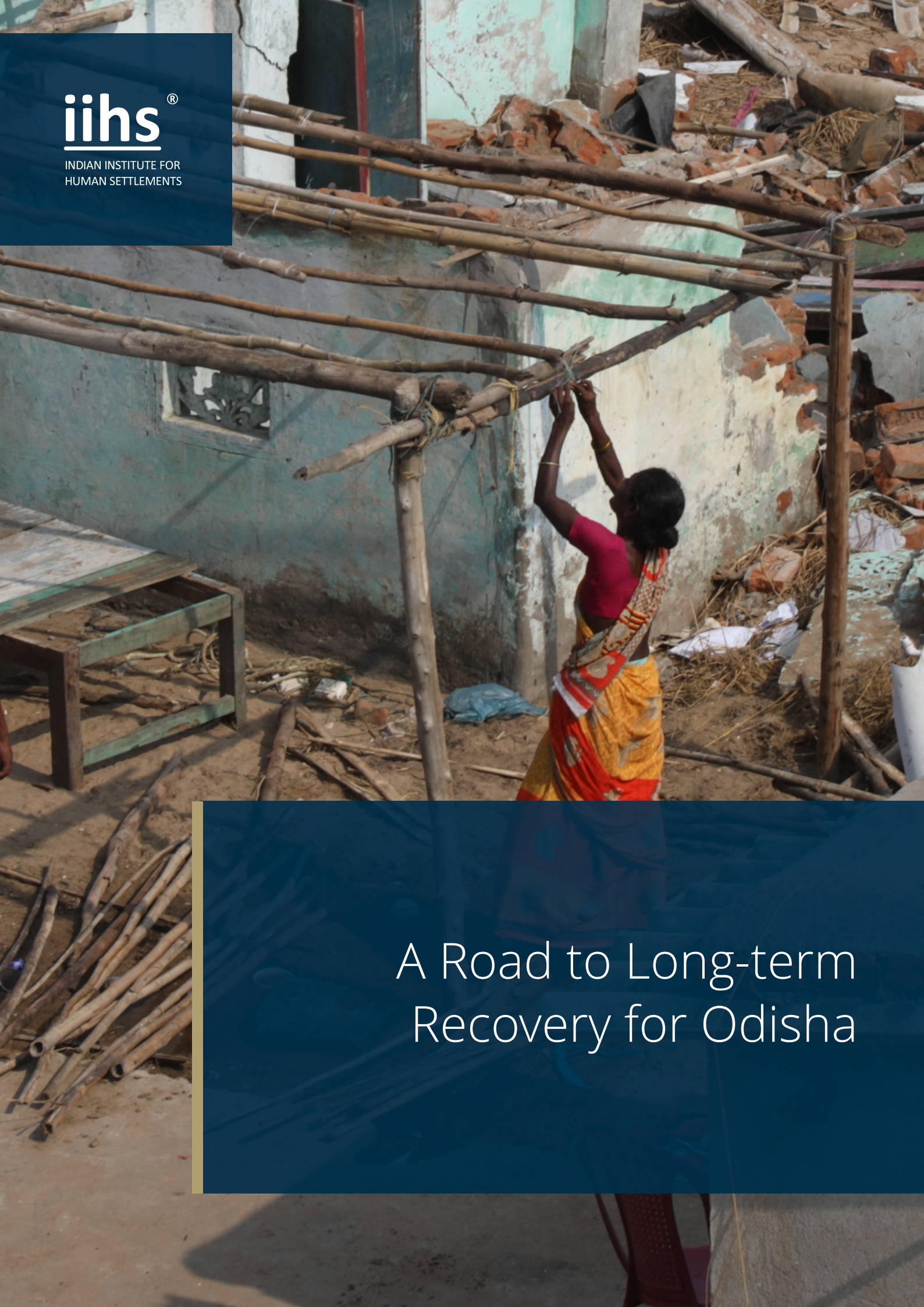


iihs<sup>®</sup>

INDIAN INSTITUTE FOR  
HUMAN SETTLEMENTS

A woman in a red and yellow sari is working on a wooden frame structure made of sticks. The structure appears to be a temporary shelter or a framework for a building. In the background, there is a damaged building with peeling paint and debris. The ground is dirt and covered with sticks and debris. The overall scene suggests a state of reconstruction or recovery after a disaster.

# A Road to Long-term Recovery for Odisha

**Authors:** Garima Jain, Vineetha Nalla, Teja Malladi, Nilakshi Chattareji, Nihal Ranjit

**Media Support:** Zohrab Reys Gamat

**Field Support:** Swastik Harish

**DOI:** <https://doi.org/10.24943/arltro.2019>

**Date:** 01 June 2019

## Table of Contents

List of Maps.....	4
List of Images.....	4
List of Boxes.....	7
List of Tables.....	7
List of Abbreviations .....	8
Why this study?.....	9
Methodology and ethics.....	10
Audience.....	11
Scope and limitations .....	12
Organisation of the report.....	12
A. Key messages .....	13
B. Baseline information .....	15
C. Field observations.....	22
1. Disaster governance.....	22
1.1 Planning, preparedness, early warning, and evacuation.....	22
1.2 Response and relief.....	24
1.3 Timing of action .....	26
2. Critical infrastructure .....	28
2.1 Cyclone shelters.....	28
2.2 Critical public buildings.....	34
2.3 Transportation and access .....	35
2.4 Electricity and communication systems.....	36
3. Settlements.....	37
4. Economic development and systematic dependencies.....	43
4.1 Livelihoods.....	43
4.2 Formal and informal tourism.....	45
4.3 Economic infrastructure and prices of goods and services .....	50
5. Social concerns.....	52
1.4 5.1 Education.....	52
1.5 5.2 Caste, language, and political alliances .....	54
6. Forest and biodiversity.....	54
6.1 Green cover loss .....	54



6.2	Heat Wave.....	57
6.3	Olive Ridley turtles.....	57
D.	Important Considerations for Long-term Recovery Planning .....	58
1.	Outcomes disparate by geography .....	58
2.	Deepening of social inequities .....	58
3.	Damaging the dignity of people.....	58
4.	Reduced economic diversity and increased inequality.....	59
5.	Changes in demography due to migration.....	59
6.	Environmental and health implications .....	59
7.	A note on self-stated needs for long-term recovery .....	59
	Annexures .....	60
8.	Annexure 1: Details of government relief packages.....	61
	References .....	65

## List of Maps

Map 1: Settlement structure map .....	16
Map 2: Population density map .....	16
Map 3: Key infrastructure and cyclone track .....	16
Map 4: Cyclone Fani affected districts .....	17
Map 5: Total population by sub-district.....	17
Map 6: Total number of households by sub-districts.....	18
Map 7: Percentage of households with roofs made of temporary material .....	19
Map 8: Percentage of households with walls made of temporary material.....	19
Map 9: Percentage of households with no access to treated water .....	20
Map 10: Percentage of households with no drainage access .....	20
Map 11: Percentage of households with assets.....	20
Map 12: Percentage of households availing banking services .....	20
Map 13: Percentage of households living in own houses .....	21
Map 14: Percentage of households living in rented houses.....	21
Map 15: Percentage of literate population across districts .....	21
Map 16: Percentage of illiterate population across districts .....	21
Map 17: Percentage of main workers across districts.....	21
Map 18: Percentage of marginal workers across districts .....	21
Map 19: Satyakali Basti settlement map in Bhubaneswar with transect route. ....	39
Map 20: Shahidnagar slum map in Bhubaneswar with transect route. ....	40
Map 21: Bayababa Basti settlement map in Bhubaneswar with transect route. ....	41
Map 22: Transect map of fishing village in Puri.....	43
Map 23: Transect route map of Temple Street, Puri.....	46
Map 24: Transect routes map of Puri Beach Road. ....	48

## List of Images

Image 1 & Image 2: Structures used as shelters in Cuttack during the cyclone. ....	23
Image 3: A school building used as a shelter near Puri. Part of this building itself is also damaged but the two structures offer shelter to over 90 affected people. It continues to be used as a shelter as people rebuild their damaged homes.....	23
Image 4: A neighbourhood temple was used as a shelter, and also a common place for cooking by a community of mixed castes.....	23
Image 5: People using thatch and cloth to cover the roofs when no adequate waterproof sheeting alternative is available. ....	26
Image 6: People seen saving the small plastic sheets for purposes other than covering damaged roof.....	26
Image 7: Damaged house images before reconstruction (shared by the family in front of other neighbours).....	27
Image 8: Image taken after repairs were done using a loan of INR 30,000 with the hope of repaying it with the relief money. ....	27

Image 9: Some people continue to live in broken houses exposed to the heat wave. ....	27
Image 10:.. Damaged thatched houses were reconstructed before their tin sheet counterparts. ....	27
Image 11: Tools being used (by youth not in the image) during self-rebuilding. ....	28
Image 12: Completely damaged mud walls and thatched roof structure. ....	28
Image 13: Old man trying to remove the remains of a fallen tree, to make way for fixing the house wall in a slum in Bhubaneswar. ....	28
Image 14: Tarpaulined roofs as makeshift arrangements before the monsoon and to protect against heat. ....	28
Image 15: 100-person capacity cyclone shelter without ramp access. ....	29
Image 16: Some cattle rearing households stayed with their animals in their sheds during the cyclone, fearing their livelihoods getting affected despite safe return. They said the animals remained safe here, but stopped giving milk for a few days because of the impact. ....	29
Image 17: People continue to live in these shelters even after three weeks as they rebuild their homes nearby. ....	30
Image 18: Open area was still being used for community kitchens as people were still sheltered here. Funds were being collected from the villagers to run the kitchen. ....	30
Image 19: Only overhead tank is in disrepair. ....	31
Image 20: Dysfunctional toilets forced some people to use the terrace or staircase landing for defecation during the cyclone. ....	31
Image 21: Structural features like beams and columns were developing cracks over the years, and insufficiency of funds was quoted as the reason for disrepair. ....	31
Image 22: Completely damaged toilet in one of the shelters. ....	31
Image 23: Lightning conductors were damaged after the cyclone. ....	32
Image 24: Structures have not been painted since they were built 20 years ago. ....	32
Image 25: An electric generator in one of the shelters stopped functioning during the days of evacuation. The DAPs pooled resources to replace it as fast as they could. ....	32
Image 26: Access ramp covered with reconstruction material. Also, co-shared by cattle. ....	32
Image 27: While the open space around the structures was used for everyday purposes, the CSMMCs did not permit the use of these structures on regular days due to limited resources to maintain their wear and tear. ....	33
Image 28: Even when the structure was part of a school compound, the ability of the school committees to upgrade these was limited. ....	33
Image 29: Some structures were inaccessible from the road due to plinth heights and no direct passages. ....	33
Image 30: Map showing concentration of shelters across the coastal belt of 10 km. (Source: OSDMA, 2019). ....	33
Image 31: A large slum settlement with over 30,000 inhabitants in coastal Puri largely evacuated to neighbouring buildings such as construction sites, police stations, and an army guest house, and had to return immediately after so that the building functions could resume. ....	34
Image 32: Collector's office and residence in Puri district. ....	35
Image 33: Residence of the Superintendent of Police, with completely damaged roof over the entire structure. ....	35
Image 34: Electric furnace damaged in the funeral grounds. ....	35

Image 35: Panchayat school damaged in Nuapada. Cyclone shelter is being used as a school for the time being.....	35
Image 36: Damaged parts of the railway station in Puri. ....	36
Image 37: People stranded for days at the railway station due to delays and cancellations.....	36
Image 38: Newly constructed road damaged near Nuapada. This road is the only access into the villages in this narrow belt of land between Chilika and the Bay of Bengal. ....	36
Image 39: Bus stand damaged near Puri. ....	36
Image 40: Odisha power infrastructure network. ....	37
Image 41: Damaged power distribution infrastructure near Puri. ....	37
Image 42: Damaged houses in Satyakali Basti with inhabitants building temporary shelters in the aftermath. ....	39
Image 43: Houses damaged due to wind speeds and water retention. Inhabitants have left their assets outside the housing unit to dry. ....	39
Image 44: Houses along the railway line with damaged roofs due to falling debris and high wind speeds. ....	41
Image 45: Houses with damaged walls and collapsed roofs. Inhabitants were residing in one part of the house. ....	41
Image 46: View of the settlement where roof overhangs have been held using sand bags and stones temporarily. ....	42
Image 47: View of the settlement two weeks after the cyclone, where damaged roofs are replaced with tarpaulin sheets which were provided as immediate relief. ....	43
Image 48: View of the fishing village immediately after the cyclone, where large scale damages to roofs, boats, and building structures can be seen. ....	43
Image 49: Buildings on Temple Street where billboards had fallen on adjacent structures. ....	47
Image 50: Damage to buildings on Temple Street where falling and flying debris of facade elements, signages, and billboards had damaged structures. ....	47
Image 51: Hotel buildings with glass facades were damaged during the cyclone. ....	48
Image 52: Sand ingress onto Beach Road and buildings post the cyclone. ....	48
Image 53: Beach Road on 3 May 2019 (day of the cyclone) where sand ingress, loss of tree cover, and damage to buildings can be seen. ....	49
Image 54: Beach Road on 21 May 2019 where sand ingress can be seen. It is also noted that recovery activities had only begun despite being two weeks after the cyclone ....	49
Image 55: Boating centre near Dolphin Centre. Image 56: Boating activities in Satpada. ....	50
Image 57: Damaged government cashew factory. ....	51
Image 58: Private cashew factory. ....	51
Image 59: Food grain godown damaged. ....	51
Image 60: Damaged rice factory. ....	51
Image 61: School roof damaged. Still being used as a shelter for those rebuilding their damaged houses. ....	53
Image 62: School assets also damaged. ....	53
Image 63: Food being cooked at the restoration centre. ....	54
Image 64: Pre- and post- cyclone NDVI analysis for Bhubaneswar region. ....	55
Image 65: Pre- and post- cyclone NDVI analysis for Jagatsinghpur region. ....	56

Image 66: Pre- and post- cyclone NDVI analysis for Puri region. ....	56
Image 67: Pre- and post- cyclone land surface temperature analysis for Jagatsinghpur region. ..	57

## List of Boxes

Box 1: Satyakali Basti, Bhubaneswar .....	38
Box 2: Shahidnagar slum, Bhubaneswar .....	40
Box 3: Bayababa Basti, Bhubaneswar .....	41
Box 4: Fishing community, Puri .....	42
Box 5: Temple Street, Puri.....	46
Box 6: Beach Road, Puri .....	47
Box 7: Dolphin Centre and Biodiversity Park.....	49
Box 8: School used as a shelter during and after the cyclone.....	53
Box 9: Puri district school being used as post-cyclone restoration centre .....	53

## List of Tables

Table 1: Relief received as stated by people (by 24 May 2019) .....	24
Table 2: Relief package announced on 6 May 2019.....	60
Table 3: Subsequent modifications to relief package and beneficiary identification .....	61
Table 4: Livelihood support.....	62



## List of Abbreviations

CSMMC	Cyclone Shelter Management and Maintenance Committees
DAPs	Disaster affected people
GoO	Government of Odisha
IIHS	Indian Institute for Human Settlements
NDVI	Normalised Difference Vegetation Index
OSDMA	Odisha State Disaster Management Authority

**Disclaimer:** The views shared in the report are of the individuals in the team, and do not represent the institution. This study was funded by the Indian Institute for Human Settlements.



## Why this study?

Early warning was received for Cyclone Fani, an extremely severe cyclone storm, which hit the eastern coast of India early on the morning of 3 May 2019. Following this, state and non-state actors in Odisha, Andhra Pradesh, and West Bengal began preparing for evacuation, rescue, relief, and response work needed to help the people in the line of the cyclone. This led to a mass evacuation exercise, with government estimates of close to 1.5 million people evacuated to safety in Odisha alone. The cyclone with wind speeds of 250 kmph hit the coast of Puri district, and followed north towards Khordha, Bhubaneswar, Cuttack, and eventually died in Jagatsinghpur. No storm surge was experienced, unlike the 1999 Super Cyclone when the wind speeds were 220 kmph and close to 10,000 people lost their lives to winds and floods, largely in Ersama block in Jagatsinghpur. Close to 64 persons are reported to have died so far due to Cyclone Fani (UN, ADB, World Bank, 2019).

The coast of Odisha has experienced several cyclonic events in the last 20 years, and some areas have faced the brunt more than once. Odisha, being a relatively poor state in India with deep-rooted socio-economic and physical vulnerabilities, is still recovering from some of the earlier losses and systemic changes that occurred in its socio-physical fabric, economy, and environment. Life loss has been reduced dramatically over the years, owing to improvements in early warning and better preparedness practices. Yet, long-term recovery approaches are still limited to shelter and rehabilitation projects and some mason training programmes. Very limited attention has been given to other needs of the people and the regions.

A team from Indian Institute for Human Settlements (IIHS) was involved in an ongoing research project examining recovery processes and the long-term outcomes for the disaster-affected people (DAPs) in Odisha. Another team was also working in parallel with the state of Odisha on comprehensive area upgradation work in select urban areas across the state. Following Fani, the two teams together conducted a short five-day field situation analysis between 20–24 May 2019. This analysis was conducted to assess the potential long-term implications of this event and to direct attention towards them apart from the business-as-usual short-term response, relief, and rehabilitation work. This report is the outcome of the field study, as a subset of the on-going research and practice engagements. It is meant to report the observations made during the visit, and initiate discussions on long-term recovery processes required for the region. This study aims to answer the following questions:

1. What are the long-term implications of the event on the people and regions, and what are the priority recovery needs of the affected population?
2. What measures and capacities are required to revitalise people's abilities to restore their full potential to lead productive, creative lives in accordance with their needs and interests, including protection against risk?
3. What are the areas of further study required to understand the specific recovery needs by regions or sectors?

## Methodology and ethics

A geo-spatial baseline study was conducted to understand the pre-existing vulnerabilities and capacities of the regions, and understand the aggregated macro-changes taking place after the event. This exercise used publicly available data and maps the physical building attributes, level of key infrastructure access, demography, location of cyclone shelters, and forest cover before the event. A newspaper roster was created to document media reports across national and regional dailies, starting with the announcement of the cyclone and the days following the event (01 May – 01 June 2019). Based on the baseline study, the areas visited are mapped below:



A team of six persons, including disaster resilience, public policy, geospatial, housing, and media experts conducted the field assessment. Visual observations were made for physical damage attributes using pre-designed templates (attached as annexures). Regional level and neighbourhood level transect studies were conducted to understand the variation of damages across large and small geographical areas. It gave an insight into the unequal impacts of the cyclonic storm. As and when possible and ethically permissible, semi-structured conversations were also conducted with affected people and key informants, using guiding questions set out in advance (available as annexure).

Apart from the institutional ethics norms and clearances, the specific ethics guidelines followed during the visit by the team were as follows:

- Adhere to the principles of humanitarianism, impartiality, neutrality, and “do no harm”.
- Follow IIHS’ ethics guidelines and be sensitive to people’s psychological needs and emotional trauma.
- Support local ownership and remain transparent to the local and regional authorities and acknowledge their leadership in recovery planning, priorities, and implementation.
- Ensure the participation and representation of affected communities, especially the most vulnerable and minority groups.
- Develop a recovery plan that addresses the gap created by the disaster, as well as underlying vulnerabilities, in a way that enables communities to build back better and reduce their own future risk.
- Incorporate long-term resilience building actions in the recommendations and be wary of potential mal-adaptive actions.
- Focus on restoring and building local capacities and capabilities.
- Be sensitive to socio-cultural aspects of disaster recovery in addition to economic imperatives.
- Ensure one team, one process, and one output.
- Ensure the dissemination of the Long-term Recovery Needs Assessment to the right audiences at the right time (no more than 45 days after the day of the event).

## Audience

This study is intended to primarily assist practitioners, researchers, and academics who participate and are responsible for the disaster management work as well as overall development of the region. Specifically, it is directed towards:

- Senior government officials responsible for disaster management and requesting international cooperation for post-disaster needs assessment and the ensuing recovery and reconstruction efforts.
- Senior managers and technical staff from multilateral agencies at headquarters and in-country offices who would be required to respond to a government’s request to organise, coordinate, and conduct a post-disaster assessment, response, and recovery.
- Public officials across sector ministries with responsibilities of social, economic, and environmental development.
- Civil society and other state and national stakeholders who have a role in recovery planning and addressing developmental needs of the region.

The study will be disseminated to specific agencies and individuals, as well as made publicly available on the IIHS Knowledge Gateway (<http://iihs.co.in/knowledge-gateway/>) in due course.



## Scope and limitations

This study is not intended to be comprehensive and all-encompassing and does not replace the more elaborate post-disaster damage and recovery needs assessment methodologies. In particular, this report is not intended to provide:

- A complete quantitative and qualitative assessment of the scale and scope of losses.
- A comprehensive financial or resource needs overview for recovery.

## Organisation of the report

After setting the context, objective, methodology, scope, and limitations of the report upfront, a summary of key messages is presented in Section A. Section B provides a baseline study of the vulnerabilities and capacities in the region, key physical attributes, and the official recorded trajectory and strength of Fani. Section C forms the bulk of the report offering key observations made across disaster governance, critical infrastructure, housing, social impacts, effects on green cover, economy, and variations of impact and actions across different regions. Finally, Section D discusses the implications of these observations on the long-term recovery aspects for urban and rural areas, deepening of social inequities, aspects of dignity, changes in demography, and economic and environmental conditions.

## A. Key messages

Summary of observations, implications for long-term recovery, and recommendations for action in the immediate-, medium-, and long- term, are detailed in this section.

### **OBSERVATIONS**

#### **Planning and preparedness**

- Rural communities seemed better prepared than those in urban areas.
- Inland areas despite being affected by high wind speeds do not have cyclone shelters.
- Reporting of numbers of people evacuated lacks transparency.

#### **Response and relief**

- Lower amounts given as relief and compensation to affected people in 'less affected' districts leave out the poor in continued vulnerability.
- 'Universal relief distribution' is not available to migrants, despite the impacts faced by them.
- Livelihood is affected as there is no compensation for loss of number of days of work; only asset loss is recognised and compensated.
- The material distributed as relief is not environmentally suitable or sustainable.
- People either reconstruct poorly constructed houses or continue to live in exposed conditions as there are delays in damage assessment.
- Delays in action are also attributed to post-election time.

#### **Cyclone shelters**

- Space is inadequate for people and animals, causing implications for health and safety.
- There are pre-existing social and cultural barriers to access.
- Infrastructure conditions are poor, and the structure is in disrepair.
- The structures, despite being multipurpose, are not being used in most places for functions other than evacuation.
- Geographical distribution is uneven and physical access to the shelter is difficult in some areas.
- Makeshift shelters exist in urban areas and the evacuation process is not systematic.
- Shelters have a deeper psychological meaning for the people and can have far reaching implications for the feeling of recovery.
- Although people are demanding separate cyclone shelters in their villages, these structures are only makeshift arrangements until overall housing is improved.

#### **Other infrastructure**

- Damaged roads affect access to vulnerable areas and can greatly affect relief distribution and early recovery.
- Delay in restoration of electricity perpetuates livelihood and other losses.
- Some government buildings, especially in Puri, were also found to be damaged.

## **Housing**

- Housing was damaged unequally within and across neighbourhoods in the same district.
- Aggregation of damage assessment and analysis can have implications in terms of understanding needs at the local level.
- Decision making for repair and reconstruction is done at the household level depending on needs and access to resources.
- There was a lack of cyclone shelters in urban areas leading to the use of makeshift buildings as shelters during evacuation.

## **Livelihoods**

- Direct impact anticipated to food security, as well as livelihoods of people dependent on horticulture and agriculture as plantations are now lost.
- Fishing activity is affected for both seafarers as well as those who do subsistence fishing in the Chilika lake.
- No formal options (in urban areas) for people to secure their animals during the cyclone.
- Informal workers and small-scale enterprises are affected by the system stressors leading to price hike and reduction in demand.

## **Economic infrastructure and systems**

- Physical damage to hotels just before the tourist season will have implications to the overall economy.
- Critical infrastructure required for certain livelihoods is damaged and will have second order implications on the region's economy.
- Local markets are damaged, increasing dependence on neighbouring areas and states.
- Prices of goods and services has escalated, worsening choices of recovery for the poor and the vulnerable.
- Banking and insurance systems are not helping in recovery as much as they should.

## **Social issues**

- Schools used as cyclone shelters are left in poor condition and will need to stay closed for a while impacting school schedules.
- Books are lost during the cyclone, and time (that is required to be at school goes into reconstruction) is lost during recovery.
- Minorities face access challenges both to shelters during evacuation and to relief.
- National election results may skew the Government of Odisha's (GoO) response to opposition districts.

## **Forest and biodiversity**

- Tree cover loss will worsen heat wave implications during the coming summers.
- The already near-extinction species (e.g. Olive Ridley turtles) may get affected as the nesting areas are impacted.

## Key considerations for long-term recovery

1. Outcomes and impacts of disasters on individuals and communities are unequal and vary across geography.
2. Both the impact of the disaster and the ensuing relief distribution could deepen social inequities.
3. Disasters themselves and the following relief and response activities could be damaging the dignity of people, depending on how they are undertaken
4. Disasters affect certain livelihoods more than others, and relief distribution further skews recovery processes. This can lead to reduced economic diversity and increased inequality within society.
5. Loss of, and continued stressors to certain livelihoods have resulted in people either diversifying to other livelihoods or migrating for better opportunities elsewhere causing changes in demography.
6. There are long-term environmental and health implications following the disasters and changing socio-economic dependencies.
7. There is a critical need to recognise self-stated needs by those who are affected for their sustainable and holistic long-term recovery.
8. There is a need to shift primary focus from relief support to long-term recovery.

## B. Baseline information

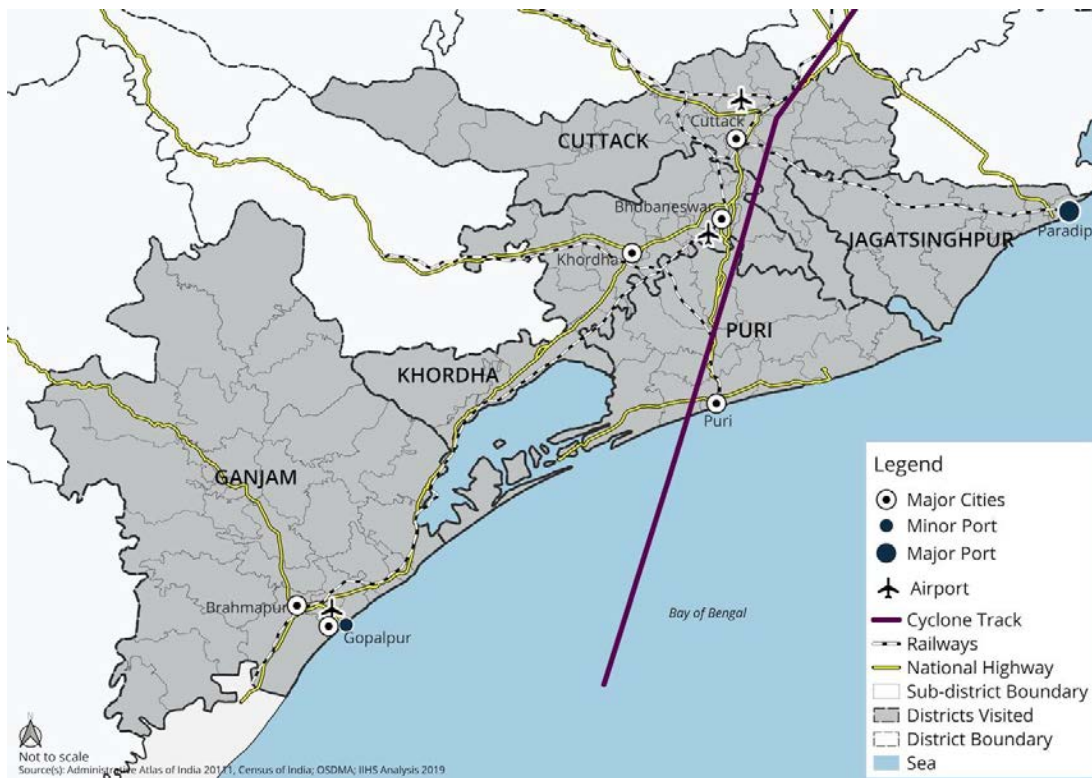
This section outlines the pre-existing conditions of the districts affected by Odisha's cyclone to help understand the patterns of losses and thereby identify suitable approaches of action that could lead to overall positive development outcomes.

Odisha with its challenging terrains in the central and the western regions, focusses most of its development and settlement density in the eastern region along the coastal belt. The National Highway 5 which is part of the golden quadrilateral network, and the East Coast Railway Network that connects Kolkata and Chennai pass along the eastern edge of the state. Although there are many airstrips located in the state, the only functional passenger airport is located in Bhubaneswar. Three ports are located on the coast— one major port in Paradip and two minor ports in Gopalpur and Dhamra. Given these physio-geographical conditions and the location of key infrastructure, most of the coastal region is densely populated.

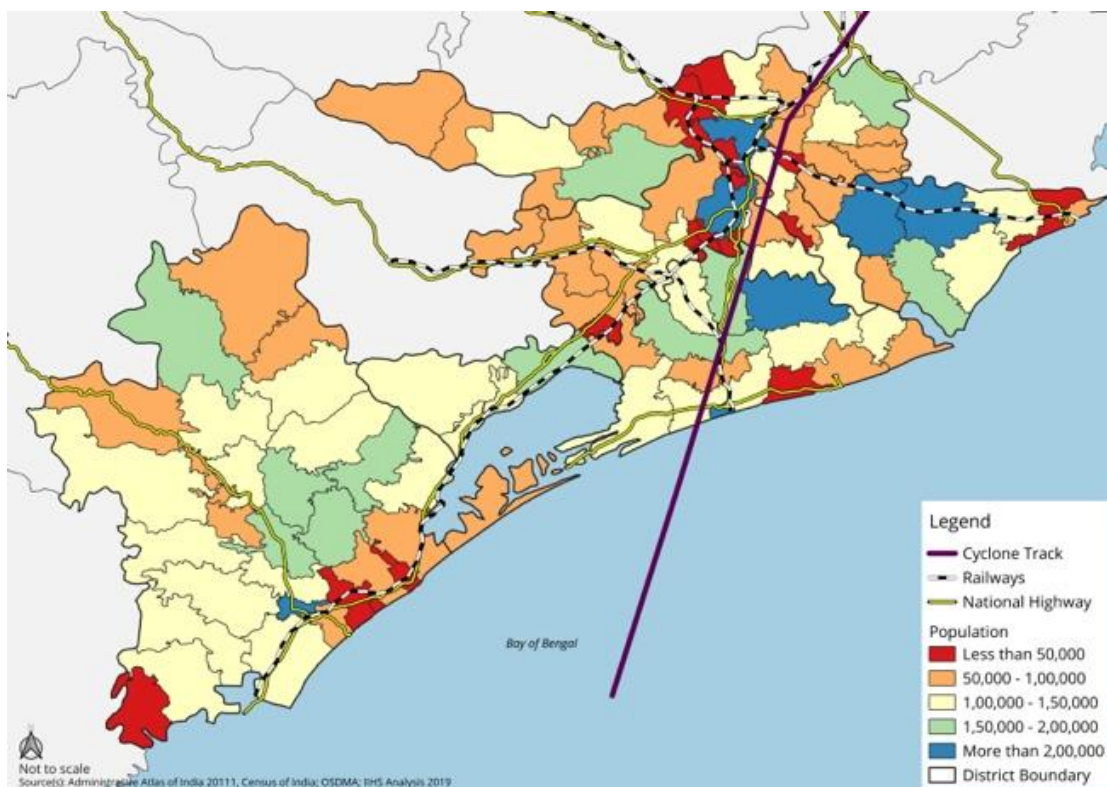


Cyclone Fani made landfall on 3 May 2019 south of Puri as an extremely severe cyclonic storm and weakened after land fall. Puri, Khordha, Cuttack, Jagatsinghpur, and Ganjam were declared the most affected districts. The team visited all the above-mentioned districts and the following maps (Map 3 – Map 18) provide the baseline information of key exposure and vulnerabilities that exist in the region. The Census of India, 2011 data was aggregated at the sub-district level for these five most-affected districts. Although the conditions now (in 2019) are very different from the census data collection period (pre 2011), select indicators are used to understand the patterns and spatial distribution of the exposure and the vulnerabilities to the cyclone. Overlaying the cyclone track over sub-district population and household data shows that the cyclone passed through some of most populated areas in the region.

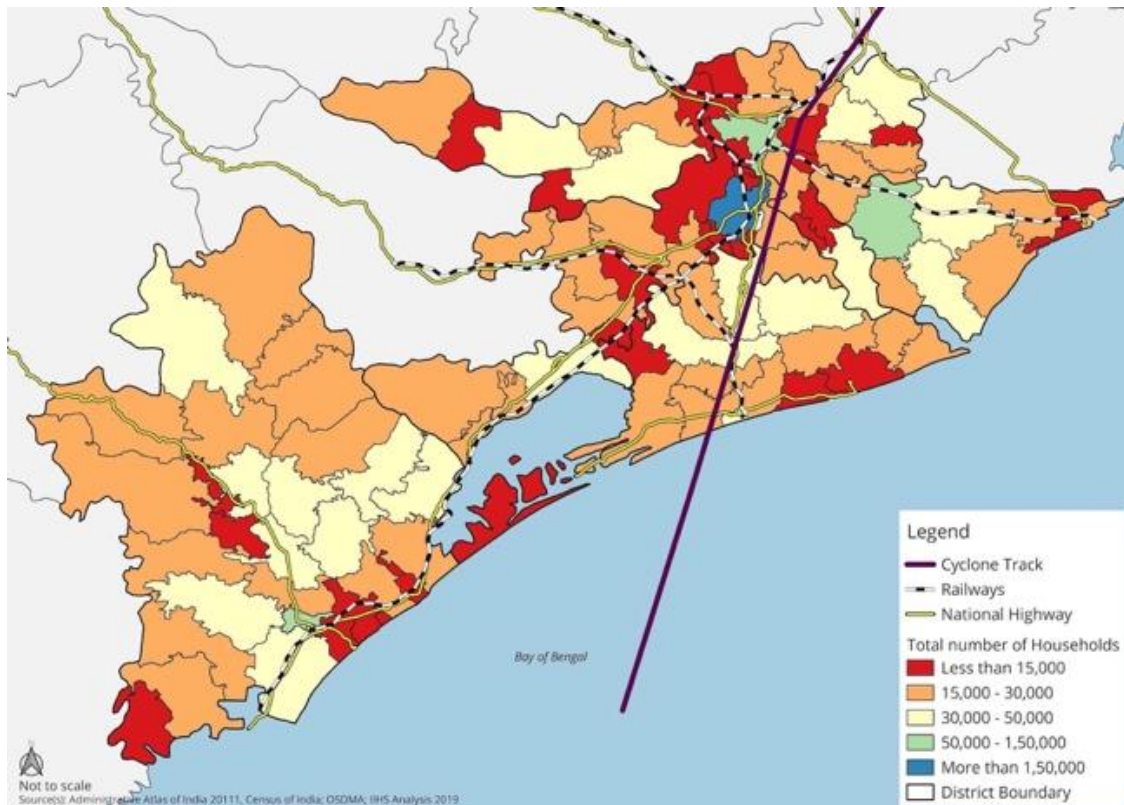




Map 4: Cyclone Fani affected districts



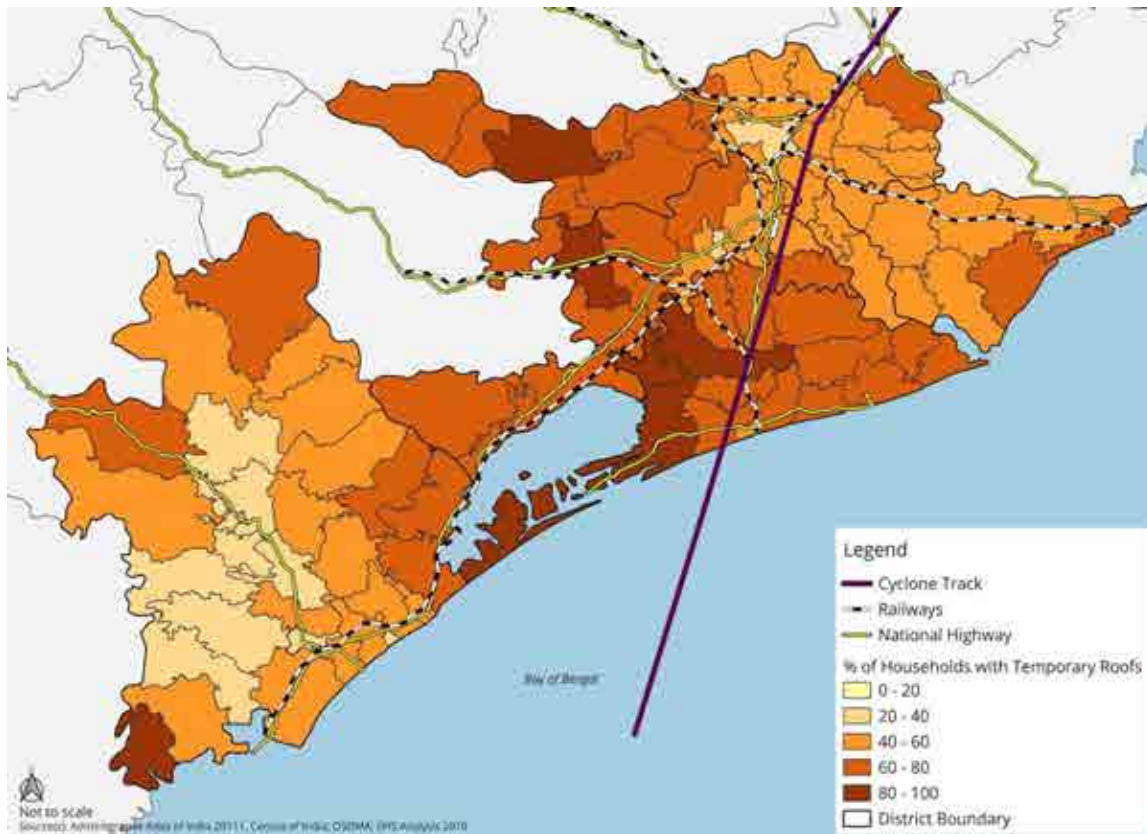
Map 5: Total population by sub-district



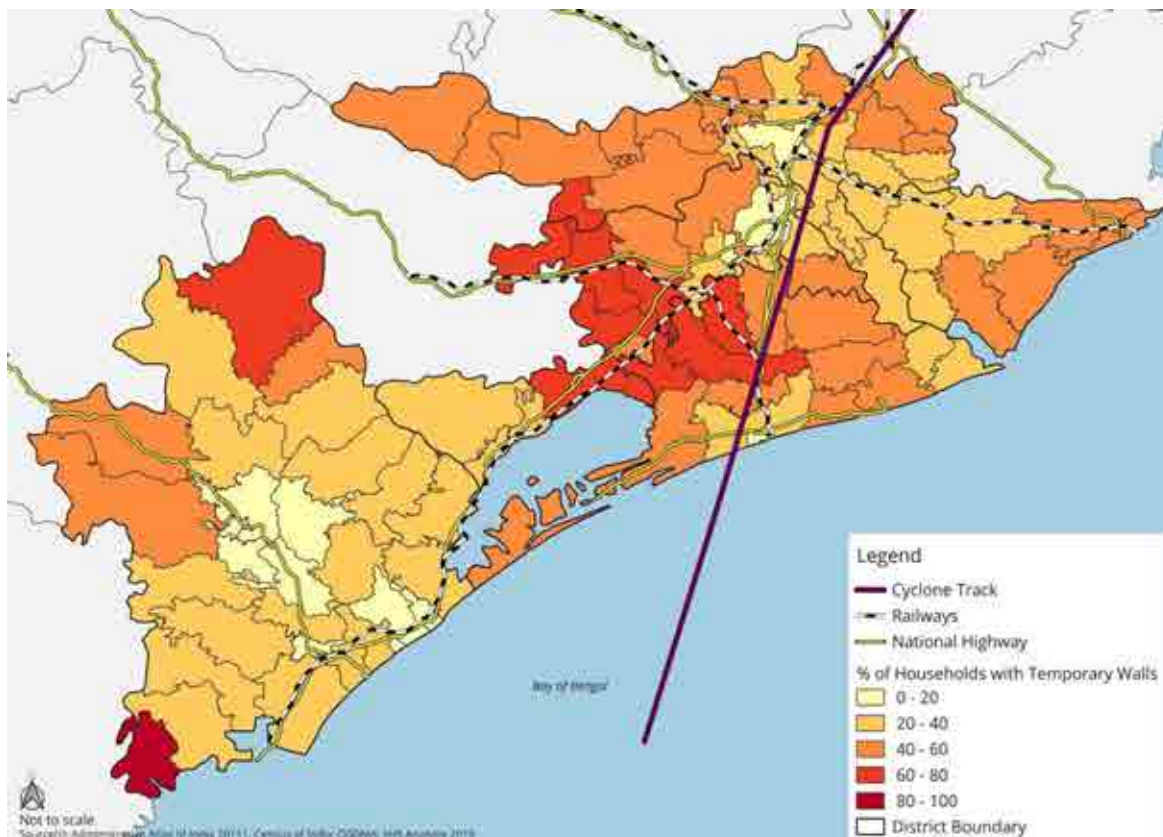
Map 6: Total number of households by sub-districts

Cyclone Fani's maximum sustained wind speed reached up to 250 kmph during landfall. During such conditions, temporary materials and structures are the most vulnerable. Among the five most affected districts, Puri has the highest percentage of houses with temporary roofing (roofs made with materials other than concrete and burnt bricks) and Puri and Khordha have the highest percentage of houses with temporary walls (walls made with materials other than concrete, stone, and burnt bricks). Both these districts with the highest percentage of vulnerable structures were located in the path of the cyclone.



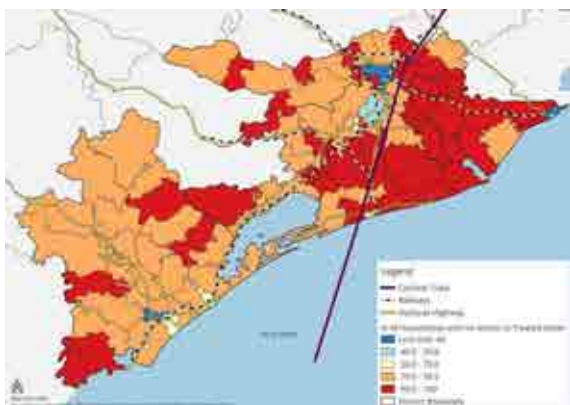


Map 7: Percentage of households with roofs made of temporary material

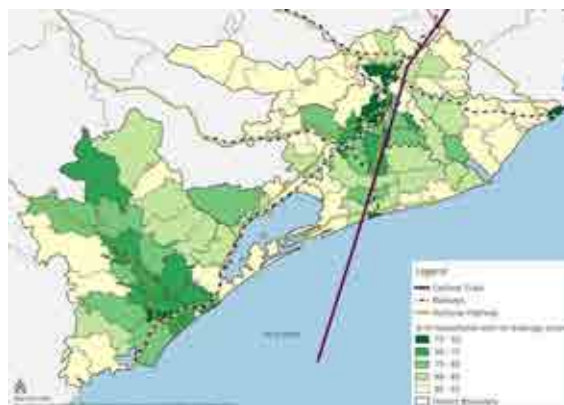


Map 8: Percentage of households with walls made of temporary material

Other than regions adjacent to Bhubaneswar, Cuttack, Puri, and Berhampur towns, majority of the Ganjam, Cuttack, Khordha, Puri, and Jagatsinghpur districts have high percentages of households with no access to treated water supply and drainage access.

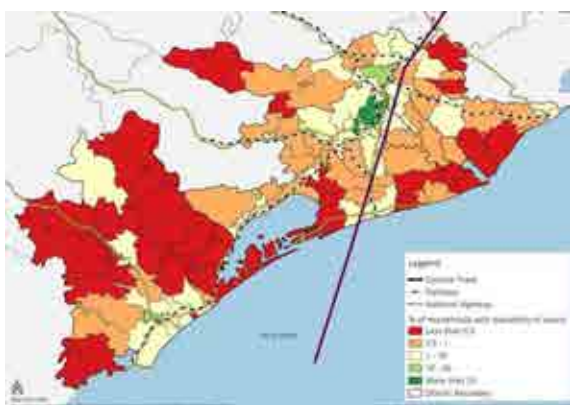


Map 9: Percentage of households with no access to treated water

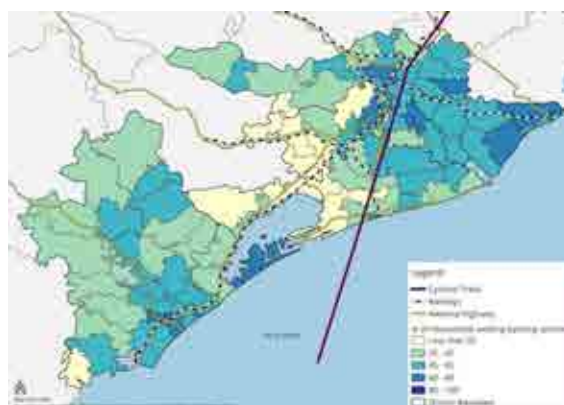


Map 10: Percentage of households with no drainage access

Spatial patterns similar to those of treated water and drainage access exist in owning assets (TV, computer/laptop, radio, telephone/mobile phone, and car/scooter) and households availing banking services. Regions near Puri town, Chilika Lake in Puri, and Ganjam district have limited access to assets and banking services and could be indicators of the high vulnerability of the region.



Map 11: Percentage of households with assets



Map 12: Percentage of households availing banking services

Most households in rural areas own houses while more households live in rental houses in urban areas.



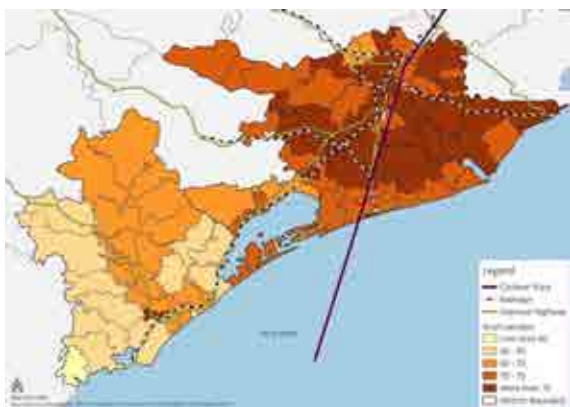


Map 13: Percentage of households living in own houses



Map 14: Percentage of households living in rented houses

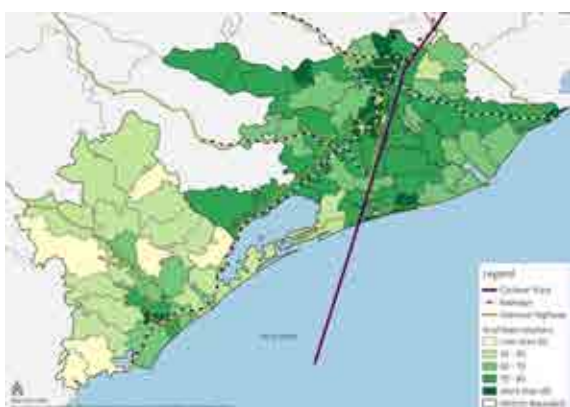
In contrast to the other distribution patterns, Cuttack, Jagatsinghpur, Puri, and Khordha districts have higher percentage of the literate population and main workers<sup>1</sup> in comparison to Ganjam district.



Map 15: Percentage of literate population across districts



Map 16: Percentage of illiterate population across districts



Map 17: Percentage of main workers across districts



Map 18: Percentage of marginal workers across districts

<sup>1</sup> As per census definition, those workers who had worked for the major part of the census reference period (i.e. 6 months or more) are termed as Main Workers.



## C. Field observations

This section records some of the observations made on the field, substantiated wherever possible, by secondary reviews and other sources of evidence.

### 1. Disaster governance

#### 1.1 Planning, preparedness, early warning, and evacuation

Learning from past events, Odisha has systematically invested in early warning systems, standard operating procedures and protocols for search and rescue, and evacuation. This was evident as people interviewed in all areas visited said they were well-informed about the timing and intensity of the cyclone a few days in advance, giving them sufficient time to evacuate if required. The pre-built cyclone shelters also seemed helpful in protecting people's lives from the high-speed winds and falling (and flying) objects like trees, hoardings, and electric poles. Yet, several gaps were observed in this pre-disaster preparation that may have implications for future events of similar nature:

- Rural communities seemed better prepared than those in urban areas: In rural areas the preparedness for evacuation seemed to be in place, including preparatory drills and trainings which seemed effective in getting people to act. In urban areas, the exercise of evacuation was left for people to self-determine. While people seemed to have been informed about the cyclone in urban areas, and were asked to leave for safer places, they were not helped to move nor were they well-informed about safe locations. For example, in a Cuttack slum, when asked to leave, people stayed in the nearby garbage collection shed while many others in Bhubaneswar and Puri found shelter in nearby apartments, with relatives, under flyovers, and other public and private buildings. There is a need to spread awareness of closest pre-determined safe locations or designated cyclone shelters (usually schools, colleges etc.) amongst residents.
- Inland areas despite being affected by high wind speeds did not have cyclone shelters: Cyclone shelters were mostly built along the coast to cater to settlements living within 10 km of the coastline. This was potentially based on lessons from the 1999 Super Cyclone, where the majority of deaths were due to a storm surge affecting areas within that distance. While locating the shelters on the coast on priority to safeguard people from any future flooding was logical, many future events, including Cyclone Phailin in 2013, Cyclone Titli in 2018, and now Cyclone Fani in 2019, have shown that impact due to the high-speed winds can go well beyond 10 km from the coast. Such infrastructure is required further inland, especially areas where the physical built environment is vulnerable to wind pressures. A new methodology to locate additional shelters more inland needs to be considered. There have been instances previously, where community members have raised issues regarding the location decisions of the cyclone shelters, highlighting the need to incorporate a participatory methodology in location decisions. In 2014 (Jadunath Pradhan vs. the State and Ors.), the sarpanch of a village filed a writ petition against the state arguing against the location of a cyclone shelter and challenging the state's methodology which did not consult the local governing structures when such a decision was taken.



Image 1 & Image 2: Structures used as shelters in Cuttack during the cyclone.



Image 3: A school building used as a shelter near Puri. Part of this building itself is also damaged but the two structures offer shelter to over 90 affected people. It continues to be used as a shelter as people rebuild their damaged homes.



Image 4: A neighbourhood temple was used as a shelter, and also a common place for cooking by a community of mixed castes.

- Reporting of numbers of people evacuated lacks transparency: It is unclear how the number of 1.5 million people evacuated has been arrived at by the Government of Odisha (GoO) in press releases. That figure makes this one of the largest exercises of evacuation undertaken globally. The website claims the capacity of many of the cyclone shelters to be as high as 3000–5000. However, the 20 cyclone shelters assessed during this visit were either already claimed to be at over-capacity with 1000 people or had less than 300 people taking refuge during the time. Besides, as mentioned earlier, urban dwellers had self-evacuated if possible and feasible, without much support from the

government. There needs to be more clarity in terms of how this number of evacuations is being arrived at, to assess future needs better.

## 1.2 Response and relief

- Lower relief amounts in less affected-districts leaves out the previously poor in continued vulnerability: Government had announced different relief packages for different districts on the basis of initial damage reports (Barik, 2019). **Table 1** and **Table 2** summarise the relief package by district and the severity of the cyclone impact. All the people the team interviewed mentioned receiving at least some relief and compensation within the first two weeks of the event, but the amounts they received varied hugely between districts.

**Table 1: Relief received as stated by people (by 24 May 2019)**

District	Compensation received (irrespective of the level of damage)
Puri	INR 2000, and 50 kg rice
Khordha/Bhubaneswar	INR 1000 and 25 kg rice
Cuttack	INR 500 and 5 kg rice
Ganjam	Only 5 kg rice
Jagatsinghpur	Only 5 kg rice

The relief announcement was done in phases with changes in relief packages and the eligibility of beneficiaries. The first relief package was announced three days after the cyclone on 6 May 2019. Three districts of Cuttack, Kendrapara, and Jagatsinghpur were classified as moderately affected, Puri was categorised as extremely affected, and parts of Khordha as severely and extremely affected. The District Collector is responsible for identifying whether the block is extremely, severely, or moderately affected.

Despite the fact that some of the households in lesser affected districts (e.g., Cuttack) were as badly affected due to pre-existing vulnerabilities (e.g., non-notified slum dwellers) as areas directly in line of the cyclone track (e.g., Puri), they received lesser amounts of cash and rice in relief. It is understandable that providing universal compensation based on an overall standard for a district is the fastest way to provide relief to one and all. In addition, multiple changes in eligibility and organising multiple distribution drives could be a time and resource intensive exercise for officials. Instead, the relief package should be based on the track of the cyclone and its estimated wind speed; geographical distribution of the damage (with finer resolution than a district); existing vulnerabilities instead of administrative boundaries; and maximum limit for each district. This exercise could also help in planning for damage assessment, recovery, and reconstruction stages.

- Universal compensation not available for migrants despite the impact faced: Post Cyclone Phailin in 2013, the government had announced a relief of INR 500 and 25 kg rice for all the extremely affected families and INR 300 for 25 kg rice for all the severely affected families. However, during Fani, the relief was announced by districts and the eligibility was to have a food security card. As a result, migrants were left out from receiving relief since they do not have ration/food cards or any proof of residence to be eligible to get these cards. The eligibility criteria were changed in Bhubaneswar, Puri, and Khordha multiple times to include all the families affected by the cyclone and the first announcement came nearly a week after the cyclone (OSDMA, 2019). Despite being equally affected, or often more due to poorer living conditions and access to local resources, excluded families not getting relief in the most-needed time could pose additional impact to their vulnerabilities and dignity.
- Livelihood is affected as there is no compensation for loss of number of days of work; only asset loss is recognised and compensated: Post Phailin, the government had provided additional compensation for lost fishing days as a livelihood measure to the fisher families as the damage to the boats had prevented them from fishing. There was no such provision after Cyclone Fani except for the damage compensation for the boats and nets. During the visit to Penthakata, a fisher settlement in Puri, fishers hadn't started fishing even three weeks after the cyclone as there was no electricity for ice production. The fishers have no other means to store fish during and after their return from fishing. Other than this, fishing was affected even in areas not directly in line of the cyclone track due to environmental shocks in the sea, and a bigger area along the coast must be studied for such impact while assessing compensations.
- The material distributed as relief is not environmentally suitable or sustainable: Polythene sheets distributed widely by public, private, and civil society actors, after the cyclone as an immediate relief is not appropriate for hot weather conditions such as in Odisha. Besides, it was generally found flimsy and inadequate in size to be used as sheeting material to cover damaged roofs. A bigger sheet might be more useful for covering damaged roofs or building temporary shelters immediately after the cyclone before the reconstruction period. It might also be a useful multipurpose item for the families in the longer term. Within a few days of the initial relief package announcement, the government had announced that INR 1,000 in Puri district and INR 500 in other districts be paid in lieu of polythene sheets. Polythene sheets are in high demand during these emergency situations and are part of most of the relief packages provided by the government and other agencies. A sudden rise in demand could lead to price escalation and shortage of such items key to immediate shelter. Alternate materials, preferably more sustainable in nature, must be promoted at this time. There may also be a need to invest in research and development for low-cost sustainable roofing alternative that can be sourced locally.





Image 5: People using thatch and cloth to cover the roofs when no adequate waterproof sheeting alternative is available.



Image 6: People seen saving the small plastic sheets for purposes other than covering damaged roof.

### 1.3 Timing of action

- People either reconstruct poorly built houses or continue to live in exposed conditions as there are delays in damage assessments: When the field visit was conducted three weeks after the cyclone, there had been no official damage assessments. The affected families did not have any information of the planned damage assessment dates. The government had announced building assistance based on levels of damages but there was no clarity on the difference between these categories among those affected. In the meantime, fearing the onset of monsoon in a few days, some people had already taken loans, or scavenged material to rebuild houses that remain vulnerable to future cyclones. The families who expected to receive some support had not taken up any repairs and were still staying in the damaged house waiting for the assessments to be done. People are suffering living in the damaged houses without electricity and during the heat wave, it is particularly demanding. During the visit, some families were still living in the cyclone shelters (e.g., as witnessed in a local school visited on the highway to Puri). With monsoon arriving soon, there is an urgent need for repairing of the houses as the rains will cause further damage and hamper the reconstruction process.
- Delays in action were also attributed to post-election time: The cyclone, coming soon after the elections, seemed to have had a significant impact on the post-disaster recovery process. While the Election Commission of India's model code of conduct was completely lifted in the 11 coastal districts of the state, the action was limited to evacuation, initial relief distribution process, and restoration of critical infrastructure. There was no clarity on damage assessments, announcements on compensation, and recovery packages even



three weeks after the disaster as the election results were yet to be announced at the time of the visit. This delay in action waiting for the election results could have an impact on early recovery. There is a need to make special provisions for such times during a change of government.



Image 7: Damaged house images before reconstruction (shared by the family in front of other neighbours).



Image 8: Image taken after repairs were done using a loan of INR 30,000 with the hope of repaying it with the relief money.



Image 9: Some people continue to live in broken houses exposed to the heat wave.



Image 10: Damaged thatched houses were reconstructed before their tin sheet counterparts



Image 11: Tools being used (by youth not in the image) during self-rebuilding.



Image 12: Completely damaged mud walls and thatched roof structure.



Image 13: Old man trying to remove the remains of a fallen tree, to make way for fixing the house wall in a slum in Bhubaneswar.



Image 14: Tarpaulined roofs as makeshift arrangements before the monsoon and to protect against heat.

## 2. Critical infrastructure

### 2.1 Cyclone shelters

Twenty shelters were visited as part of the field review and visual assessment and interviews with people who took shelter in these structures or were part of the Cyclone Shelter Management and Maintenance Committees (CSMMC) were carried out. The following were some of the findings from this research related to cyclone shelters and their effectiveness during evacuation:

- Space is inadequate for people and animals, having implications on health and safety issues: Although the Odisha State Disaster Management Authority (OSDMA) website claims that some of these shelters have a holding capacity of 3000 people, interviews with people who used these shelters during Fani indicated that space was only enough for 1000 people to stand. The shelters built prior to 1999 by Red Cross, were much smaller, and accommodated 50 people while the remaining stayed in their homes. Considering these shelters are used for several days by people, before, during and after the event, the capacity need is underestimated. Living in overcrowded conditions for a long time can also cause health issues and spreading of communicable diseases. The toilet facilities in these shelters were also seen to be inadequate for large numbers of men and women taking shelter, leading to open defecation and related safety hazards. Apart from people, shelters are also required for cattle and animals (Dalieda, 2019) in both rural and urban areas. The ground floors of these shelters were originally designed for this purpose, but since the entire space is already inadequate for people, this space is not used for animals. Instead, people leave their animals in the open to fend for themselves or stay back with their animals to protect them during the cyclone. Both of these approaches leave these animal rearers affected in the aftermath. Evacuation needs require to be assessed and additional space needs to be built accordingly in these shelters to address some of these issues.



Image 15: 100-person capacity cyclone shelter without ramp access.



Image 16: Some cattle rearing households stayed with their animals in their sheds during the cyclone, fearing their livelihoods getting affected despite safe return. They said the animals remained safe here but stopped giving milk for a few days because of the impact.





Image 17: People continue to live in these shelters even after three weeks as they rebuild their homes nearby.



Image 18: Open area was still being used for community kitchens as people were still sheltered here. Funds were being collected from the villagers to run the kitchen.

- There are pre-existing social and cultural barriers to access: Considering space is inadequate for all the people seeking shelter, the powerful among these communities seem to take on the role of who can and cannot access these shelters during an emergency. The research team came across groups of people who were not permitted to take shelter during evacuation because of their caste (also validated by Pattnaik, 2019 and Chari, 2019) or language (e.g., Garia village in Ersama that is primarily Bengali speaking in a largely Odiya speaking region). Although the social fabric cannot be affected in a short time period, design and planning approaches to address the needs of vulnerable communities are required to make these shelters inclusive for all.
- Infrastructure conditions are poor, and structure is in disrepair: Assessment of some cyclone shelters during preliminary visits indicated that there are issues of lack of funds and resources for maintenance of these structures. As a result, some of them had damages from leakages, crumbling structural components like concrete columns, beams, slabs, and damages to windows and doors. In some cases, saline water intrusion due to heavy winds had also further degraded the structure. In other cases, the villagers who took shelter reported to the research team that there was no water available and they had to go to the nearby village for drinking water. The overhead tanks were not maintained and were broken in many cases. Although the management of these shelters was handed over to the community-based CSMMC, and a corpus of INR 50,000 was given to the registered CSMMCs, it needs to be assessed how this fund is currently accessed and used, its sufficiency, and the ways to improve overall financial management. There is a need to improve financial management and monitoring to promote long-term upkeep and use of these structures.



Image 19: Only overhead tank is in disrepair.



Image 20: Dysfunctional toilets forced some people to use the terrace or staircase landing for defecation during the cyclone.



Image 21: Structural features like beams and columns were developing cracks over the years, and insufficiency of funds was quoted as the reason for disrepair.



Image 22: Completely damaged toilet in one of the shelters.





Image 23: Lightning conductors were damaged after the cyclone.



Image 24: Structures have not been painted since they were built 20 years ago.



Image 25: An electric generator in one of the shelters stopped functioning during the days of evacuation. The DAPs pooled resources to replace it as fast as they could.



Image 26: Access ramp covered with reconstruction material. Also, co-shared by cattle.

- The structures, despite being multipurpose, are not being used in most places for functions other than evacuation: Although these shelters are called multipurpose cyclone shelters, some CSMMCs do not permit the use of these shelters other than for evacuation purposes during emergencies because of lack of funds to manage them. This needs a detailed assessment of the commercial valuation of these shelters, including the training of CSMMC members, to be able to maximise the social and economic benefits to be derived from these shelters for the community. Better functional integration with local needs must be promoted.





Image 27: While the open space around the structures was used for everyday purposes, the CSMMCs did not permit the use of these structures on regular days due to limited resources to maintain their wear and tear.



Image 28: Even when the structure was part of a school compound, the ability of the school committees to upgrade these was limited.

- Geographical distribution is uneven and physical access to the shelter is difficult in some places: In some cases (particularly in the Chilika region), the number of cyclone shelters was fewer than what was required during the cyclone, leading to either overcrowding in the few available, or people seeking alternate shelters. It was also noted during Cyclone Titli that Patrapur block which was severely affected by the cyclone, had no available cyclone shelters. The original methodology of locating cyclone shelters needs to be retested with geographical data on vulnerable households who might need shelter during a cyclone. These should be in addition to extra shelters that must be planned in more inland regions which are otherwise excluded from the process. There were also some shelters in the Nuapada area where level differences in the ground level and plinth height (See Image 29) have made it very difficult to access. Physically disabled, senior citizens, pregnant women, or children, could have trouble accessing them during an emergency.



Image 29: Some structures were inaccessible from the road due to plinth heights and no direct passages.

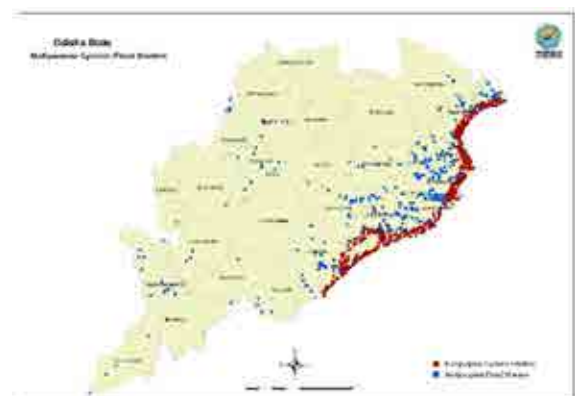


Image 30: Map showing concentration of shelters across the coastal belt of 10 km. (Source: OSDMA, 2019)

- Makeshift shelters in urban areas and ad-hoc evacuation processes: During the interactions with the affected settlements in Puri, Bhubaneswar, and Cuttack, the research team found that the families were informed of the impending cyclone, but no clear guidelines and directions were given in terms of where they could evacuate to with details of safe shelters. The families took shelter in the nearby concrete structures and depended on the relief distributed by local citizens or religious institutions while there. In cases where schools, hospitals, and other public buildings were used as shelters, their business-as-usual seemed to suffer. There is a need to build a more detailed strategy for evacuation and compensation for the vulnerable populations in urban areas.



Image 31: A large slum settlement with over 30,000 inhabitants in coastal Puri largely evacuated to neighbouring buildings such as construction sites, police stations, and an army guest house, and had to return immediately after so that the building functions could resume.

- Shelters have a deeper psychological implication: These shelters seemed to play a deeper psychological role for the neighbouring communities. Their physical presence reminded them of previous events, and in turn had implications for building the perceptions of risk for the younger generations who had not experienced those events first-hand. Some people also pointed out that they liked to call these structures “cyclone homes” and not “shelters” because the latter, to them, related more to animals and the abandoned. There seems to be a need to understand this psychological role played by these structures further, and accordingly provide a narrative that can help improve the sense of dignity and preparedness among these communities.

## 2.2 Critical public buildings

- Some government buildings (especially in Puri) were also found damaged: Apart from several schools and hospitals that were damaged, other important buildings including the official residences of the Collector and the Superintendent of Police were also completely damaged. This could impact their ability to function fully during an emergency. The electric crematorium in the funeral area was also found damaged in Puri, which would have affected the last rites of the deceased after the disaster.



Image 32: Collector's office and residence in Puri district.



Image 33: Residence of the Superintendent of Police, with completely damaged roof over the entire structure.



Image 34: Electric furnace damaged in the funeral grounds.



Image 35: Panchayat school damaged in Nuapada. Cyclone shelter is being used as a school for the time being.

## 2.3 Transportation and access

- Impact to access in affected areas can greatly affect early recovery: Although the airport in Bhubaneswar was seen largely undamaged and fully functional at the time of the visit, other forms of transportation to and from the affected areas seemed to have been affected. The recently built bus stand near Puri was also a tourist attraction for its architectural uniqueness but is now in need of immediate repairs. Roads around Nuapada and Satapauda were also seen damaged due to water intrusion from the Chilika side. Some of the railway lines were also affected because of fallen trees and electric pole damages, and people were seen stranded in these areas even after weeks.





Image 36: Damaged parts of the railway station in Puri.



Image 37: People stranded for days at the railway station due to delays and cancellations.



Image 38: Newly constructed road damaged near Nuapada. This road is the only access into the villages in this narrow belt of land between Chilika and the Bay of Bengal.



Image 39: Bus stand damaged near Puri.

## 2.4 Electricity and communication systems

- Delay in restoration of electricity perpetuates livelihood and other losses: Electricity and power distribution infrastructure is one of the most affected sectors in the cyclone. The map in Image 40 shows existing and proposed power distribution networks at the state level. Most of these networks in the cyclone path were fully damaged. At the time of the visit, electricity was still not restored in most parts of Puri city. Diesel generators were in high demand with fuel prices increasing substantially post the cyclone. Use of generators was mostly in public buildings, hospitals, hotels, manufacturing units, and a few residences which could afford the expense. For example, loss of electricity was particularly affecting fishing communities on the coast of Puri, as they needed electricity to keep their refrigerators running in order to store fish. This had an impact on when they could resume their livelihood activities.



Image 40: Odisha power infrastructure network.



Image 41: Damaged power distribution infrastructure near Puri.

### 3. Settlements

Boxes 1-4 are summaries of the transect exercises conducted across multiple settlements in the affected districts. Following are the key findings from those:

- Housing was damaged unequally within and across neighbourhoods in the same district: It is known that at a city scale, different population groups have different exposures based on their location. Based on the transect walks it was observed that not only was there differential exposure and vulnerability within population groups at a city scale, it was also true at a settlement scale as well. Some of the inhabitants (often new residents) of the settlements had relatively weaker structures and had settled in the riskier parts. Therefore, they faced greater damages, further increasing their vulnerability and possibly impacting their ability to recover. It becomes evident through them that the housing damage was not equal across all affected neighbourhoods and may perpetuate pre-existing poverty and other vulnerabilities.
- Aggregation of damage assessments and analysis can have implications in terms of understanding local level needs: As noted earlier in Section 1.2 in the report, relief was announced by area (districts). Given the observation of varied impact of the cyclone and differential vulnerability within settlements, such an area-based approach may not be adequate to help households recover. While it is understandable that such an approach is faster to provide immediate relief, a settlement level survey at a later stage would possibly be more effective. During the transect, it was also noted that no government or any other formal survey for individual households had been conducted yet.
- Decision making of repair and reconstruction is done at household level depending on needs and access to resources: In conversations with residents, it was found that they were apprehensive about whether they would be denied further relief if they had already begun repair work. In most settlements visited, a few of the residents had begun repair



work to varying degrees using a combination of state provided relief money and their own finances. Conversations with residents of settlements visited revealed that relief was distributed to the entire settlement and not individually. They expressed their preference for receiving relief individually preferably after a damage assessment so that they could receive what was deemed the right amount of relief. This could have stemmed from the fact that within each settlement, different households incurred varied degree of damages due to the cyclone, but the same amount of relief was distributed to all residents.

- Lack of cyclone shelter awareness in urban areas: As mentioned earlier in the report, it was reported that although extensive early warnings and evacuation notices were given to all residents of the arriving cyclones in Bhubaneswar and Puri, not much information was given on where they could evacuate to within the city. They were not informed on the availability of services at the official designated shelters in urban areas (schools and public buildings) which may have impacted the residents' motivation to leave their homes. People evacuated to adjacent buildings in their settlements that seemed relatively stronger, and where "good neighbourliness" was practiced.

**Box 1: Satyakali Basti, Bhubaneswar**

The following observations were made during a transect walk in Satyakali Basti in Bhubaneswar city. The settlement is located perpendicular to a canal with the terrain sloping towards it.

As demarcated in the transect Map 19, section A of the settlement which was situated at a relatively higher ground had housing units made of brick walls with asbestos roof. These units saw relatively less damage save a couple of houses where branches from trees fell through the roof. A few others faced damages to the roof structures due to high wind speeds. Repair work was in progress during the time of the visit.

In section B of the settlement also, the housing units were made of brick walls with asbestos roof. Almost all the housing units faced major damage to the roof and also incurred damages to walls, windows, and doors. In a few cases, water retention from the rain was seen to have damaged the walls.

Section C, which was closest to the canal, was the most affected in the settlement with major damages to roof and wall structures. The housing units in this part of the settlement were a mix of brick houses with asbestos roof, mud houses with tarpaulin roofs (possible thatch previously), and wooden frame houses with asbestos roof. The units were further damaged due to tree branches and water retention from the rain.



Map 19: Satyakali Basti settlement map in Bhubaneshwar with transect route.



Image 42: Damaged houses in Satyakali Basti with inhabitants building temporary shelters in the aftermath.



Image 43: Houses damaged due to wind speeds and water retention. Inhabitants have left their assets outside the housing unit to dry.

### Box 2: Shahidnagar slum, Bhubaneswar

This settlement was located adjacent to a railway track, expanding linearly. Housing units were a mix of brick walls with asbestos roof and thatch roof. Almost all the units incurred damages to their roofs to a varying degree, and damage to walls was observed in some units. Damages due to trees, branches, and collapsing of adjacent structures was also prominent here. PGs and hostels were observed around the slum, who reportedly offered shelter to the settlement residents (they are employed as domestic help within these units). During the visit, repair work had just begun among structures that incurred only roof damages. In the case of structures that incurred larger damages (damaged walls, entire structure collapse) no repair work had begun, and it was noted that the residents were awaiting further relief from the state. The inhabitants were being accommodated in the housing units that were still standing and in the neighbouring concrete structures.

Within this settlement, a small gated community (of sorts) was observed with housing units made of walls approximately 10 inches thick with steel framed roofs. No damages were observed in this cluster. A closer inspection and communication with the residents were not possible during the visit as they were unavailable.



Map 20: Shahidnagar slum map in Bhubaneswar with transect route.



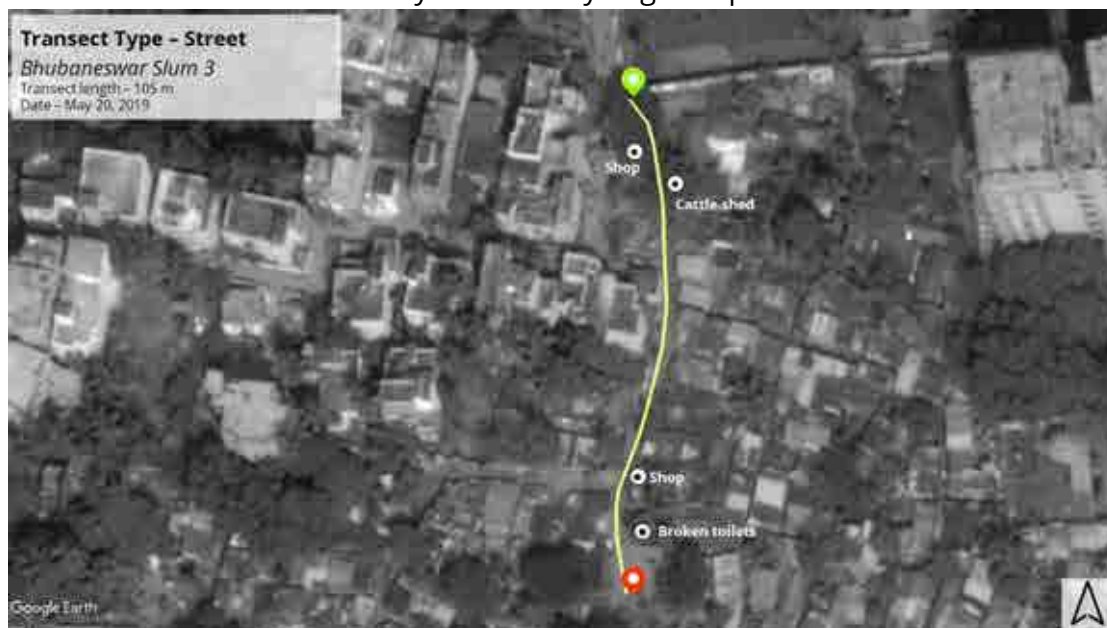
Image 44: Houses along the railway line with damaged roofs due to falling debris and high wind speeds.



Image 45: Houses with damaged walls and collapsed roofs. Inhabitants were residing in one part of the house.

### Box 3: Bayababa Basti, Bhubaneswar

As in the case of Satya Kali Basti, this settlement was also located along a sloping terrain. Housing units consisted of brick or cement block walls with asbestos roof and mud-walled houses with thatch roofs. Almost all housing units in the settlement incurred damages to roof structures due to high wind speeds, and in some cases, walls were also damaged. Within the inner streets and towards the lower end of the settlement which was located at a lower elevation, damage to walls due to water retention (due to both rain and sewage water) was observed. Almost all households had already begun repair work using a combination of relief money provided from the state and their own finances. A few of the thatched roofs survived as they were secured before the cyclone in response to the early warnings issued in the settlements. It was noted that during the cyclone, they took shelter at nearby schools. They were provided food and water in the shelter. They had spent approximately two days at the shelter and then returned to their homes to begin repair work. During the visit, no survey of damages was done by any state agency. The residents expressed apprehension if they would be denied further relief as they had already begun repair work.



Map 21: Bayababa Basti settlement map in Bhubaneswar with transect route.





Image 46: View of the settlement where roof overhangs have been held using sandbags and stones temporarily.

#### **Box 4: Penthakata - Fishing community, Puri**

The fishing community was located within metres of the coast and experienced major damages due to the cyclone. Almost all the houses had collapsed roofs, damages to walls, and in some cases, total building failure was also seen. During the cyclone, wind speeds and flying debris seemed to have caused maximum damage. Although they were issued early warnings, the residents reported underestimating the severity of the disaster. As a result, most people stayed back at home and were physically injured as well. A cyclone shelter cum community centre was present in the settlement but it was in very poor condition and the fisher folk reportedly remained at home. Those who stayed at the shelter also did not prefer to stay for more than the duration of the cyclone.

Although they were primarily fisher folk, they did not venture back into the sea to resume fishing activities soon after the cyclone. It was noted that due to electricity not being restored, and diesel generators being expensive, they could not store their fish. This was the primary reason for not resuming fishing activities. There is an urgent need to restore electricity within the settlement.

Further, it was noted that the entire settlement consisted of migrants from coastal Andhra districts and were primarily Telugu speaking. They noted that there was no media coverage



given to their plight. Despite being severely affected, they received the same amount of relief as the rest of the city. In the immediate aftermath, a few civil society groups distributed tarpaulins to cover their houses. However, the ensuing heat wave after the cyclone, made it very difficult to remain within the houses.



Map 22: Transect map of fishing village in Puri.



Image 47: View of the settlement two weeks after the cyclone, where damaged roofs are replaced with tarpaulin sheets which were provided as immediate relief.



Image 48: View of the fishing village immediately after the cyclone, where large scale damages to roofs, boats, and building structures can be seen.

Source: India Today Magazine, May 2019

## 4. Economic development and systematic dependencies

### 4.1 Livelihoods

- Direct impact anticipated to food security, and livelihoods of people dependent on horticulture and agriculture as plantations are now lost: Although there were no storm surge related damages during Fani, unlike those experienced during 1999 Super Cyclone,

high-speed winds damaged a lot of green cover, some of which affected people's livelihoods directly. Cashew trees, in particular, provided an alternate source of income to many households in the region. Some villages, especially those near Chilika Lake where there was limited arable land available for agriculture, were either dependent on lake fishing, or coconut and cashew harvests for their livelihoods. People said they would get somewhere between INR 25–50,000 per household with one cashew harvest (once a year), but with the trees now damaged, this source of income is practically lost at least for 10 years till the new plants regrow enough to bear fruit. According to the villagers based on their past experiences with cyclones, the coconut trees that seemed to still stand would also fall after a few weeks. With these livelihood options gone, many villagers (especially the dalits who do not fish) mentioned daily-wage construction labour or migration as their only alternatives for livelihood.

This region is also known for its Kewra production and exports. A flower that grows on a large bush is harvested, extracts from which are distilled in local distilleries using traditional methods to produce fragrances and food additives. Households involved with Kewra farming and distillation will also get affected, apart from the overall impact on the economic output of the region, since the bushes (although mostly in common or forest lands) are damaged in the cyclone. Meanwhile, these impacts are going to have immediate and long-term implications on the dependent families and the local and regional economy; yet there's been no relief package planned for the horticulture industry. However, the Chief Minister's Livelihood Support package announced by the GoO has enlisted Kewra, coconut, betel vines, and cashew as perennial crops. Thus, small and marginal cultivators who have suffered a loss of 33 per cent and above are eligible for an input subsidy at the rate of INR 18,000 per hectare (OSDMA, 2019).

- Fishing activity is affected for both seafaring as well as those who do subsistence fishing in the Chilika Lake: While talking to people, it became evident that while the big fishing villages had suffered damages to their boats and nets, there were some forms of immediate relief being received by them from NGOs, and a government announcement of compensation packages. The targeting was done through marine cards. But the small fishers living around Chilika Lake shared their trauma of not having gone to work for three weeks (by the time the team visited and spoke to them). They did not know what action they could take next other than migrate to look for alternate sources of income. Under the Chief Minister's Livelihood Support package, marine and inland fisher folk whose boats and nets were fully or partially damaged were eligible for financial assistance. Marine and Chilika fisher folk were eligible for assistance at 50 per cent of INR 80,000 for new boats and at 50 per cent of INR 20,000 for new nets. Similarly, those engaged in inland fishing in other parts of the state were eligible for assistance at 50 per cent of INR 30,000 for new boats and at 50 per cent of INR 20,000 for new nets. [Note: A marine card is issued to seafaring fishers. This is primarily used to compensate the loss of livelihood during the Olive Ridley nesting season when fishing activities are banned. The other card is Matsya Credit Card. Under this scheme, an input subsidy is provided for

raising fish fingerlings in ponds.] However, the reach of these schemes is not clear given the fact that despite these packages that they are eligible for, fisherfolk from many villages are migrating either to larger fishing areas (such as Mumbai and Udupi region) or diversifying into other livelihood options – such as construction and masonry work in cities.

- No formal options (in urban areas) for people to secure their animals during the cyclone: As mentioned previously in the report, animal rearing households found it a difficult choice to leave their cattle out during the storm. Some decided to stay back with their cattle (their only source of livelihood) and suffered the impact of the cyclone themselves. Others who decided to let their cattle go free, found only a few after the cyclone. There is a need to plan emergency shelters for animals as well.

#### **4.2 Formal and informal tourism**

Boxes 5 and 6 are summaries of transect exercises conducted across commercial areas of Puri. They provide some insights related to the long-term implications of the damages suffered by the tourism industry, a primary source of income in the region. Other sources of livelihoods, such as the Dolphin Centre and Biodiversity Park illustrated in Box 7, have also been affected. The larger region's recovery depends on the recovery of Puri region's formal and informal economic and physical system.

- Informal workers and small-scale enterprises affected by the system stresses leading to price hike and reduction in demand: There were many types of vendors on the street, although it is known from previous visits of the researchers that the number of vendors was lesser than before. Conversations revealed that the prices went up to more than double for 4-5 days before returning to pre-cyclone rates in the wholesale market from where they were sourcing their material. They are anticipating fewer tourists until the hotels are restored, since most were affected because they were along the beach. Particular commodities noted below had a large impact.
  - Betel leaves and supari: The price of betel leaves went up from a day before the cyclone and were still costing more than usual.
  - Cashews: They may be able to sell scavenged cashews from the fallen trees for another month. But after that, for several months/years, they may not be able to get any cashews and might have to consider other livelihoods.
  - Vegetables: Costs in the wholesale market were double for almost all daily vegetables, such as onions and potatoes, for a week, but started returning to normal after three weeks.
  - Flowers: Fewer people were buying due to a fall in tourism. Also, the locals who could afford to buy flowers worth INR 50 earlier, are only able to buy for INR 20. The flowers used to come from Puri earlier but were being transported from Kolkata and Bengaluru post the cyclone, driving costs up.
  - Lemon soda and lassi: No significant change felt.

- Curios: The raw material would come in from Kolkata and locals would make them into curios. That supply might get affected. Stored goods were also lost during the winds since they could not have been stored elsewhere.
- Physical damage to hotels just before the tourist season will have implications to the overall economy: In a few weeks following the cyclone, the city was expecting to host the famous Rath Yatra, which annually attracts many tourists from across India and other countries. While the making of the Rath itself had started already (using wood from fallen trees), most hotels lining Beach Road in Puri are badly damaged and may not be ready in time to host visitors. There may be a price escalation due to fewer options of hotels, which may affect the number of tourists who are able to attend the Yatra.

### Box 5: Temple Street, Puri

The following observations were made during a large transect walk of about 1.6 km across Temple Street. Temple Street consisted largely of a mix of commercial and residential buildings with billboards and signages across all buildings. These signages were all damaged and a few billboards mounted on top of buildings toppled over onto adjacent buildings damaging their roof structures. Large scale damages were observed across all building facades, primarily to doors, windows, and overhangs (which were made of asbestos). In a few cases, steel framed roofs and concrete buildings were also observed to be damaged with rubble damaging the adjacent structures as well. Reconstruction work had already begun using a combination of self-sponsorship and state-provided relief.



Map 23: Transect route map of Temple Street, Puri.





Image 49: Buildings on Temple Street where billboards had fallen on adjacent structures.



Image 50: Damage to buildings on Temple Street where falling and flying debris of facade elements, signages, and billboards had damaged structures.

#### **Box 6: Beach Road, Puri**

Beach Road primarily consists of hotels, resorts, and a few residential houses that were all majorly damaged during the cyclone. Hotels and resorts, although made of concrete and brick structures had glass facades which were shattered during the cyclone. Beach Road witnessed sand and silt ingress and a major loss of tree cover. At the time of the cyclone, early warnings were issued by the police along Beach Road and all the hotels were closed. However, in some of the hotels, the staff stayed behind with an adequate supply of food and water to cater to their needs.

It was noted that although early warning and evacuation notices were given by the police, they were not informed on where they could evacuate to. Further, during the visit (two weeks after), the hotels had just begun repair work and sand and silt were being removed. Electricity was not yet restored in the city and diesel generators were being used in the interim. However, the cost of the generators had increased substantially and had become unaffordable in most places. In the hotels, some of the staff who stayed back were migrants from neighbouring states.



Map 24: Transect routes map of Puri Beach Road.



Image 51: Hotel buildings with glass facades were damaged during the cyclone.



Image 52: Sand ingress onto Beach Road and buildings post the cyclone.



Image 53: Beach Road on 3 May 2019 (day of the cyclone) where sand ingress, loss of tree cover, and damage to buildings can be seen.

Source: Shared by a local resident

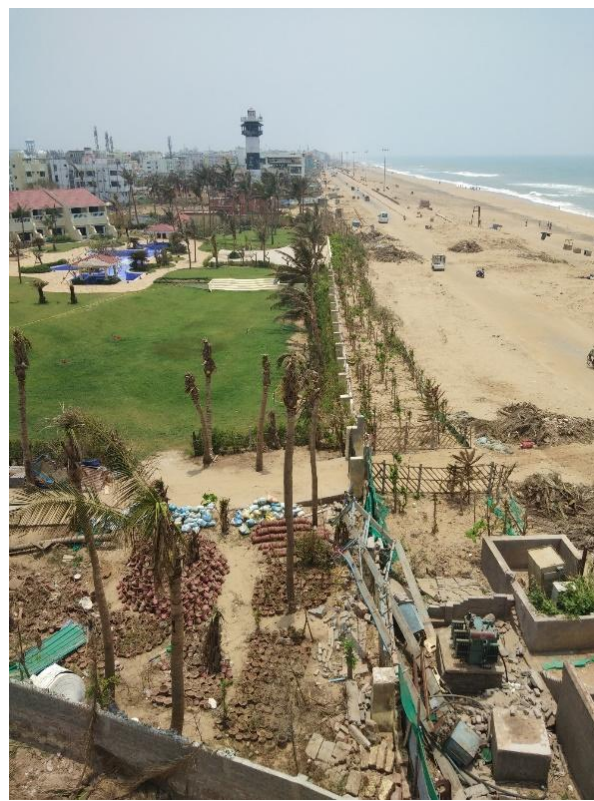


Image 54: Beach Road on 21 May 2019 where sand ingress can be seen. It is also noted that recovery activities had only begun despite being two weeks after the cyclone

### Box 7: Dolphin Centre and Biodiversity Park

This was a government run tourist centre with gardens, a museum, and a boating facility. We spoke to a guide at the ticket counter for the motorboat. They had 160 boats but only 10 remain now. Rest were damaged or taken away into the sea. Boats are owned by individuals, and they cannot afford to repair since there is no income. Government had given them life jackets to keep on the boats but those are also gone now. They have not received any help yet. Their office space was damaged. As we spoke, there were some fishers who were sitting nearby and fixing their damaged nets.

According to him, in the four winter months, they are able to rent out about 120 boats per day. On a regular day in this time of the year, they are able to rent 50-60 motorboats per day, when people come to watch dolphins in the sea. But since Fani, in three weeks they have been able to rent out no more than 20 boats. That too not legally because they are still not allowed to. He said they needed a government license every year to run motorboats, for which they have to pay INR 26,000. Since Fani, this license is not being renewed. Without a government license, insurance also cannot be renewed, and their damages will not get covered. Insurance company is denying to pay and there seems to be no recourse.

Usually, the rent for one boat is INR 1700 for 2–2.5 hours for 1 family of maximum 6 persons. It is not on sharing basis. Boat and engine cost about 2–2.5 lakhs. Once filled, diesel lasts for about 2.5 hours. Diesel cost per trip is INR 600. Government takes INR 500 as tax per ride.

PJ has been working here as a guide for the last two years; he also runs a boat. However, when we went to talk to him, he was filling out job applications. As a guide he earns INR 250 per day (9 am to 3 pm). Alongside, he is able to fish and run a boat. He has a contract with the association.

Very few tourists have come this season, and now all depends on when Puri will get fixed and people coming to Puri will then come to this Dolphin Centre.



Image 55: Boating centre near Dolphin Centre.



Image 56: Boating activities in Satpada

#### 4.3 Economic infrastructure and prices of goods and services

- Critical infrastructure required for certain livelihoods is damaged and will have second order implications on the region's economy: Several government owned as well as private cashew processing units and godowns for rice were completely damaged affecting the local food security as well as economic output. These directly affect the people working in these units but also all those who are part of the supply chain linked with them. Their recovery will be key to avoiding long-term implications to all those dependent livelihoods.





Image 57: Damaged government cashew factory.



Image 58: Private cashew factory.



Image 59: Food grain godown damaged.



Image 60: Damaged rice factory.

- Local markets are damaged, increasing dependence on neighbouring areas and states: As noted above, local supply chains for raw materials were damaged, and price hike was experienced for a few days. This was soon supplanted by supply from neighbouring states such as West Bengal, Andhra Pradesh, and Bihar. While the price hike may have temporarily subsided, the impact on the supply sources may remain long term. For example, some villagers in Jagatsinghpur pointed out that they used to do Kewra farming until the 1999 Super Cyclone. But afterwards, even after their plants revived, the demand for their Kewra was very less and eventually people left Kewra farming altogether.
- Prices of goods and services had escalated, worsening choices of recovery for the poor and the vulnerable: Prices of fuel, raw materials, food items, and reconstruction material are expected to rise during such times of emergency. But due to these, there are second order challenges also being faced such as with water and heat. For example, electricity is needed by many, especially in urban areas, to pump water into their tanks. Since electricity has been taking time to resume, people have resorted to the use of diesel-run generators. There are only a few generators in the city, and the fuel cost is already high. Both of these lead to extremely high price escalation and pricing out the poor among the

urban residents. Not having access to water (or proper construction material) is also likely to lead into worse heat wave impact on these people now and in the coming months.

- Banking and insurance systems are not helping as much as they should in recovery: As the case of the motorboats illustrated in Box 7 highlights, insurance mechanisms are currently not helping as much in recovery. In a similar vein, some cases (Giridhari Mishra vs. State of Orissa, 2012; and New India Assurance Co. Ltd. vs. Bhagaban Behera and Ors., 1993) were filed in the past with respect to insurance grievances. In the first case, farmers who grew paddy under the National Agricultural Insurance Scheme, suffered loss due to drought and were denied insurance money as the insurance was on an area-based approach (wherein a group of villages were designated under a block). The petitioners' block was not identified as a drought-affected area despite a few of them suffering loss in yield and crop damage. In the second example, a case was made against the insurance company for wrongly identifying the fishing trawler to have suffered partial damage when it actually suffered total damage and denying the petitioner his insurance money). It was noted in Odisha during previous studies that during the cyclone people still relied on friends and local money lenders rather than bank accounts even though most of them had zero balance accounts.

## **5. Social concerns**

### **5.1 Education**

- Schools used as cyclone shelters are left in poor condition and will need to stay closed for a while impacting school schedules: The schools were either damaged due to the winds, were used as shelters during and after the cyclone by the neighbouring residents, or were put to use by the government as relief distribution centres. In all of these instances, the school's original functionality was affected, and the students potentially stand to lose valuable time in their education year.
- Books lost during cyclone and rains and time lost during recovery: Many of the people we spoke to in the affected areas showed their children's damaged books and were worried how they would recover over the year. Some young adults were currently busy rebuilding their broken homes and helping their parents in recovery. They were planning to appear for entrance examinations conducted across the state/country and were worried they would potentially get worse results owing to this loss of time and material.

**Box 8: School used as a shelter during and after the cyclone**

The team visited a school that looked badly damaged after the cyclone. Although parts of it were damaged, two structures with a concrete roof were offering shelter to over 90 affected people. It continues to be used as a shelter as people rebuild their damaged homes. Looking at the state of the building, it is difficult to say when it could return to full functionality. It is a common school for all the villages in the Panchayat.



Image 61: School roof damaged. Still being used as a shelter for those rebuilding their damaged houses.



Image 62: School assets also damaged.

**Box 9: Puri district school being used as post-cyclone restoration centre**

This school was not used as a cyclone shelter, rather a post-cyclone restoration centre. Food was being prepared in large quantities and there were water tankers lined up outside. Distribution officers on site informed us that earlier food was cooked here for 44,000 people twice a day. It slowly went down to 25,000 by 14 May 2019, and now 5,000 people were present on the day of the visit. This would go on for another 3-4 days. The numbers are determined by surveys done of the affected bastis across the municipality.

Sharing of responsibilities: Numbers, locations, and distribution is led by the GoO, in coordination with the Collectorate and the Municipal Corporation. Production of food is being done by private companies like Dalmia who are contributing for the resources on their own. The contractors engaged in cooking activities are pre-identified by the government, but procured, contracted, and paid directly by private companies. The food quality is monitored by government food inspectors after each meal is prepared and before it is distributed. The private sector companies are also ensuring cleanliness, and water supply for cooking.

While this multi-functional use of a centrally located space works at this time of the year (when schools are off for summers), it may not be recommended during other times of the year without affecting the school teaching schedules for over a month.



Image 63: Food being cooked at the restoration centre.

## 5.2 Caste, language, and political alliances

- Minorities face access challenges during evacuation and access to relief: Some Bengali-speaking communities indicated they were not given access to cyclone shelters as those were controlled by Odiya speakers. Some other reports indicated similar experiences by people of lower castes, and it seemed that normalcy was yet to prevail in the lives of socially excluded sections, especially Dalits<sup>2</sup>.
- National election results may skew the GoO's response to opposition districts: As national election results came out around this time, it was evident that some districts had voted for parties other than the one that is represented at the state. NGOs conducting relief exercises remained cognizant of this and gave special attention to these districts to ensure they were not excluded from disaster relief.

## 6. Forest and biodiversity

### 6.1 Green cover loss

- Tree cover loss will make the heat wave implications during the coming summers worse: Using the Normalised Difference Vegetation Index (NDVI) analysis, the loss of tree cover was visualised comparing pre- and post- cyclone satellite imagery. Most of the tree cover in Bhubaneshwar city was damaged and this had severe impact in the heat wave that followed within a few days of the cyclone. Land surface temperature was used as an

<sup>2</sup> <https://www.thehindu.com/news/national/other-states/dalits-stranded-in-puri-community-shelters-a-month-after-cyclone-fani/article27406811.ece> (accessed on 10 June 2019)



indicator for mapping the heat wave impact pre- and post- cyclone. There was nearly a 5 degree rise in temperature in the areas where there was loss of tree cover.

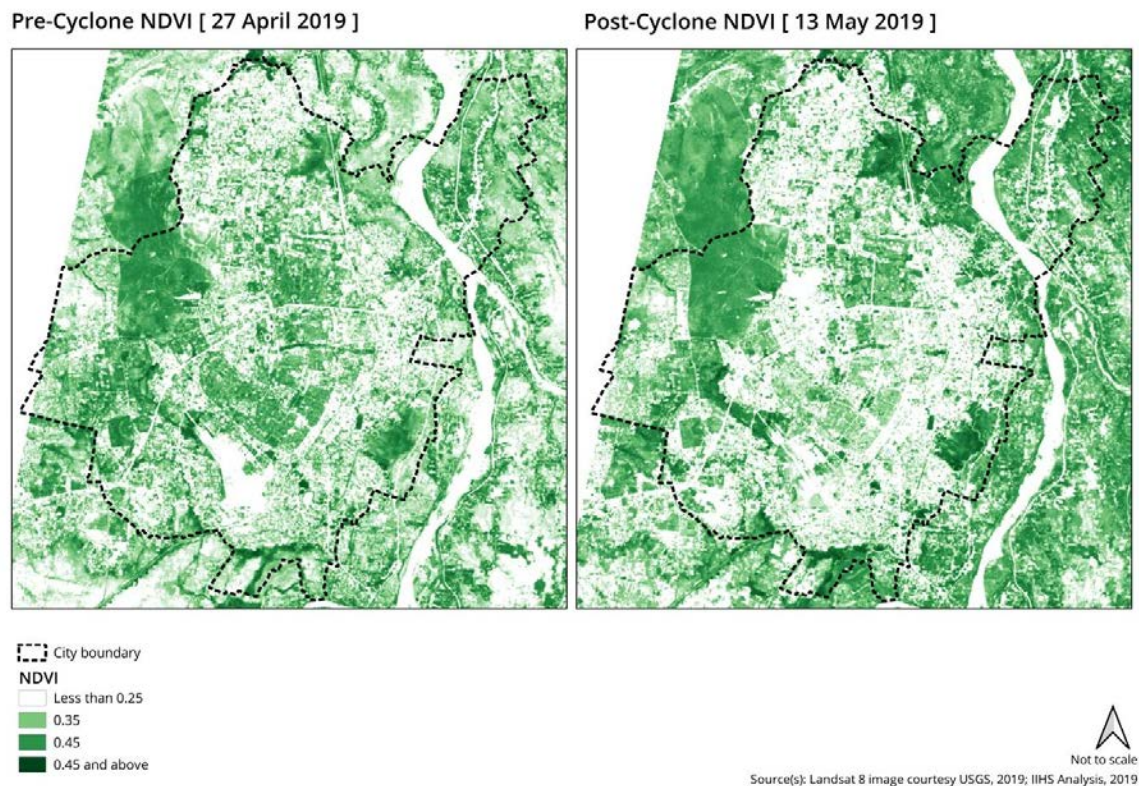
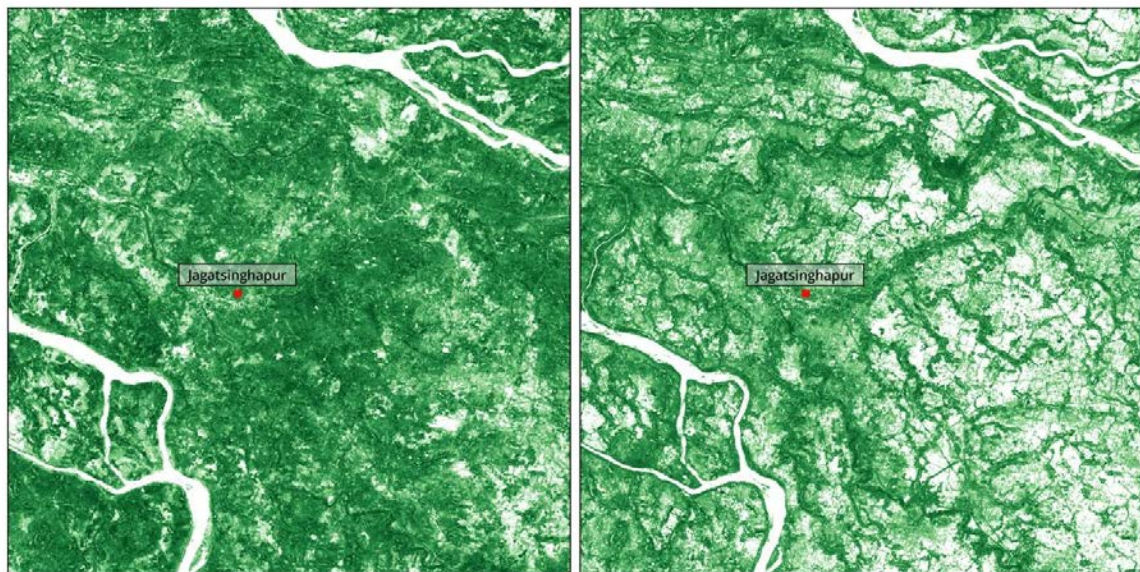


Image 64: Pre- and post- cyclone NDVI analysis for Bhubaneswar region.

Pre-Cyclone NDVI [ 26 March 2019 ]

Post-Cyclone NDVI [ 29 May 2019 ]



**Legend**

**NDVI**

- Less than 0.25
- 0.35
- 0.45
- 0.45 and above



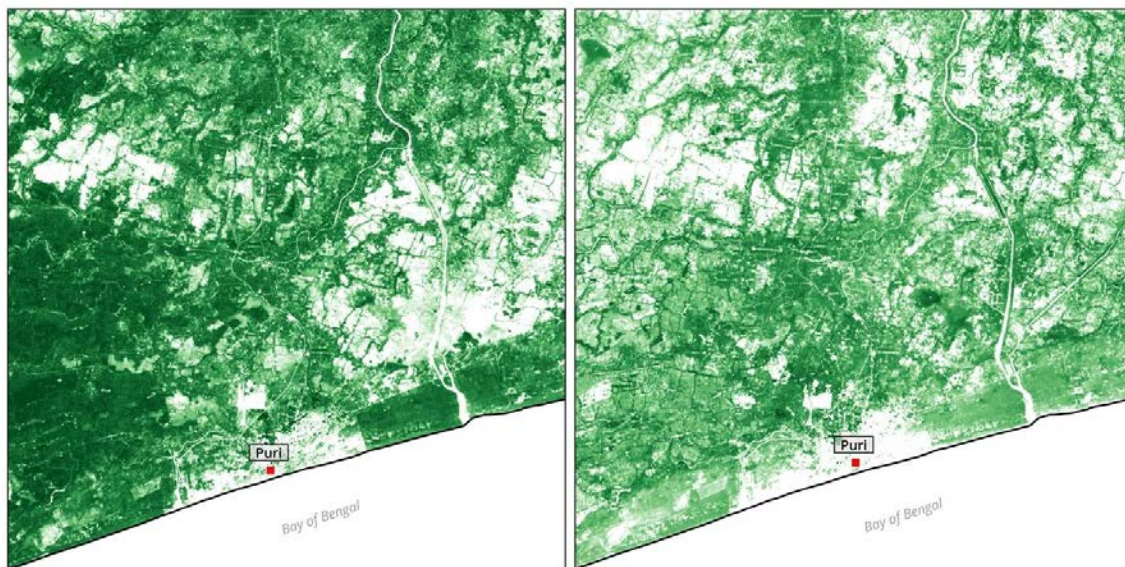
Not to scale

Source(s): Landsat 8 image courtesy USGS, 2019; IIHS Analysis, 2019

Image 65: Pre- and post- cyclone NDVI analysis for Jagatsinghpur region.

Pre-Cyclone NDVI [ 26 March 2019 ]

Post-Cyclone NDVI [ 29 May 2019 ]



**Legend**

**NDVI**

- Less than 0.25
- 0.35
- 0.45
- 0.45 and above



Not to scale

Source(s): Landsat 8 image courtesy USGS, 2019; IIHS Analysis, 2019

Image 66: Pre- and post- cyclone NDVI analysis for Puri region.



## 6.2 Heat Wave

- Heat wave implications are expected to be much worse this year than the past years: Odisha has been extremely proactive in the past reducing both mortality and morbidity outcomes during summer months. However, this year, with the cyclone affecting the normal course of state activities, green cover loss, lack of access to water, and damaged shelters, severe heat wave implications are likely to result, especially for the poorest.

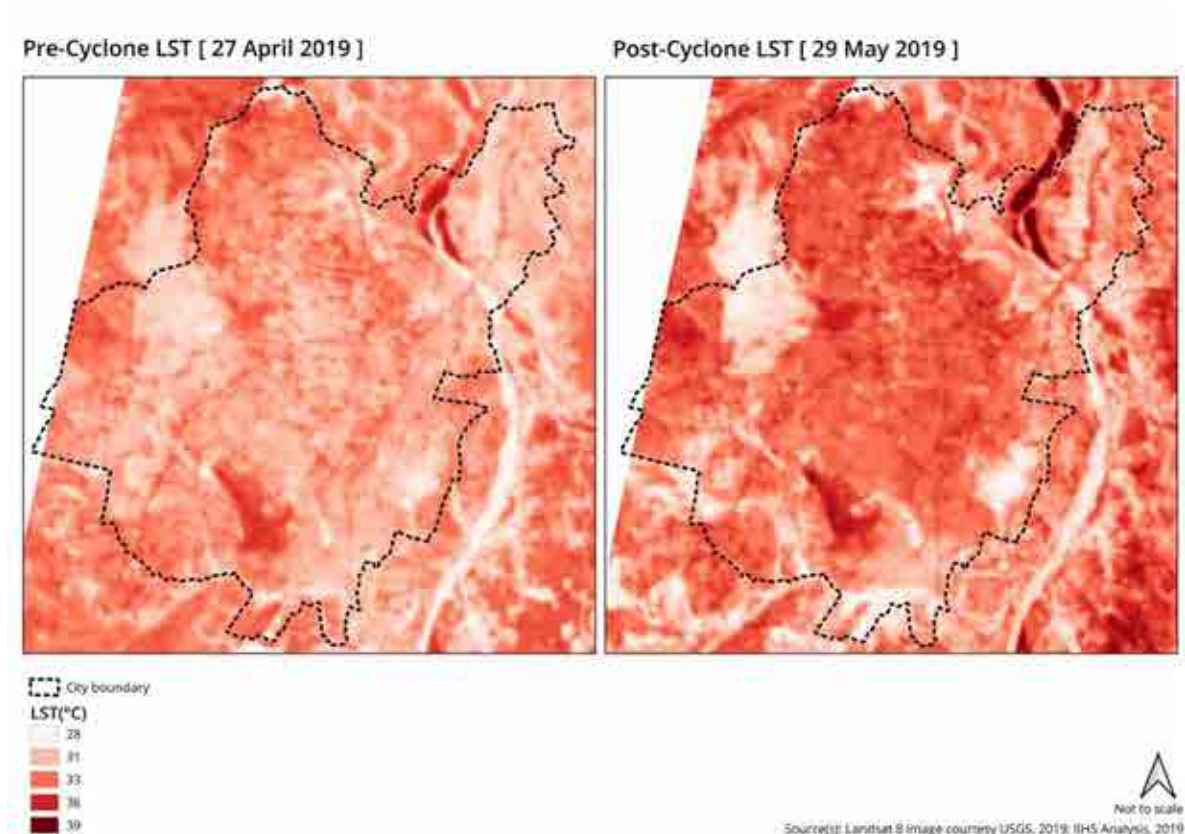


Image 67: Pre- and post- cyclone land surface temperature analysis for Jagatsinghpur region.

## 6.3 Olive Ridley turtles

- The already near-extinction species may get affected as the nesting areas are impacted: Impact of the cyclone could adversely affect the beaches resulting in the erosion of mass nesting areas of the Olive Ridley turtles. A study by Behera et al (2014) attributes the failure of mass nesting in 2013–2014 at the Ganjam coast to erosion of sandy beaches as a result of cyclone Phailin. Furthermore, several ecologists and officials have pointed out that during the annual nesting season this year less than 3,000 nests were laid in Ganjam as opposed to earlier numbers of 5 lakh<sup>3</sup>. Nevertheless, there is need for further research to understand the impact of cyclones on Olive Ridley turtles.

<sup>3</sup> <https://www.news18.com/news/india/did-olive-ridley-turtles-sense-cyclone-fani-was-coming-nesting-at-odisha-beach-was-less-than-1-this-year-2126975.html> (accessed on 10 June 2019)

## D. Important Considerations for Long-term Recovery Planning

This section outlines some broader reflections on the implications for long-term recovery planning, based on the observations shared in the previous section.

### 1. Outcomes disparate by geography

While rural areas seemed to be better prepared to evacuate, they may be worse off in their abilities to recover due to severe shelter and livelihood losses. On the other hand, urban dwellers suffered a lot more during the storm, with not many choices for safe places to evacuate to. Their livelihoods, however, are relatively less impacted as their dependence on natural resources is much less, and urban areas and systems come back to normalcy faster. In a similar vein, coastal areas are largely more affected, but also receive better response because of their “most affected” status. Meanwhile, the affected people in the somewhat lesser affected areas do not get as much attention during relief and recovery. Odisha’s coast being largely plains has recovery programmes (including housing designs) suited for the plains. The state is much less prepared to respond to the needs of hilly areas which are also home to tribal communities. An example of this is Patrapur, which experienced serious landslides during Cyclone Titli. Chilika region, in particular, surrounded by water on two sides, has poor access and often experiences neglect at the hands of various humanitarian actors. These spatial inequalities during and after such large events can perpetuate themselves over time into deep-seated developmental outcomes for the different regions within the state.

### 2. Deepening of social inequities

Similar to geographic disparities, it is also clear that the ones who are already poor are also affected more and have fewer resources to recover. Minorities on the lines of caste, class, language, gender, and political affiliations are also seen as being relatively more affected. Tribal groups, in particular, are less prepared, much less connected to the humanitarian systems of relief delivery, and more dependent on natural resources, and are also among those who are highly affected during such extreme events. Without special focus being given to such groups of people over a longer period of time, their recovery can become onerous and can push them into perpetual poverty.

### 3. Damaging the dignity of people

Events such as these can be deeply damaging to the dignity of people; something that can push them down the social hierarchy and worsen their outcomes in existing power struggles. People see themselves as being “treated like beggars”. Some others note that they are “made dependent on aid and giving, as against food for work/money for work approaches used before”. Statements like these are also telling: “we do not like to call these [cyclone] shelters. Shelters are for animals. We call these ‘*batya ghar*’ [in Odiya meaning cyclone homes]”. While some simple approaches could help mitigate this, a conscious effort needs to be taken by all humanitarian actors to ensure that people’s dignity and agency is the focus of all relief and recovery work.



#### **4. Reduced economic diversity and increased inequality**

With natural resources getting affected, and critical economic infrastructure being impacted severely, supply chains break and dependencies on them shift—in the short- and long- term. At the same time, the state supports the most dominant forms of livelihoods (e.g., fishing and agriculture), giving those practices more impetus. All these reduce the economic diversity of the affected region and push the dependent people to work for the few who escaped the direct impact. These could lead to not only the narrowing of the economic diversity base but also put more economic power in the hands of a few. It is, therefore, imperative for the state to look into smaller but multiple forms of livelihoods practiced, and support their recovery starting at the early stages as well as in the long term.

#### **5. Changes in demography due to migration**

With economic options affected and reduced, people are pushed to migrate in search of work. Odisha is already among the states with the highest numbers of out-migrants. With livelihood recovery on the back burner, this phenomenon will only increase, pushing especially the youth to migrate in search of more stable livelihood opportunities elsewhere. Despite the poor life conditions experienced in other places (especially by the rural migrants in urban areas), people make the choice to stay away from their families. This, in the long term could also have serious implications for the demographic structure of the affected regions and the state at large.

#### **6. Environmental and health implications**

Natural resources such as mangroves, and biodiversity such as Olive Ridley turtles affected by such events can have implications not just for the region but the larger ecosystem. These need to be studied in greater detail, and focus actions need to be taken to inspire community-led initiatives to protect and promote these species for an overall healthy living environment.

#### **7. A note on self-stated needs for long-term recovery**

After disasters, there is an urgency felt to arrive at an actionable strategy to help people and regions recover fast. The experts conducting these assessments often forgot that the best people to know about recovery needs are the affected people themselves. It is a must, therefore, to ensure that affected people are consulted immediately and consistently for a long period so that their changing needs are met and they are supported to move forward on the road to long-term recovery.



## Annexures

### Annexure 1: Details of government relief packages

**Table 2: Relief package announced on 6 May 2019**

District	Date	Relief announced
Collectors to identify extremely, severely and moderately affected blocks in each district.		
Extremely affected parts of - Puri - Khordha	06-05-2019	for all families covered under food security - INR 2000 - 50 kg rice - Polythene
Severely affected parts of - Khordha		for all families covered under food security - INR 1000 - Additional one-month quota of rice - Polythene
Moderately affected parts of - Cuttack - Kendrapara - Jagatsinghpur		- INR 500 - Additional one-month quota of rice - Polythene *no mention whether it is provided to all affected families or those covered under food security
All affected districts - Puri - Khordha - Cuttack - Kendrapara - Jagatsinghpur		- One-month additional pension  House building assistance - INR 95,100 for fully damaged structures - INR 5,200 for partially damaged - INR 3,200 for minor damage Other - Compensation for agricultural and horticulture crop loss, animal, and fisheries loss will be compensated

**Source:** OSDMA website, 2019.

**Table 3: Subsequent modifications to relief package and beneficiary identification**

District	Date	Relief announced
Khordha District except Bhubaneswar Municipal Corporation area	08-05-2019	for all families covered under food security card holders <ul style="list-style-type: none"> <li>- INR 2000</li> <li>- 50 kg rice</li> <li>- Polythene</li> </ul>
	10-05-2019	- INR 500 may be provided in lieu of polythene in case polythene is not available
	11-05-2019	for non-card holders <ul style="list-style-type: none"> <li>- 50 kg rice</li> </ul>
Bhubaneswar Municipal Corporation	10-05-2019	based on requests made from slum residents in BMC, extending relief <b>for all deserving families</b> living in various slums who do not possess card under NFSA/SFSS <ul style="list-style-type: none"> <li>- INR 2000</li> <li>- 50 kg rice</li> <li>- Polythene or INR 500 in case polythene is not available</li> </ul>
Puri	10-05-2019	for all families <ul style="list-style-type: none"> <li>- 50 kg rice</li> <li>- INR 1000 in lieu polythene in case polythene is not available</li> </ul>
	11- 05 -2019	for all families <ul style="list-style-type: none"> <li>- INR 2000</li> </ul>
	18-05-2019	for all families <ul style="list-style-type: none"> <li>- Additional relief of INR 1000</li> </ul>
Nayagarh - Ranpur Block	11- 05 -2019	for families covered under food security <ul style="list-style-type: none"> <li>- INR 2000</li> <li>- 50 kg rice</li> <li>- Polythene or INR 500 in case polythene is not available</li> </ul> for non-card holders <ul style="list-style-type: none"> <li>- 50 kg rice</li> </ul>
Cuttack <ul style="list-style-type: none"> <li>- Niali Block</li> <li>- Kantapada Block</li> </ul>	16- 05 -2019	for families covered under food security <ul style="list-style-type: none"> <li>- INR 2000</li> <li>- 50 kg rice</li> <li>- Polythene or INR 500 in case polythene is not available</li> </ul> for non-cardholders in <ul style="list-style-type: none"> <li>- 50 kg rice</li> </ul>



Source: OSDMA website, 2019.

**Table 4: Livelihood support**

Sector	Support
Agriculture	<p>Input Subsidy for small and marginal Farmers with loss of 33% and above</p> <ul style="list-style-type: none"> <li>- INR 6,800 per ha for rainfed/non-irrigated lands or INR 1,000, whichever is maximum</li> <li>- INR 13,500 per ha for land under assured irrigation or INR 1,000, whichever is maximum</li> <li>- INR 18,000 per ha for perennial crops or INR 2,000, whichever is maximum</li> </ul> <p>In addition, incentives, subsidies, loan extensions for selected numbers</p> <p>Input subsidy for tree plantations</p> <p>INR 500 for damager coconut tree (max 25 trees per farmer)</p>
Animal rearing	<p>Compensation for animal loss</p> <ul style="list-style-type: none"> <li>- INR 30,000 per mulch cow and buffalo</li> <li>- INR 25,000 per draught animals (up to 3 nos.)</li> <li>- INR 16,000 per calf (up to 6 nos.)</li> <li>- INR 3,000 per goat (up to 30 nos.)</li> <li>- INR 50 per bird (maximum INR 5,000)</li> </ul> <p>Additional support for construction of cow sheds and goat sheds, assistances for animal feed and medicines, fodder, goat, and poultry for selected numbers.</p> <p>75% subsidy, limited to INR 1,00,000 per unit of 500 birds for 2,000 poultry units</p>
Fisheries	<p>Marine and Chilika fishermen</p> <ul style="list-style-type: none"> <li>- INR 40,000 for FRP boat replacement (max 6,000)</li> <li>- INR 10,000 for nets (max 3,000 nos.)</li> </ul> <p>Inland fishermen</p> <ul style="list-style-type: none"> <li>- INR 15,000 for FRP boat replacement (max 500)</li> <li>- INR 10,000 for nets (max 500 nos.)</li> </ul> <p>Freshwater and brackish water aquaculture</p> <ul style="list-style-type: none"> <li>- INR 12,200 per ha for repair of dykes for 500 ha</li> <li>- INR 75,000 per ha as input assistance for 200 ha</li> </ul>
Handicrafts	<ul style="list-style-type: none"> <li>- INR 4,100 per artisan for 70,000 artisans for loss of raw material, tools/equipment, and goods</li> </ul>

Handlooms	- INR 4,100 per artisan for 60,000 weavers for loss of raw material, tools/equipment, and goods
SHGs	<ul style="list-style-type: none"> <li>- INR 10,000 for affected women SHGs for livelihood activities</li> <li>- INR 50,000 for women SHGs for damaged infrastructure/machines producing take home ration</li> <li>- INR 4,00,000 for Common Facility Centre for 268 nos. in extremely affected districts</li> <li>- INR 1,00,000 for 15,000 SHGs for providing loans to households in extremely affected districts</li> <li>- 10 lakhs SHG members will be enrolled under Aam Admi Bima Yojana in affected districts</li> <li>- INR 2,00,000 per cluster for 100 clusters for promotion of livelihoods</li> </ul>
Land revenue	<ul style="list-style-type: none"> <li>- 100% remission on land revenue cess for 2019-20 for all affected villages</li> <li>- 100% water rate exemption for 2019 Rabi season for farmers with over 33% loss</li> </ul>
Education	<ul style="list-style-type: none"> <li>- School and examination fees exemption up to high school level in government schools in affected areas</li> <li>- School uniform for children up to elementary school</li> <li>- 2 extra pairs in extremely affected areas</li> <li>- 1 extra pair in severely affected areas</li> </ul>
Street vendors	- INR 10,000 for 30,000 affected street vendors across 11 severely affected ULBs

**Source:** OSDMA website, 2019

## References

- Behera, S. K., Mohanta, R. K., Kar, C., & Mishra, S. S. (2014). Impacts of the Super Cyclone Phailin on Sea Turtle Nesting Habitats at the Rushikulya Rookery, Ganjam Coast, India. *Poultry, Fisheries & Wildlife Sciences*, 2(2). doi:10.4172/2375-446x.1000114
- Chari, M. (2019, May 13). Cyclone Fani: Dalits in Puri say they were turned away from shelters at height of storm. Scroll. Retrieved from <https://scroll.in/article/923211/cyclone-fani-dalits-in-puri-say-they-were-turned-away-from-shelters-at-height-of-storm>
- Daileda, C. (2019, April 2). Shelter for man and beast: Can India's cyclone refuges protect all? Retrieved from <http://news.trust.org/item/20190402005327-0avin/>
- Odisha State Disaster Management Authority (2019). Situation report on extremely severe cyclonic storm – Fani. Retrieved from GoO website: <http://www.osdma.org/fanidownloads/SITREP-FANI12052019%20-10-30AM.pdf>
- Odisha State Disaster Management Authority. (2019). *Chief Minister's package for livelihood support for the persons affected by cyclone Fani*. Retrieved from <http://www.osdma.org/fanidownloads/CMPkgLivelihoodsupport.pdf>
- Pattnaik, Sudhir. "Multipurpose Cyclone Shelters and Caste Discrimination." *Economic & Political Weekly* 54.21 (2019): 13.
- UN, ADB, and World Bank (2019). "Cyclone Fani: Damage Loss and Needs Assessment". Government of Odisha. Available at: [http://digitallibrary.in.one.un.org/TempPdfFiles/3965\\_1.pdf](http://digitallibrary.in.one.un.org/TempPdfFiles/3965_1.pdf) (Retrieved on 01 June 2019)









**iihs**®

INDIAN INSTITUTE FOR  
HUMAN SETTLEMENTS

**IIHS BENGALURU CITY CAMPUS**

197/36, 2<sup>nd</sup> Main Road, Sadashivanagar, Bengaluru 560 080. India.  
T +91 80 6760 6666 | F +91 80 2361 6814

**IIHS CHENNAI**

Floor 7A, Chaitanya Exotica, 24/51 Venkatnarayana Road, T Nagar  
Chennai 600 017. India. T +91 44 6630 5500/6555 6590

**IIHS DELHI**

803, Surya Kiran, 19, Kasturba Gandhi Marg, New Delhi 110 001. India.  
T +91 11 4360 2798 | F +91 11 2332 0477

**IIHS MUMBAI**

Flat No. 2, Purnima Building, Patel Compound, 20-C, Napean Sea Road  
Mumbai 400 006. India. T +91 22 6525 3874

**[iihs.co.in](http://iihs.co.in)**