public and critical economic sectors.

xvi **Community Based Capacity Building**: National capacity building for strengthening civil society and communities are the integral part of response hence in the peace time the efforts should be made for their capacity building by Odisha Disaster Response Action Force and Fire Service. Number of community responders was much higher than the organised forces and also the entire operations of organised forces could be done because of community support. The World Disasters Report recognised that most lives are saved by friends and neighbours, and that disaster affected people have a capacity to pull together and not give up when a disaster strikes.

xvii **Building Local Capacity**: Local and regional response clearly provides a major and significant part of the overall crisis response, particularly in natural disaster situations. Furthermore, it can be clearly demonstrated in various disaster situations around the world that local and national disaster preparedness pays.

xviii **Focus on Disadvantageous Groups**: Society is very heterogeneous and divided into different caste, culture and environment. Challenges and obstacles faced by vulnerable and disadvantaged groups, faced the problem of equity and justice. Special measures to protect these are very much needed. Indeed, a human right-based approach to social protection requires that states give special attention to those persons who belong to the most disadvantaged and marginalized groups in society. This entails guaranteeing non-discriminatory treatment as well as adopting proactive measures to enable those suffering from structural discrimination (for example, ethnic minorities or indigenous peoples) to enjoy their rights.

xix **Perpetual Discrimination**: Affirmative action and other proactive measures should aim at diminishing or eliminating conditions that give rise to or perpetuate discrimination, and at countering stigmas and prejudices. The recommendations are

the use of a range of laws, policies and programmes, including special measures to tackle discrimination. The measures that states adopt should pay attention to the specific human rights problems that emerge with relation to, for example, gender, age, disability, migration and displacement.

xx **Women's Need to be Understood Differently**: Appropriate measures for providing women with equal opportunities in public life, education, employment, health care, economic and social life, and marriage and family relations. In order to redress disadvantages associated with gender, both contributory and non-contributory social protection programmes should be made gender-sensitive. This means contributory programmes should take into account the factors that prevent women from making equal contributions. In any case, states have obligations to take into account the whole range of women's need differently. Women in reproductive age should be given special focus on response, recovery, camp management, and planning for risk reduction.

xxi **Rural–Urban Divide** : The states must take appropriate measures to modify the social patterns that accord differential status to men and women and ensure the equality of women in rural and urban areas differently. The needs, priorities and challenges are different. The social protection programmes along with DRR should also be designed, implemented and evaluated differently.

xxii **Child Centric DRR**: The best interests of children should be respected at all times, and their special needs should be accommodated. A child-sensitive social protection programme is one which ensures the rights of the child, and takes into account all the factors that might place children in a vulnerable position. Programmes are required to factor in age- and gender-specific risks and vulnerabilities at each stage of the life course, especially considering the needs of families with children. Special provisions should be made for children without parental care and those who are marginalized within their families due to gender, disability, ethnicity, HIV/AIDS status or other markers of identity.

xxiii **Deployment of Resources**: Sufficient resources like manpower and machineries to be deployed at strategic and vulnerable locations with efficient management units. The deployment planning problem deals with determining the best time and locations in which to deploy emergency response assets. In order to solve this problem one needs to characterize the demand across space and time, solve an integrated scheduling and location model, negotiate with response team and potential crews, and manage dynamically over time so deployment is adjusted accordingly to changing system status. These planning and operation problems are important to fire, police, state response force and central response force.

xxiv **Risk Transfer Mechanism**: Insurance coverage should be implemented as an option for building financial resilience. The function of insurance is to spread the losses of the few amongst the many; whereby, the actual loss value is substituted by the average loss value. This function is also referred to as risk pooling. In theory, the

insurance premium, or rate, charged by an insurer should distribute the cost of insurance fairly amongst the pool of the insured. The rate can also be expected to encourage the reduction of loss through the implementation of controls. Therefore, critical infrastructure needs to be addressed.

xxv **Mobile Network**: Assess the mobile networks, their possible interoperability and the shortcomings in the current service delivery model. This enables the policy makers to identify the gaps in the sector and act in advance.

xxvi **Strengthening of School Safety and Youth programme**: Schools can teach curriculum covering meaning and concept of disasters, their consequences, and the possible implementation of preventive measures: The students and youth should be sensitized about disaster prevention and mitigation. The curriculum should focus more on practical knowledge on disaster management with mock drills and situation simulation. Inclusion of NYKS, NCC and NSS with community volunteers are the key for success.

xxvii **Incentivising DRR**: Government may think of incentivising risk reduction to all sectors, corporate and individuals. Those who are taking initiatives for risk reduction may be given some incentive. A detailed policy and guideline may be drafted by the experts in this regard. However, initially some soft loans, subsidized housing materials, tax incentives, insurance may be thought of.

xxviii **Strengthening Federal Agencies** : The disaster response support provided by the national agencies- Hon'ble PM Visit, release of grant, NDRF deployment, Early Warning support provided by IMD , Flood inundation information by CWC, Coast Guard, Armed forces, Air force, Civil Aviation, Railways, Power Sectors etc turned out to be a great support. These agencies must be further strengthened for providing specialized support to the states. Support from other line ministries including Ministry of Earth Sciences, ISRO and Ministry of Home Affairs both in the pre and post disasters were highly applauded with the **concept of cooperative federalism**. NDMA and NIDM's role in capacity building and developing new strategies and ideas were also acknowledged.

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CONCLUSION

After every disaster, demands that arise will vary based on the challenges experienced. Action plans of each sector/ department will be naturally designed accordingly with the intention of meeting these challenges and demands mushroomed. Though this is relevant in combating the future disasters, it is also important to foresee the risks unseen in the past or during Fani for ensuring better resilience in combating the future disasters. As in Fani, by strengthening disaster early warning and response, pre disaster investment in preparedness has paid well in reducing the mortality, however, protecting infrastructure is still a challenge. There is a need to revisit development investment- both of inbuilt environment and new investment. Disaster resilience should be made an integral part of this. Hence, innovation, research and development and building financial resilience too should always remain as a priority and also as an integral part of the disaster management framework. Therefore, any government should start capacity building process at the local level for achieving the targets of sustainable development goals.

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